

PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
=

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ROYAL GEOGRAPHICAL SOCIETY
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The Bahrein Islands, in the Persian Gulf.

By J. THEODORE BENT.

(Read at the Evening Meeting, November 25th, 1889.)

Map, p. 56.

THE group of islands known as the Bahrein (Arabic dual form of Bahr, i. e. two seas) lies in a bay of the same name about 20 miles off the coast of El Hasa, in Arabia, in the Persian Gulf. Bahrein, the largest, is 27 miles long by 10 wide. It is almost a dead level of sandy desert, relieved by palm-groves, where there is a good supply of water and occasional patches of cultivation. In the centre of the island are found rocky hills, 400 feet high, of limestone formation; they are called Jebel Dukhan, or "the mountain of mist," doubtless from the fact that they are frequently enveloped in sea mist, the cause of the extreme unhealthiness of these islands during the summer heats. The rest of the island is of coral formation. Around Jebel Dukhan is a depression skirted by low cliffs. The second island in point of size is Moharek, north of Bahrein, and separated from it by a strait one mile broad; it is of horseshoe form, seldom more than half a mile broad, and is about five miles in length. The rest of the group are mere rocks: Sitrah, four miles long, with a village on it of the same name; Nebbi-Saleh; Sayeh, and Khaseifah, and to the east of Moharek, Arad, three-quarters of a mile in length, with its date-grove, and a large double fort thereon of Portuguese construction, either an island or a peninsula at low tide. Arad is the only island which retains its ancient name; the others, according to Strabo, Pliny, and Ptolemy, having been called Tyros or Tylos, and Tharros.

The sea all round the Bahrein is remarkably shallow. Two coral reefs run out from Bahrein and Moharek respectively, which shut in the harbour, and through which large vessels cannot pass; but the harbour is sufficiently deep for good-sized *baghalows* until quite close to the shore, which no boats can approach, and landing has to be effected on the backs of the celebrated white donkeys of Bahrein, a breed noted all over the East for strength and swiftness; their tails, manes, and flanks are usually

decorated with henna, and as the rider is provided with no reins or stirrups, the transit to the shore is effected not without considerable inconvenience to the inexperienced.

The shallowness of the sea between Bahrein and the mainland has contributed considerably to the geographical and mercantile importance of the Bahrein. Ptolemy in his map places Gerrha, the mart of ancient Indian trade, and the starting-point for caravans on the great road across Arabia, just opposite where El Katif is now.

Classical authors, as we shall see later, with good reason assign the original home of the mercantile Phœnicians to these islands. The Portuguese recognised the importance of Bahrein, and took it in 1521, and built one of their principal forts in the Persian Gulf thereon. The great Portuguese explorer, Albuquerque, wrote on October 20th, 1514, to the King of Portugal,* stating its favourable position, and asserting that with Hormuz and Bahrein in Portuguese hands, the Persian Gulf would be entirely in their power. Major Durant, in a consular report, states it as his opinion that, "under a settled government, Bahrein could be the trading place of the Persian Gulf for Persia and Arabia, and an excellent harbour near the warehouses could be formed." No big vessels can approach the opposite coast of Arabia, hence, in olden days, when the caravan trade passed this way, all goods must have been transhipped to smaller boats at Bahrein.

The Bahrein Islands have been celebrated for their pearl fisheries ever since the days of the *Periplus of Nearchus* in the time of Alexander the Great. The chief commercial town, Manameh, on Bahrein, is inhabited by pearl merchants and divers. The merchants dwell in towers of certain architectural merit, a style of architecture borrowed from the neighbouring coast of El Hasa, strictly Saracenic. We inhabited one of these towers during our stay—a square room 16 feet, with 26 unglazed windows and a door, so there was plenty of circulation of air. The divers, chiefly negro slaves from Africa, dwell in bamboo huts along the coast. These divers resent all attempts at improvements in the way of diving apparatus, &c.; the loop and stone, the horn protection for the nose, and oil for the orifice of the ear, being all the paraphernalia required.

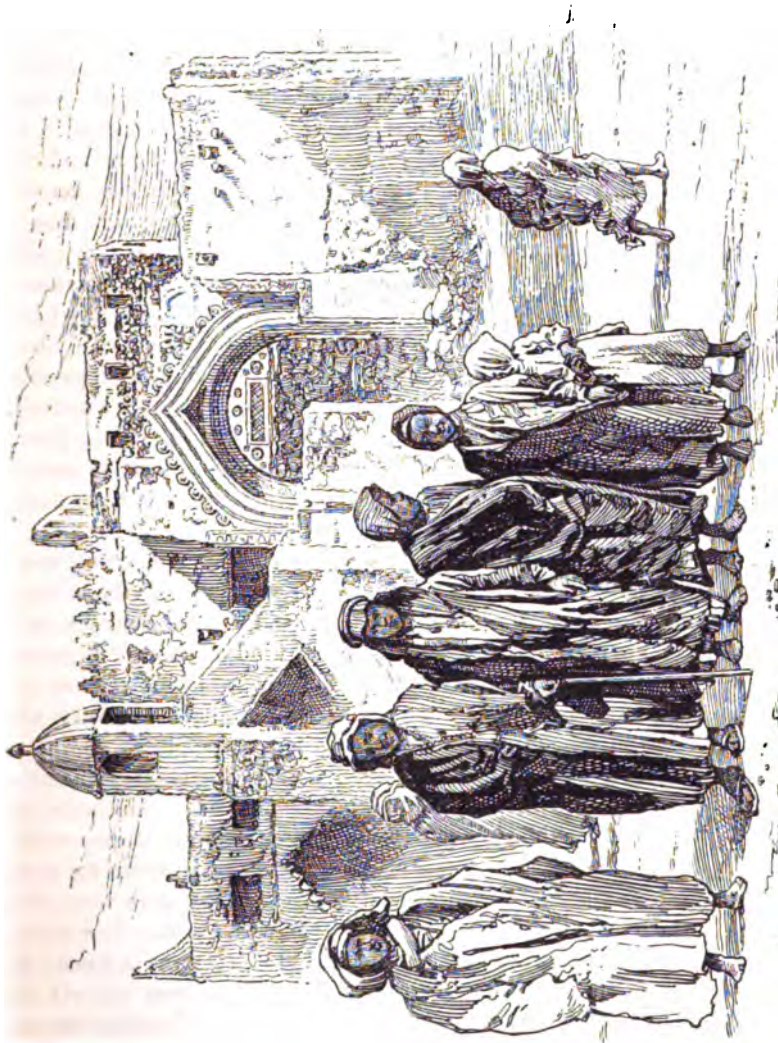
Albuquerque, in his commentaries,† thus speaks of Bahrein pearl-fishing in 1510:—"Bahrein is noted for its large breeding of horses, its barley crops, and the variety of its fruits; and all around it are the fishing grounds of seed pearls, and of pearls which are sent to these realms of Portugal, for they are better and more lasting than any that are found in any other of these parts." This is also the verdict of the modern pearl merchants, who value Bahrein pearls as more lasting and harder above those even of Ceylon. Evidently Albuquerque got an order from his sovereign for pearls, for he writes,‡ in 1515, that he is getting the

* 'Cartas de Alfonso de Albuquerque,' p. 264. † Published by the Hakluyt Society.

‡ 'Cartas de Alfonso de Albuquerque,' p. 328.

pearls which the king had ordered for "the pontifical of our lady," and in their dealings the pearl merchants of Bahrein still make use of the old Portuguese weights and names.

At present the pearl fisheries employ about 400 boats, of from eight



MOSQUE AT MANAMEH.

to twenty men in each. Each boat pays a tax, which goes to the sheikh, and the season for fishing is from April to October.

Manameh, the commercial capital of Bahrein, is a long, narrow town extending for nearly two miles along the shore; it has a few barn-like mosques with low minarets. For the inhabitants along the coast are

chiefly Arabs, of the fanatical sect of Wahabi, who object to any mosque, decoration, or ritual; whereas the inhabitants of the inland villages are mostly of the Shiite, or Persian sect, pointing to the supremacy of Persia in the islands in former years. Manameh has about 8000 inhabitants, and an active, though exceedingly dirty bazaar.

The sea between Manameh and Moharek is alive with strange craft: the *baghalow* of the Persian Gulf, with long prow decorated with shells, and huge grip, which makes it a boat easily turned in a squall; the companion is usually elegantly carved, and in the shallow waters it is propelled by poles, or oars made of poles, with pieces of board tied on with twine and used as paddles. Many of them have curious-shaped stone anchors, and water-casks of uniform and, doubtless, old-world shape. The sheikh has some fine war-vessels, called *Batfls*, which did good execution about fifty years ago, when the Sultan of Oman and the rulers of El Hasa tried to seize Bahrein, and a naval battle took place, in which the Bahreini were victorious in the shallow sea off the coast. Now that the Gulf is practically English and piracy at an end, these vessels are more ornamental than useful. His large *baghalow*, which mounted ten guns, and was called the *Duniyah*, is now employed in trade. Then there are the bamboo skiffs, an exceedingly primitive form of canoe used in all the fishing villages round the coast, with decks flush with the sides, and requiring great skill in managing.

In the sea, sometimes a mile from the shore, men may be seen wading and collecting sea-weeds, which form a staple diet for both men and cattle on the islands. They give sea-weed to the donkeys and camels, and for their cows they make a curious kind of cake with green dates, date-stones, and fish-bones boiled together, which is said to be excellent for producing milk. Fish is a very staple commodity all through the island, and one can realise how the Greeks placed on these coasts their fish-eaters and tortoise-eaters. The bazaars of Manameh are full of stockfish for the consumption of the natives. The floors of their bamboo huts and the tiny courtyards in front are all strewn with the helix shells; the favourite game of men and boys is spinning tops made out of whelk-shells, which I really believe must have been the original pattern from which our domestic toy was made. The door-posts of their huts are often made of whales' teeth; a great traffic is done in sharks; the cases for their swords and daggers are all of shagreen. The Gulf well deserves the name given to it by Ptolemy of the *Ichthyophagorum sinus*.

At low tide you can cross over from Manameh to Moharek on donkey-back. In the centre of the strait is an old dismantled Portuguese fort, used only by the sheikh as a stable for his fine breed of Arab horses. The town of Moharek is about the same size as Manameh; it is the seat of government, the aristocratic capital, whereas Manameh is given over to the pearl merchants. Moharek is the home of the sheikh

and his relatives of the royal house of El Kalifah. The El Kalifah originally held the kingdom of El Hasa too, on the mainland opposite, but they were driven out by the Turks about fifty years ago, and now the Bahrein Islands is all that is left to them of their former extensive territories.

The El Kalifah are the chiefs of the Uttubi tribe of Arabs. Sheikh Esau, the present head of the family and sovereign lord of Bahrein, owes the possession of his throne entirely to English protection. In 1867 the Shah of Persia aimed at acquiring Bahrein, though his only claim to it was based on the fact that Bahrein had been an appanage of the Persian crown under the Suffavean kings. He instituted a revolt on the island, adopted a claimant to the sheikhdom, and got him to hoist the Persian flag. Our ships blockaded Bahrein, intercepted letters, and obliged the rebel sheikh to quit. Then it was that we took the islands under our protection. In 1875 the Turks caused trouble, and the occupation of Bahrein formed part of their great scheme of conquest in Arabia. Our ship the *Osprey* appeared on the scene, drove back the Turks, and transported to India several sheikhs who were hostile to the English rule, and placed Sheikh Esau under British protection on the throne, under which he happily rules to this day.

One of Sheikh Esau's palaces is at Moharek, and here he holds his court in the winter-time. When we visited him, the courtyard of his palace, which recalls the Alhambra somewhat in its architectural features, was crowded with Arab chiefs in all manner of quaint costumes, the royal family being always distinguished from the others by their red handkerchiefs bound round by akkals or rings of camel's hair bound with gold. My wife got a photograph of a group of them resting on their guns, and with their kanjars or sickle-shaped daggers by their sides. We took Prince Mohamed, the heir apparent, and the stout Seid ben Omar, the prime minister of Bahrein, or, as he is called, the bazaar master, i. e. minister of commerce. But Sheikh Esau refused to place his august person within reach of our camera. Sheikh Esau gave us cups of bitter coffee, followed by cups of sweet cinnamon tea, a disagreeable custom at first to those accustomed to take their coffee and sugar together. The coffee-pots of Bahrein are quite a speciality, also coming from El Hasa, which appears to be the centre of art in this part of Arabia. With their long beak-like spouts and concentric circles with patterns on, these coffee-pots are a distinct feature. In the bazaars of Manameh and Moharek coffee-vendors sit at every corner with some huge pots of a similar shape simmering on the embers; in the lid are introduced stones to make a noise and attract the attention of the passers by. Coffee-shops take the place of spirit and wine shops on the island, which in this strict Wahabi country would not be for a moment tolerated.

Besides the coffee-pots, other objects of El Hasa workmanship may

be seen in Bahrein. Every household of respectability has its wooden bowl with which to offer visitors a drink of water; these are beautifully inlaid with silver in very elaborate patterns. Also the guns used by Bahreini sportsmen are similarly inlaid, and the camel-saddles of



SHEIKH SEID BEN OMAR IN SHEIKH ESAU'S PALACE.

the sheikhs are most beautifully decorated on the pommels in the same style.

The old weapons of the Beduin Arabs are still in use in Bahrein—the long lance which is put up before the tent of the chief when he goes about, the shield of camel's skin decorated with gold paint and brass

knobs, the coat of mail, and other objects of warfare belonging to an age long gone by.

Walking through the bazaars one is much struck by the quaint huge iron locks, some of them with keys nearly two feet long, and ingeniously opened by pressure of a spring. In the commoner houses the locks and keys are all of wood. In the bazaars, too, you may find that queer el Hasa money called Towilah, or "long bits"—short bars of copper doubled back and compressed together, with a few characters indicating the Prince who struck them. Cooking is done on tiny little braziers for charcoal, holding merely sometimes a spoonful of live coal; these little things look remarkably like the fire altars of old Zoroastrian days.

The town of Moharek gets its water supply from a curious source, springing up from under the sea. At high tide there is about a fathom of salt water over the spring, and water is brought up either by divers who go down with skins, or by pushing a hollow bamboo down into it. At low tide there is very little water over it, and women with large amphoræ and goat-skins, which look very real and life-like though headless, wade out and fetch what water they require. This source is called Bir Mahab, and there are several of a similar nature on the coast around, the Kaseifah spring and others.

The legend is that in the time of Merwan, a chief Ibn Hakim, from Katif, wished to marry the lovely daughter of a Bahrein chief. His suit was not acceptable, so he made war on the islands, and captured all the wells which supplied the towns on the bigger island; but the guardian deity of the Bahreini caused this spring to break out in the sea just before Moharek, and the invader was thus in time repulsed. It is a curious fact that Arados, the Phœnician town on the Mediterranean, was supplied by a similar submarine source. The force of the stream as it comes out of the earth is so considerable that it pushes back the salt water and does not get impregnated.

In their ordinary life the Bahrein people still retain the primitiveness of the Beduin. At the two inland villages of Rufaà—"mountainous Rufaà" or Rufaà Jebeli, so-called because it is situated on the edge of the low cliff before alluded to which skirts the central depression, and Rufaà Shergeh—we stayed at the house of Sheikh Khallet, a strict Wahabi, who does not allow smoking or alcoholic drinks in his house. The Rufaà are much older than Moharek or Manameh, fortified villages with castellated walls of mud bricks; here many of the El Kalifah family reside in comfortable houses. Sheikh Sabas, who has been in India, has decorated his room with trophies from Bombay, but Sheikh Khallet's room has no furniture whatsoever save the matting with which his floor is strewn. The courtyards of these houses are architecturally interesting: the Saracenic arch, the rosettes of openwork stucco, the squares of the same material with intricate

patterns—great boons in a hot land to let in the air without the sun. There is also another contrivance for obtaining air; in building the house a niche three feet wide is left in the outer wall, closed in on the inner except for about a foot. It is funny to see the heads of muffled women peering out of these air-shafts into which they have climbed to get an undisturbed view. Here some of the women wear the Arabian *buttra* or mask, which whilst it hides their features gives their eyes full play. They are very curious. Some of the women one meets on Bahrein are highly picturesque when you see them without the dark-blue covering; they wear red petticoats and orange-coloured drawers down to their heels, aprons of gold coins, and gold bracelets and turquoise rings. Carrying on their heads baskets of huge citrons they look very well, but if they see the dangerous animal man coming they dart behind a palm-tree till he has passed. Some are very superstitious, and we felt great contempt for the good ladies of Ali who refused to pollute themselves by washing infidel clothes, and obliged us to employ a washerman instead. Occasionally we got a good peep at the women as they were working in the fields or cutting with sickle-like saws the scrub that grows in the desert for their cattle.

Sheik Mohamed's palace at Rufaà Gebeli is interesting; he is nephew of Sheik Esau, and heir-apparent to the sheikdom.

From the Rufaà we visited the fishing village of Asker, where we reclined during the heat of the day to rest in one of the bamboo huts paved with helix shells and which we found delightfully cool, and then remounting our camels proceeded to examine Jebel Dukhan, an escarped mass of limestone rocks with rugged outline and deep caves: from the summit Bahrein looks like a sheet of oatcake floating on the waves. On the surrounding desert a small gazelle is abundant. One day we came across a cavalcade of Bahreini sportsmen, who looked exceedingly picturesque in their flowing robes and akkals, and riding gaily caparisoned horses, with crimson trappings and gold tassels. Each had on his arm a hooded falcon and by his side a Persian greyhound. When the gazelle is sighted the falcon is let loose, it skims rapidly along the ground, attacks the head of the animal and so confuses it, that it falls an easy prey to the hounds in pursuit. Albuquerque in his Commentaries says, "There are many who hunt with falcons about the size of our goshawks, and take by their aid certain creatures smaller than gazelles, training very swift hounds to assist the falcons in catching the prey."

There are about fifty villages scattered over the islands, recognisable from a distance by their patch of cultivation and groups of date-palms. Except at Manameh and Moharek they have little or nothing to do with the pearl fisheries, but are an exceedingly industrious race of peasants who cultivate the soil by means of irrigation from the numerous wells with which this island is blessed. These wells are worked like Indian wells, by donkeys and bullocks and a running slope, so that the buckets

or skins for water descend as the animals ascend and *vice versâ*. There are generally three to six small wheels attached to the beam, over which the ropes of as many large leathern buckets pass. When these buckets rise full they tilt themselves over, and the contents are taken by little channels to a reservoir which feeds the dikes and are transferred to the palms by buckets raised by the leverage of a date-trunk lightly swung by ropes to a frame, and balanced at one end by a basket of earth into which it is inserted, and is so light to lift that women are generally employed in watering the trees.

After leaving Manameh and passing Sheikh Esau's summer palace, just a large fortified enclosure, in which his followers pitch their tents, with one room over the entrance for his majesty, the belt of palms is reached which extends for several miles, and is from two to three miles in width. This district produces some of the best palms in the Persian Gulf. We witnessed the artificial fructification of the date-palms when we were there. The long male spathes are cut off, dried for twenty hours, and sold in the markets; two or more flower-twigs are inserted into the female flower, and the fructification thus effected.

Green dates (*salang*) are given to the donkeys for fodder, and to this the Bahreini attribute their exceptionally good breed. They make *sheerah* for their own consumption out of dates dried for three days; then date-juice is poured over them and sesame seeds, walnuts, or ginger powder mixed with them. For exportation the dates are dried and the date-juice allowed to run off in the *madabash*, and then they are packed in date-leaf baskets. To manure their date-groves they use the fins of a species of ray-fish called *awal*, which, by the way, was an ancient name of the Island of Bahrein.

This area of fertility is very rich and beautiful; it extends all along the north coast of the island, and the fishing village of Nayim, with its bamboo huts nestling beneath the palm-trees, is highly picturesque; and all this fertility is due to the number of fresh-water springs which burst up here from underground, similar, no doubt, to those before alluded to which spring up in the sea. The Arabs will tell you that these springs come straight from the Euphrates by an underground channel by which the great river flows beneath the Persian Gulf, reminding one, and doubtless being the same legend alluded to by Pliny when he says, "Flumen per quod Euphratem emergere putant." There are many of them—the Garsari well, Uhm-i-Shaun, Abu Zeidan, and the Adari, which last supplies many miles of date-groves through a canal of ancient workmanship. The Adari well is one of the great sights of Bahrein, being a deep basin of water 22 yards by 40 long, beautifully clear, and full of prismatic colours. It is said to come up with such force from underground that a diver is driven back, and all around it are ruins of ancient date, proving that it was prized by former inhabitants as a bath. The water is slightly brackish, as is that of all these sources, so that

those who can afford it send for water to a well between Rufaà Gebeli and Rufaà Shergeh—one of the sights of the island—called Hanaini, which is exceedingly good, and camels laden with skins may be seen coming into Manameh every morning with this treasure.

The other well, Abu Zeidan, is situated in the midst of the ruins of the old Arab town known now as Beled el Kadim, or "old town." This is built round, and is reserved for the private use of Sheikh Esau and his family. Adjoining it he has a tiny mosque, where he says his prayers and drinks his coffee during the hot summer weather.

This ancient capital, dating from a period prior to the Portuguese occupation, still presents some interesting ruins. The old mosque (Madressah-i-abu Zeidan), with its two slender and elegant minarets, so different from the horrible Wahabi constructions of to-day, forms a conspicuous landmark for ships approaching the low-lying coasts of these islands. Around the body of the mosque runs a fine inscription in Cufic letters, and from the fact that the name of Ali is joined with that of the Prophet in the profession of faith, we may argue that this mosque was built during some Persian occupation, and was a Shiitè mosque. The architecture, too, is distinctly Persian, recalling in its details the ruins of Rhey or Sultanieh in the north of Persia, and has nothing Arabian about it.

Ruins of houses and buildings surround this mosque, and here in the open space in the centre of the palm-groves the Bahreini assemble every Thursday for a market; in fact the place is more generally known now as Suk-el-Khamis, or Thursday's market. We attended one of these gatherings, and were much struck with the picturesqueness of the scene, to which the mosque minarets and waving palm-trees lent an agreeable background.

About a mile from Beled el Kadim is the garden of Sheikh Esau, where amidst a perfect jungle of hibiscus, acacia, pomegranates, and other trees he passes much of his time in summer. Again another closer to the sea is the fine ruined fortress of the Portuguese, Gibliah, as the natives call it now, just as they do one of the two fortresses at Muscat. It covers nearly two acres of ground, and is built out of the remains of the old Persian town, for many Cufic inscriptions are let into the wall, and the deep well in the centre is lined with them. It is a regular bastioned fortification of the sixteenth century, with moat, embrasures in the parapets, and casemented embrasures in the re-entering angles of the bastions, and is one of the finest specimens of Portuguese architecture in the Gulf, attesting to the importance with which they looked upon this island.

The Portuguese rule in Bahrein and in the Persian Gulf generally forms a very interesting episode, unfortunately but little known, in the history of commercial enterprise. The Portuguese were the first Europeans to enter the Persian Gulf and give an account of themselves

since the days of Alexander the Great and Nearchus. It was, in fact, for many years a Mahommedan lake, closed to the infidel. The great explorer Albuquerque was the man who again opened out this district to Europeans. Early in the sixteenth century (1504), Albuquerque urged the occupation of the Gulf. In 1506 three fleets went to the East under the command of Tristan d'Acunha, with Albuquerque as second in command. Tristan soon took his departure further afield, and left Albuquerque in command. This admiral first attacked and took Hormuz, then governed by a king of Persian origin. Here and at Muscat he thoroughly established the Portuguese power, thereby commanding the entrance into the Gulf. From Barros' account it would appear that the King of Bahrein was a tributary of the King of Hormuz, paying annually 40,000 pardaos, and from Albuquerque's letters we read that the occupation of Bahrein formed part of his scheme. In fact, Albuquerque's scheme at that time would appear to have been exceedingly vast and rather chimerical, namely, to divert the Nile from its course and let it flow into the Red Sea, ruin Egypt, and bring the India trade via the Persian Gulf to Europe. Of this scheme we have only the outline, but beyond establishing fortresses in the Gulf it fell through, for Albuquerque died, and with him his gigantic projects.

The exact date of the occupation of Bahrein by the Portuguese I have as yet been unable to discover; but in 1521 we read of an Arab insurrection in Bahrein against the Persians and Portuguese, in which the Portuguese factor, Ruy Bale, was tortured and crucified.

Sheikh Hussein bin Said, of the Arabian tribe of Ben Zabia, was the instigator of this revolt. In the following year the Portuguese governor, Dom Luis de Menezes, came to terms with him, and appointed him Portuguese representative in the island.

A few years later, one Ras Bardadim, Guazil or Governor of Bahrein, made himself objectionable, and against him Simeon d'Acunha was sent. He and many of his men died in the expedition of fever, but the Portuguese power was again restored.

The Turks were the next enemies that the Portuguese had to deal with, and their defeat by the Portuguese off Muscat, in 1554, is considered by Turkish historians to have dealt a more effectual blow at their power than the better known battle off Corone, when Andrea D'Oria defeated Barbarossa and obliged Solyman to relinquish his attempt on Vienna.

Towards the close of the sixteenth century the Portuguese came under the rule of Spain, and from that date their power in the Persian Gulf began to wane. Their soldiers were drafted off to the wars in Flanders instead of going to the East to protect the colonies: and the final blow came in 1622, when Shah Abbas of Persia, assisted by an English fleet, took Hormuz, and then Bahrein. Twenty years later a company of Portuguese merchants, eager for the pearls of these islands,

organised an expedition from Goa to recover the Bahrein, but the ships were taken and plundered by the Arabs before ever they entered the Gulf.

Thus fell the great Portuguese power in the Gulf, the sole traces of

which now are the numerous fortresses, such as the one on Bahrein. Amongst the débris in the fort we picked up numerous fragments of fine nankin and celadon china, attesting the ubiquity and commerce of the former owners, and attesting, too, the luxury of the men who ruled here—a luxury as fatal almost as the Flanders wars to the well-being of the Portuguese in the East.

From 1622 up to this century the contest in Bahrein has been one between the Arabians and Persians, and as the Persian power has been on the wane the Arabian star has been in the ascendant. In 1711 Sultan bin Seif wrested Bahrein from Persia. In 1784 the tribe of the Uttubi from El Hasa got it, and have held it ever since, despite the attempts of Seyid Said, of Oman, the Turks, and the Persians, and if Sheikh Esau and his successors are willing to submit to the British Protectorate, the El Kalifah family will probably continue to reign as long as the English are the virtual owners of the Gulf.

Leaving the palm-groves and the Portuguese fortress behind us, we re-entered the desert to the south-west. Here we came upon what is



THE MOUNDS AT ALI.

really the greatest curiosity of Bahrein, to investigate which was our real object in visiting the island, namely, the vast sea of sepulchral mounds, which extends as if from a culminating point at a village called Ali, just on the borders of the date-groves; at this point the mounds reach an elevation of over 40 feet, and as they extend further southwards they diminish in size, until miles away in the direction of Ruffa we found mounds elevated only a few feet above the level of the desert, and some mere circular heaps of stones. This is a vast necropolis of some unknown race, to discover which was our object in excavating. There are many thousands of these tumuli extending over an area of desert for many miles. There are isolated groups of mounds in other parts of the islands, and a few solitary ones are to be found on the adjacent islets, on Moharek, Arad, and Sitrah.

Our attention was first given to the larger mounds, situated at the northern corner of the group near Ali, from which village we were able to obtain workmen of an indifferent kind. We pitched our tents under the immediate shadow of one of them in the desert, and commenced operations under considerable disadvantages with regard to both workmen and tools.

Complete uncertainty exists as to the origin of these mounds and the people who constructed them. But from classical references and the results of our own work, there can now be no doubt that they were of Phœnician origin. Herodotus (ii. 89) gives us as a tradition current in his time that the forefathers of the Phœnician race came from these parts. The Phœnicians themselves believed in it: "It is their own account of themselves," says Herodotus; and Strabo (xvi. iii. 4) brings further testimony to bear on the subject, stating that two of the now called Bahrein Islands were called Tyros and Arados. Pliny follows in Strabo's steps, but calls the island Tylos instead of Tyros, which may be only an error of spelling.

Ptolemy in his map places Gerrha, the mart of ancient Indian trade and the starting-point for caravans on the great road across Arabia, on the coast just opposite, near where the town of El Katif now is, and accepts Strabo's and Pliny's names for the Bahrein Islands, calling them Tharros, Tylos or Tyros, and Arados. The fact is that all our information on the islands prior to the Portuguese occupation comes from the *Periplus of Nearchus*. Eratosthenes, a naval officer of Alexander's, states that the gulf was 10,000 stadia long from Cape Armozum, i. e. Ormuz, to Teredon (= Koweit) and the mouth of the Euphrates. Androstenes of Thasos, who was of the company of Nearchus, made an independent geographical survey of the gulf on the Arabian side, and his statements are that on an island called Icaros, now Peludji, just off Koweit, he saw a temple of Apollo. Southwards, at a distance of 2400 stadia, or 43 nautical leagues, he came on Gerrha, and close to it the islands of Tyros and Arados, "which have temples like those of the Phœnicians," who

were, the inhabitants told him, colonists from these parts. From Nearchus too we learn that the Phœnicians had a town called Sidon or Sidodona in the gulf, which he visited, and on an island called Tyrine was shown the tomb of Erythras, which he describes as "an elevated hillock covered with palms," just like our mounds, and Erythras was the king who gave his name to the gulf. Justin accepts the migration of the Phœnicians from the Persian Gulf as certain; and M. Renan says, "The primitive abode of the Phœnicians must be placed on the Lower Euphrates, in the centre of the great commercial and maritime establishments of the Persian Gulf" (*Hist. des langues sémitiques*, vol. ii. p. 183). As for the temples, there are no traces left, and this is also the case in Syrian Phœnicia; doubtless they were all built of wood, which will account for their disappearance. When we ourselves, during the course of our excavations, brought to light objects of distinct Phœnician provenance, there would appear to be no room for doubt that the mounds which lay before us were a vast necropolis of this mercantile race, and that either of two suppositions must be correct, firstly, that the Phœnicians originally hailed from here before they migrated to the Mediterranean, that this was the land of Punt from which the Puni got their name, a land of palms like the Syrian coast from which the race got their distorted Greek appellation of Φοίνικες; or, secondly, that these islands were looked upon by them as a sacred spot for the burial of their dead, like the Hindoo looks upon the Ganges, or the Persian regards the shrines of Kerbela and Meshed. I am much more inclined to the former supposition, judging from the mercantile importance of the Bahrein Islands and the excellent school it must have been for a race which was to penetrate to all the then known corners of the globe, to brave the dangers of the open Atlantic, and to reach the shores of Britain in their trading ventures; and if nomenclature goes for anything, the name of Tyros and the still existing name of Arad ought to confirm us in our belief and make certainty more certain.

We commenced operations on one of the largest of the mounds; its dimensions were as follows: 35 feet in height, 76 feet in diameter, and 152 paces in circumference. We chose this in preference to the higher mounds, the tops of which were flattened somewhat and suggested the idea that they had fallen in. Ours, on the contrary, was quite rounded on the summit and gave every hope that in digging through it we should find whatever was inside in *statu quo*. At a distance of several feet from most of the mounds are traces of an outer encircling wall, similar to walls found around certain tombs in Lydia, and this encircling wall was more marked around some of the smaller and presumably more recent tombs at the outer edge of the necropolis; in some cases several mounds would appear to have been clustered together and to have had an encircling wall common to them all.

We dug from the top of our mound for 15 feet with great difficulty,

through a sort of conglomerate earth, nearly as hard as cement, before we reached anything definite. Then suddenly this close earth stopped, and we came across a layer of large loose stones, entirely free from soil, which layer covered the immediate top of the tombs for two feet. Beneath these stones, and immediately on the top of the flat slabs forming the roof of the tomb had been placed palm branches, which in the lapse of ages had become white and crumbly, and had assumed the flaky appearance of asbestos. This proved that the palm flourished on Bahrein at the date of these tombs, and that the inhabitants were accustomed to make use of it for constructive purposes.

Six very large slabs of rough unhewn limestone, which had obviously come from Jebel Dukhan, lay on the top of the tomb, forming a roof. One of these was six feet in length and two feet two inches in depth.

The tomb itself was composed of two chambers, one immediately over the other, and approached by a long passage, like the dromos of rock-cut Greek tombs, which was full of earth and small stones. This passage was 23 feet in length, extending from the outer rim of the circle to the mouth of the tomb. Around the outer circle of the mound ran a wall of huge stones, evidently to support the weight of earth necessary to conceal the tomb, and large unhewn stones closed the entrance to the two chambers to the tomb at the head of the passage.

We first entered the upper chamber, the floor of which was covered with débris. It was 30 feet long, and at the four corners were four recesses two feet ten inches in depth, and the uniform height of this chamber was four feet six inches. The whole surface of the débris was covered with the tiny bones of the jerboa, that rat-like animal which is found in abundance on the shores of the Persian Gulf. We then proceeded to remove the débris and sift it for what we could find therein.

The chief objects of interest consisted in innumerable fragments of ivory, fragments of circular boxes, pendants with holes for suspension, evidently used as ornaments by this primitive race, the torso of a small statue in ivory, the hoof of a bull fixed on to an ivory pedestal, evidently belonging to a small statue of a bull, the foot of another little statue, and various fragments of ivory utensils. Many of these fragments had patterns inscribed on them—rough patterns of scales, rosettes, encircling chains, and the two parallel lines common to so many ivory fragments found at Kameiros, and now in the British Museum. In fact, the decorations on most of them bear a close and unmistakable resemblance to ivories found in Phœnician tombs on the shores of the Mediterranean, and to the ivories in the British Museum from Nimrud in Assyria, universally accepted as having been executed by Phœnician artists, those cunning workers in ivory and wood, whom Solomon employed in the building of his temple, and before the development of Egyptian and Greek art the travelling artists of the world. The ivory fragments we found are now in the hands of Mr. A. S. Murray, of the British Museum,

who writes to me as follows:—"I have not the least doubt, judging from the incised patterns, from bull's foot, part of a figure, &c., that the ivories are of Phœnician workmanship."

The pottery found in this débris offered no very distinctive features, except being coarse and unglazed, but the numerous fragments of ostrich shells, coloured and scratched with rough patterns in bands, also pointed to a Phœnician origin, or at least to a race of wide mercantile connection, and in those days the Phœnicians were the only people likely to combine in their commerce ostrich shells and ivory. We also found small shapeless pieces of oxidised metal, brass or copper.

No human bones appeared in the upper chamber, but those of a large animal, presumably a horse, but the chamber immediately beneath was much more carefully constructed; it was exactly the same length, but was higher, being six feet seven inches, and the passage was wider. It was entirely coated with cement, in which all round the walls at intervals of two feet were holes sloping inwards, in which in the second tomb we opened we found traces of wood, showing that poles had been inserted for hanging drapery upon. The ground of this lower chamber was entirely covered with a thin brown earth of a fibrous nature, somewhat in appearance resembling snuff; it was a foot in depth, and evidently the remains of the drapery which had been hung around the walls. Prior to the use of coffins the Phœnicians draped their dead,* and amongst this substance we found traces of human bones.

Thus we were able to arrive at the system of sepulture employed by this unknown race. Evidently their custom was to place in the upper chamber broken utensils and the corpse of an animal belonging to the deceased, and to reserve the lower chamber for the corpse enshrouded in drapery. For the use of this double chamber our parallels are curiously enough all Phœnician. Perrot, in his 'Art in Phœnicia,' gives us examples of two-storied tombs in the cemetery of Amrit, in Phœnicia, where also the bodies were imbedded in plaster to prevent decay prior to the introduction of the sarcophagus, reminding us of the closely cemented lower chamber in our mounds. A mound containing a tomb with one chamber over the other was last year observed in Sardinia, and is given by Della Marmora (part ii. pl. x. p. 73) as of Phœnician origin. Here, however, the top of the tomb is conical, not flat, as in our mounds, which would point to a later development of the double chamber which eventually blossomed forth into the lofty mausolea of the later Phœnician epoch and the grandiose tombs of Hellenic structure.

Also at Carthage, this very year, excavations have brought to light certain tombs of the early Phœnician settlers which also have the double chamber. In answer to Perrot's assertion that all early Phœnician tombs were *hypogea*, we may say that, as the Bahrein Islands offered no facility

* Perrot, 'Hist. of Art in Phœnicia.'

for this method of sepulture, the closely covered-in mound would be the most natural substitute.

Before leaving the tombs we opened a second and smaller one of coarser construction, which confirmed in every way the conclusions we had arrived at in opening the larger tomb. Near the village of Ali, one of the largest mounds has been pulled to pieces for the stones. By creeping into the cavities opened I was able to ascertain that the chambers in this mound were similar to those in the mound we had opened, only they were double on both stories, and the upper storey was also coated with cement; two chambers ran parallel to each other, and were joined at the two extremities.

Major Durand also opened one of the mounds, but unfortunately the roof of the tomb had fallen in, which prevented him from obtaining any satisfactory results; but from the general appearance, it would seem to have been constructed on exactly the same lines as our larger one. Hence, we had the evidence of four tombs to go upon, and felt that these must be pretty fair specimens of what the many thousands were which extended around us.

In conclusion, I may add that our researches in every way confirmed the statements of Herodotus, Strabo, and Pliny, that the original home of the Puni was the group of the Bahrein, and on quitting these islands we felt what a wonderful commercial pedigree these low-lying, unhealthy specks of earth had had. From Phœnicians we pass on to Portuguese, and from Portuguese to Englishmen, who now, as virtual lords of the Persian Gulf, are beginning to recognise their importance. If the Euphrates Valley Railway had ever been opened, if the terminus of this railway had been at Koweit, as it was proposed by the party of survey under the command of General Chesney, the Bahrein group would at once have sprung into importance, as offering a safe harbour in the immediate vicinity to this terminus. Bahrein is the Cyprus of the Persian Gulf, in fact. This day is, however, postponed indefinitely until such times as England, Turkey, and Russia shall see fit to settle their differences; and with a better understanding between these powers, and the development of railways in the East, the Persian Gulf will yet once more become a high road of commerce, and the Bahrein Islands will once more come into notice.

After the paper, which was illustrated by lantern-slides from photographs

Admiral LINDSAY BRNE said he visited the Bahrein Islands some years ago, and could confirm the description given in Mr. Bent's paper. The photographs which had been exhibited were, however, rather misleading in one respect. The Arabs were not such fearful people to look at as they appeared on the screen, some of them being very handsome men indeed. With regard to the supply of fresh water, it was quite true that there were several fresh-water springs under the sea in the harbour of Bahrein, in places where, in days gone by, the dhows would anchor. In order to obtain the water, a man would go down with a skin or jar and place it where the spring rose from the sea-bed, fill it, and bring it up. That was the way

in which the dhows generally obtained their supply of fresh water. He knew of no such springs in any other country, except in the harbour of Syracuse, where the fresh water rose up from the sea at a place where it was about 20 feet in depth.

Mr. CECIL H. SMITH (of the Department of Greek and Roman Antiquities, British Museum) said that he would only speak of the archæological interest connected with the questions arising out of Mr. Bent's paper. As far as the evidence went at present, he thought the Museum authorities were prepared to admit that the Bahrein Islands probably represented a primitive site of the Phœnician race. The mode of sepulture seemed certainly connected with that people. An enormous necropolis of large mounds like that at Bahrein was practically unique: it was true that a similar necropolis existed in Lydia, the burial-place of the early kings, but this was of considerably later date, and might have been remotely suggested by a Phœnician origin: on the other hand, the tomb chamber within the Lydian mounds was of different construction. The special feature of the burial system at Bahrein was the double construction, with one chamber over another, and this system seemed to be specially characteristic of the Phœnicians. Within the last two years the French excavations at Carthage had laid bare what was believed to be the necropolis of the earliest Phœnician settlers on that site, and the form of tomb was that of the double chamber. As to the great antiquity of the Bahrein mounds, a point of evidence worth noting was the fact that at present no inscriptions had been discovered there. Five mounds had now been opened: one by Captain Durand, another by officers of the *Sphinx*, and three by Mr. Bent, but no trace of inscriptions had yet been found. Another peculiarity was, that in almost all the necropoles connected with the Phœnicians, it was usual to find objects of glass, but in the mounds recently opened glass had not as yet been found. And yet we know that in later times at any rate Phœnician glass found its way in that direction. Three years ago, when he was in the Persian Gulf, he was given for the British Museum a bangle, which seemed undoubtedly of Phœnician glass: this had been found by the donor near the village of Pasni, on the coast of Baluchistan. At present the evidence was somewhat scanty, and rather negative than positive; but the character of the finds pointed to a primitive, unwarlike, trading race such as we know the Phœnicians in the Persian Gulf, previous to their migration, must have been. Mr. Bent's excavations would reopen the controversy which had raged among Egyptologists as to the identification of the land of *Punt*. This was frequently mentioned in the early Egyptian texts as some mysterious land to the north-east of Egypt, from which they got, amongst other products, that of incense. If the land of Punt or Puane could be connected with the primitive home of the Phœnicians, it would argue in favour of the etymological identity of the two forms. The Greek "Phœnix" (= Phœnician) has also the meanings which point to South Arabia. The difficulty in this identification had always lain in the fact that in the Egyptian texts referring to the inhabitants of the land of Punt mention is made of giraffes and negroes; this had led Mariette to believe that Punt could not be Arabia, but was rather Somaliland, the *regio cinnamomifera* of the ancients. The most recent authority, however, Schweinfurth, had produced botanical and other proof that the land of Puane or Punt must have included the whole of Southern Arabia as well as the opposite adjoining coast of the Red Sea. Now in the early texts, Puane is often associated with To Nefer, the "divine land," or more usually in the plural the "holy islands." If, therefore, Punt referred to Southern Arabia, it might be that To Nefer referred to islands like those of the Bahrein group, rendered holy in remote times as the burial-place of the people. In conclusion, he was glad of the opportunity of expressing the obligation which the British Museum and the public generally owed to Mr. and Mrs. Bent: for four years in succession they had now conducted researches,

at no small risk and discomfort to themselves, the results of which had been on each occasion most generously given to the British Museum.

The PRÆSIDENT said that Mr. Theodore Bent's paper proved that it was not necessary for a traveller who desired to give the Society valuable information to go in all cases very far from the ordinary routes of commerce. The members welcomed with delight the intelligence sent to them by those distinguished men who, taking their lives in their hands, crossed great continents and sent back information with regard to regions which were like new worlds; but they had also a warm welcome for others who gave them information without such sacrifices as Mr. Stanley had made. Mr. Bent seemed to have a peculiar liking for the exploration of islands. In the year 1885 he published an excellent work upon the Cyclades. Towards the end of last year he contributed to the 'Nineteenth Century' a very remarkable paper upon the island of Santorin in its connection with the New Testament. Quite recently he had written on the Princes' Islands, in the Sea of Marmora; and to-night he had given them a very instructive paper on the Bahrein group. Perhaps the most valuable portion of his paper was that in which he described his excavations in the mounds which he believed to be of Phœnician origin. Hitherto one of the things which it had been most difficult to believe in Herodotus had been his reiterated statement that the Phœnicians thought they originally came from the Erythræan Sea. It seemed in the present case, as in many others, that with increase of knowledge further confirmation was given to the general truth of the statements of the Father of History. In addition to the archæological information which he had given, Mr. Theodore Bent had communicated to them a great many very interesting observations with regard to the present state of the Bahrein Islands, and he (the President) was sure that he was the faithful interpreter of the meeting when he returned to Mr. Bent the thanks of the Society for his very instructive and agreeable paper.

*Progress of the Russian Expedition to Central Asia under
Colonel Pievtsoff.**

THE following is an extract from the first letter of Lieut. Roborovsky, describing the progress of the expedition into Central Asia, which was led at starting by General Prejevalsky and continued after the death of the leader by Colonel Pievtsoff. Lieut. Roborovsky had been a companion of Prejevalsky on his former expeditions. This letter was despatched on the 4th August, 1889, from a place to the south of the Yarkand Oasis.†

Our caravan left Prjevalsk on the 13th May for the village of Slivkina, where we were to join it. In the evening, Kozloff and I, in company with General Savrimovitch and Lieutenant-Colonel Korolkoff, who were then on service, went for the last time to the lake to say farewell and greet at the tomb of our beloved and never-to-be-forgotten chief, Nicholas Mikhailovitch Prejevalsky. We stayed there some hour and a half, and returned home much moved.

The 14th, in the morning, we paid some farewell visits, and towards 3 p.m. set

* Translated from the 'Russian Invalide,' Oct. 11/23rd, 1889.

† For map vide Prejevalsky in 'Proceedings R.G.S.,' 1887, p. 268, and Carey, *ibid.*, p. 790.

out from Prjevalsk in two post-troikas amidst the warm good wishes of the townsfolk, who had assembled to speed us on our way, and left behind us the dear grave, in the care of worthy people and guarded by the blue waves of the beautiful lake.

It rained hard and the wind blew sharp and cold. Five miles and a half brought us to the river Irdik. Wind and rain increased. Wrapped in dreams and thoughts of the most varied kinds, we did not at first notice our approach to the village of Slivkina, whose gardens we only observed when within three versts. At the commencement of the village, on the right-hand side as you enter it, is a fairly rich farm, built by a German, who collects in the neighbourhood insects and birds for the Berlin Museum, and who has evidently made himself very comfortable in a house of unbaked brick, with a good garden of young trees, a pond in front of the house, cattle, poultry—in short, he lives like a landed proprietor.

The village of Slivkina consists of about 120 houses, well built of unbaked brick, and planted round about with trees, mostly willows. There is a village school for boys and girls, but no church. On church holidays and the evenings before, the old men read the Gospel, and on very important occasions a clergyman comes over from Prjevalsk.

Many of the peasants, besides agriculture, employ themselves in cattle farming and apiculture, whilst gardening, under the encouragement of the Governor-General, already gives good results, and promises still better for the future. The peasants drive their cattle and sheep together with those of the Kirghis to pasture on the plateau of the Tian-Shan named Sirt. The population is composed of emigrants from various governments, the founder of the village, Slivkin, being still alive and apparently 80 years of age. He is from the Government of Tamboff, and settled here a great while ago amongst the Kirghis, who first learned agriculture from him. Twice has he journeyed on foot from Issik-kul to Kief to pray, and on the way looked in at home at Tamboff to greet his relations.

At 1 p.m. next day we commenced loading the camels, the villagers zealously helping, and about 3 p.m. the caravan, fully equipped, set out on its way in eight divisions, each led by one Cossack, with another behind every two divisions to keep order. The divisions marched at sufficient intervals to prevent any accidental stoppage of one throwing into confusion those behind. The rear was brought up by the sheep and our own camels without their burdens, which were carried over the Tian-Shan on camels hired from the Kirghis in order that our own beasts might reserve their powers for the long journey before us. Colonel Pietvoff, Kozloff, and I did not as yet take up any definite stations, so that we might ride up and down the whole length of the caravan and the more conveniently maintain the good order somewhat difficult for the young soldiers who were making their first essay in travel.

By 6 p.m. we had made about ten miles. The road lay flat over the clay, at first diverging from Issik-kul, and afterwards approaching that lake to within two or three miles. To the left were the lower slopes of the Tian-Shan. We bivouacked on an arik (irrigating canal) as the Kirghis assured us that there was no other water near, and at 7 p.m. were joined by Korolkoff from Prjevalsk, who wished to share our marching life, if only for a time. Clouds gathered, it began to drizzle, and the waves of the lake, which had hardly settled into calm, rose once more. Long we stood gazing at and admiring them and the mountain giants beyond them, whose sunny heads as the clouds drew over to our side of the water, gleamed in the rays of the setting sun.

The next day, accompanied by Korolkoff, we journeyed about eleven miles, and halted at a point where a small river debouched into the lake, which was still heaving though the weather was still and fine, and the long smooth waves lapped with their blue water over the sand on which we stood. Not far from the bivouac Korolkoff and I made a botanical and entomological excursion, finding 25 kinds of plants, amongst which there were, of brushwood, four varieties of acacia (*Caragana* sp.), berberry (*Berberis* sp.), honeysuckle (*Lonicera* sp.), and spiræa

(*Spiræa* sp.); and of flowers:—forget-me-not (*Myosotis* sp.), veronica (*Veronica* sp.), alpine yellow poppy (*Papaver alpinum*), wild hemp (*Cannabis* sp.), besides several grasses.

The 17th May we continued our journey to the ravine leading to the Barskotünski Pass, by which we were to reach the Sirt. In the morning when the caravan started, Korolkoff took cordial leave of us and our Cossacks. Having said good-bye to him we journeyed seven miles and casting a last glance at the lake, turned into the ravine of Barskotün. Seeing before us a spruce fir wood, we determined to make our bivouac under the trees. On either side, at first, rose the bare, lofty, and overhanging cliffs of the ravine, of a sadly monotonous muddy grey colour. In the hollow the river Barskotün coursed over the stones. Further on we came to small pools, and the banks were clad in brushwood, then to a large meadow at the edge of the forest, traversed by springs of clear water, where we halted. A mighty forest of dark spruce (*Abies Schrenkiana*) the lower limit of which lies at an absolute height of 6000 feet, rose from the bottom of the ravine, and climbed its steep sides, far, far upwards. The lowermost trees grew on the fragments fallen from the cliffs which were piled together in vast masses. Through the débris, roaring, foaming, and leaping, the river cuts its way. There are no trees but the spruce in the forest, but there is an undergrowth of bushes which line also its edges, and are seen higher up the mountain beyond the trees. They consist chiefly of the juniper (*Juniperus Sabina*), two kinds of honeysuckle (*Lonicera* sp.), willow (*Salix* sp.), two kinds of dogberry (*Cotoneaster* sp.), mountain ash (*Sorbus aucuparia*), whitethorn (*Rosa* sp.), three or four of acacia (*Caragana* sp.), and *Ephedra* sp. In the meadow there were quantities of forget-me-not, violets, and purple iris.

The mountains here are crystalline, chiefly gneiss and granite, the slopes covered in places with clay and vast fragments of the same rocks fallen from above.

The latter circumstance impeded greatly the progress of the caravan: often the loads strike against these masses and are broken; the camels injure their feet severely. There are no side ravines in the pass, which with its lofty overhanging sides, half covered with dark and speary trees, stretching far up into the blue, and the river dashing and crashing over the rocks below, is wild and savage. The winding path is sometimes edged by fearful precipices. The camel loaded with a yurt (Kirghis tent) slipped down and fell headlong, but thanks to the soft pack of felt, was unharmed, and with great difficulty we pulled him out and up again.

On the 19th we rested in an alpine meadow, not far (eight miles) from the top of the pass. The ground here opens out a little, the mountains recede on either side, and the former wildness disappears. The upper limit of the forest is at 11,000 feet absolute height, but vegetation generally continues to 12,000 feet. Serjeant-major Ivanoff, whom we sent forward to inspect the pass, reported that it was completely choked with snow, and without being cleared was impassable. So we had to halt for the day, and send on eight Cossacks, with 20 camels, that the latter might trample a path. Towards evening the weather underwent a great change; rain fell, passing later into snow, and we had to don our fur coats. At 10 p.m. our men came back and reported that the road was bad, and that by morning, in all probability fresh snow would have filled up completely the path they had trampled out to-day. Next morning therefore, we sent on the Cossack Teleshoff, with Kirghis and shepherds and all the spare camels to renew the work, and started ourselves with the caravan three hours later, up a sufficiently steep and difficult ascent, which, however, we surmounted successfully. Thence the road turned to the left diagonally across a steep slope towards the pass; below, we could hear the river rushing in the depths of a profound abyss, which threatened to swallow us at the first unwary step. At first there was no snow at all, but as we approached the pass the patches became more and more frequent and deeper and deeper, being at the same time

rotten from the burning rays of the spring sun. The weather changed every half-hour; now we had a cold wind with snow coating our faces with ice, then the sun came out and pricked and burnt us. From time to time the snow rose in whirling columns. With great difficulty, towards 7 p.m., after a whole day's labour, we dragged the camels up the pass. To proceed was absolutely out of the question, so there, on the very summit of the pass, we spread the caravan along the path, and at once unpacked. The snow was so deep at the sides that a camel which got off the road was buried in it. We trampled a place on the wet snow, and pitched our tent on it. At 11 p.m. we dined, and wet and tired lay down to sleep. The pass proved to be only moderately high, not much more than 12,000 feet. At other times of the year, viz. in winter and autumn, when the snow is firm and able to bear beasts of burden, it cannot, of course, present much difficulty, and may be accounted quite practicable, and even convenient. In spring, however, when the melting snow becomes rotten, and the animals plunge through and bury themselves, it is difficult. It can be used, of course, but with certain loss of pack-animals.

Next day, the 22nd May, we made six miles between 11 a.m. and 5 p.m., or only one mile per hour; the spare camels treading a path in the deep snow, which gave the appearance of a trench with high snow walls. The people were worn out with fatigue, and the animals no less so, the constant change of temperature acting very unfavourably on our men. At one moment the sun was so hot as to induce perspiration; at another, the cold wind and snow made one shiver and shake. Nearly all fell ill, some with fever, some with coughs, some with sore throats, whilst many were nearly blind with inflammation of the eyes, and all, without exception, had their faces so burnt by the wind that the skin cracked and bled.

On the morning of the 23rd, Colonel Pievtsoff, Kozloff, and I climbed a neighbouring mountain to see how far the snow extended, for it seemed impossible to continue the journey if it remained so deep. The animals must inevitably perish from want of fodder and over-work, and the people break down altogether. Luckily, from the mountain we saw in the direction of our old route of 1885 that the snow diminished; there were bare patches first here and there, and then no snow at all. The line of march was immediately changed: instead of the nearest road directly southward, but all covered in snow to such an extent that deep ravines were completely filled up, we decided to turn to the east, and, in point of fact, this route proved so much better, that after going nearly 11 miles we pitched our camp not on the snow but on the grass! The animals fed eagerly off the old grass of last year, and stilled the pangs of several days' hunger. The Kirghis guides and many of our men were completely blind, and I washed their eyes with lead water. The camels, dogs, and sheep had watery eyes too. But there was now hardly any snow, and eyes would soon recover, only our cracked faces and swollen lips and noses smarted sadly as they excoriated.

The 24th we went eastward across a slope along the left bank of the Ara-bel, and coming to our old route of 1885, followed the river, leaving on our left the passes of Zauke and Kashka, through which in that year we reached Slivkina. We found next an excellent resting-place after an 18-mile march on an affluent of the Ara-bel,—a flat dry spot on the bank of the river. The pasture for the beasts, though last year's grass, was excellent. To the east, or rather south-east, lay the mighty glaciers which in summer feed abundantly the Ara-bel, a river belonging to the Aral system, falling into the Narin, and so into the Sir-Darya. At night, frost. The rest of our march to the Sirt was unadventurous, and there was no more snow.

On May 28th we bivouacked at the foot of the Bedel Pass. The Sirt, over which we had been journeying now for a whole week, is a high plateau (10–11,000

feet), 100 miles wide where we crossed it from north to south, whilst from east to west it is extremely wide. Scattered over it are separate mountain groups and ridges, running east and west, between which glisten the bright glaciers and spring waters of two systems, the Aral and Tarim basins, with the pass of Souak, over a ridge without name as watershed. All the mountains of this plateau are of schist, we found no granite, the soil being of clay and schist near the mountains, clay only in the valleys and on the banks of the rivers. The vegetation consisted of herbaceous plants only, unless we except one kind of honeysuckle, quite hidden in the ground. We found rushes (*Carex*), kipets (*Stipa* sp.), and other grasses, several of the crucifers and of the pea and bean tribe (chiefly *Astragalus* sp.), ranunculus, &c. The fauna is not remarkable for variety, though fairly abundant. Particularly numerous are the wild mountain sheep called by the Kirghese Argal, wolves, foxes, tarabagans (*Bobax* sp.), and hares. There are few birds. The commonest vulture is the black vulture (*Vultur Monachus*), kites, crows, larks, and small mountain finches. There is no constant population, but in summer the Kirghis drive their vast flocks and herds to pasture in the fine alpine meadows of the Sirt, as do likewise the Russian peasants from Slivkina. The rich plains are covered then with cattle, horses, and sheep, and there are no insects injurious to them. The perpetual freshness of the atmosphere, good and abundant water with salt-spots here and there, favoured the rapid fattening of our animals, which enjoyed complete rest and put on flesh in the most marvellous way.

Halting at the foot of the Bedel Pass, we sent Teleahoff on after dinner to reconnoitre it. There proved to be so much deep and rotten snow on the acclivity that there could be no question of surmounting it without first clearing a way, so we had to halt for the day. Early next morning we sent on people and camels to do the necessary work. They worked all day, and stayed for the night, so we sent them food and a tent. On the 30th, at 9 a.m., the caravan started. Colonel Pievtsoff went ahead with the interpreter to take the height of the pass with the barometer, Kozloff and I remaining with the caravan. It was a march of two and three-quarter miles to the snow, and these we covered easily and quickly. Of snow there was only one and a quarter mile, but what heavy marching! The first camel was dragged over the summit only at 5 p.m.!

The whole of the 31st was spent in dragging the loads up the pass—a most exhausting labour for men and beasts. The camels would plunge through the rotten snow all four feet at once; they had to be dragged out again by hand, and for that it was necessary to unload them, then reload them, or carry the packs ourselves. Only on the third day, i. e. 1st June, at 8 a.m., did the last camel and the last load get across, when, gathering all together, we made a fresh start and covered 17 miles by nightfall.

Two couriers met us next day—one from Kashgar, with a packet from the Consul, the other from the Aksakal of Aksu, a Sart by name Khasim, but a Russian subject, who had brought us letters on our previous expedition to Lob-nor from Consul Petrovsky. Both men had been awaiting us some days already in Turfal, and becoming impatient came on to meet us. Not far from here was a Chinese picket station, where in 1885 we had to break down the gates in order to get the laden camels through. This time the Chinese were sufficiently thoughtful to break down the gates themselves. Only one Chinese lives here, and he did not show himself. He has a Mussulman guard of several armed men. From the picket the road left the river and ascended the lower slopes of the mountains covered with black pebbles of porphyries and limestones. The little river Onitai diverged on our left, and only after six miles did we again reach it and come to a halt in a green meadow amongst willow bushes with abundant springs of fresh, clear

water around us, shadowed by barberry bushes and flowering white rose throwing its sweet scent afar. We stopped a day here, at this very spot, in 1885.

The ravine through which we came these past days from the Bedel Pass is by no means so wild, but also by no means so beautiful as that of Barskofin. Its slopes are covered with limestone and schist formations, with a coating of mud. The river Ouital runs here in a wider bed, frequently dividing into several streams, and at the point where it leaves the mountains runs over a pebbly bottom between banks of conglomerate 300 feet high. Owing to the comparatively soft quality of the rocks, and considerable quantity of mud covering them, the road in this ravine is fairly good; there are no stones to bar the way, nor steep and dangerous precipices, but a soft road without any sharp stones.

Vegetation is only seen in the form of bushes and flowering plants, for there are no trees. On the mountain slopes grow the *Kalidium* sp., *Sympegma Regelii*, *Reaumuria Kashgarica*, and *Ephedra*; near the river and in the hollows of the ravine I noticed three kinds of acacia (*Caragana*), *Lonicera*, *Ephedra*, two kinds of barberry and wild-rose (*Rosa* sp.). Lower down the river we found the white willow, large bushes of white rose as much as 14 feet high, barberry, and poplar. By the springs were primulas, *Trigochyn palustre*, *Glaux maritima*, *Oxytropis Leontodon*, grasses, &c., and along the banks and cliffs *Ephedra*, *Reaumuria Kashgarica*, *Androsace*, *Statice* (two species), *Caragana* (two species), *Kulidium*, and *Sympegma*. The fauna is very poor: wolf, fox, hare, and taramagan; and of birds—vultures, magpies, klumitsi (mountain crows with red beak and feet—choughs?), kekliki or mountain partridges, ullars, and small birds such as willow warblers, redstart, finches, and larks. No snakes; but below 8000 feet two kinds of lizard occurred, *Erimias* and *Phrynocephalus*. We found no fish.

From the river Ouital we once more bent our way upwards over the flattish mountain slopes as before. These slopes extend along the lower range of the Tian-Shan with a southerly inclination almost to the river Taushkan-Darga. Along this slope, covered with dark, smooth, shining pebbles, are many dry channels where rain-water comes down from the mountains, and up one of these we took our way towards the Taushkan-Darya. On the banks of this channel, owing to the greater frequency of water, there was much *Lasiagrostis splendens* and *Clematis songarica*. We halted eight versts short of the river by the side of a canal (arik), on some ploughed fields belonging to the Kirghis, some of whose yurts stood not far away. We were met here by a Chinese official.

Next day, the 4th June, we had to cross the Taushkan-Darya, an operation not without danger, but we got safely through the seven fairly wide streams of swift muddy water as high as our stirrups and so strong as in places to carry the horses off their legs. On the opposite bank we found a Chinese from Aksu with enquiries after our health from the Amban. We halted a mile distant from the ford, on the banks of the river, under the rock of the mountains Kara-Teke, beside a clear runlet springing from the ground close by and gurgling over smooth pebbles. It was necessary here to stop for the day in order to dismiss the Kirghis with their hired camels. Henceforward all the work is to be done by our own camels, which until now have been unburdened. We now decided to go neither to Utch-Turfan nor Aksu, but across the ridge of the Kara-Teke direct to the Yarkand river. This route has the advantage of novelty: not a single European has traversed these mountains in this part, nor is the road from the mountains to the river known. Besides this, by entering the mountains we saved ourselves at least some days of the heats, which have now assumed all their rights. Next day, the 5th June, it began to be fine and clear, and I set out on an excursion, but it did not last long. I noticed in the west a dark cloud of ominous aspect and returned to camp. The

cloud grew rapidly and advanced towards us; its dark surface was scarred already with lightning and the thunder rolled loudly. We wished to dine before the rain came, but were too late, for in the midst of our meal such a rain-storm burst upon us that in five minutes the ground was covered with water to the depth of 14 inches. The water burst into our yurt and covered our baggage. We abandoned our dinner, and each endeavoured to save his own things, whatever we cherished most. Our felt and bedding strewn on the floor of the yurt were wet through. The storm did not last long; it was over indeed whilst we were still in our first flurry, but great quantities of water had come down. Luckily it was a sloping place, and it ran off speedily without doing any great harm to our packs. No sooner was the storm over than the sun shone out, and with such force that the earth steamed. We spread out all our wet things on the neighbouring rocks, where they soon dried. That day we fished in the Taushkan-Darya for our collections and caught two species.

We left this bivouac the 6th, and went up the Taushkan-darya 8 miles to the turn into the mountains, the whole way being lined with ploughed fields partly sown with wheat, partly lying fallow. Here and there were small farms. Not far from the turn is a whole town of ancient tombs built of unbaked bricks—a silent city of the dead. Turning aside from the mountains we found ourselves in a pretty wide plain, surrounded with mountains and with several separate hills barring its entrance. Into this valley on all sides lead ravines and crevices of all sorts and sizes. I observed on the hills to the east, a wood which gave hope that the vegetation there would be richer, and I was not disappointed, for I added a good deal to my herbarium afterwards. Our road lay through the most western ravine, whose banks, now closing in, now widening out, were formed of limestone with bushes of ephedra and karagana, and in the hollows, barberry, dogberry, honeysuckle, and wild-rose trees. The bottom was a dry stony river-bed, with large round stones brought down from the hills, showing that at times there is a stream here sufficiently strong to dash the stones against each other and round and polish them. The banks of this dried-up stream are thickly covered with bushes of *Lasiagrostis splendens* and karagana, around which twines the wild clematis, thrusting out its large yellow cruciform flowers for show. Where the ravines widen out there are ploughed fields sown with barley and wheat—at other points they are narrowed by overhanging limestone rocks that have slipped down. On the second day (the 8th of June) of our journey through this gorge it narrowed to from 3–4 arshins (28 inches) and formed a corridor: the rocky walls rose from 700–1000 feet above it, and approached one another so nearly that the sky was hidden, and the road seemed to be made underground. In many spots the camels had to be taken through one at a time.

In spite of the constant coolness of the air and want of light I found here a fairly rich flora. Along the bottom many yellow violets (pansies), forget-me-nots, saxifrages, hare-cabbage (*Sedum*), campanulas, &c. From the rocky walls hang bushes of currants (*Ribes*), cotoneasters, honeysuckle, barberry, and rose, clustered round with a beautiful clematis, bearing large white odoriferous flowers. Occasionally the large leaves of the rhubarb (*Rheum*) come out of their great pods and cling close to the rock. After travelling about half a mile through this tunnel we issued into the gorge once more, which here widens and leads to the pass Dungaret-ma; the corridor or tunnel now left behind us bears the same name. I now went ahead to inspect the road and make the necessary arrangements. The ascent was not very difficult, but the descent on the other side over the schistose and slippery slopes was straight and dangerous. Each camel was led down separately, the packs being supported on both sides. We got down all right, but many of the camels nevertheless were much scratched and their legs were knocked about sadly, whilst many had sore

backs from the slipping of their loads. The men also suffered a good deal. The absolute height of the pass is about 8000 feet.

From the top we could see a lofty rocky ridge from 10 to 11,000 feet, covered with spruce woods and green meadows, on which were scattered the yurts of the nomad Kirghis. Descending from the pass the road led through a defile which next day brought us to a small river hemmed in by perpendicular mountains: numbers of boulders, torn from their tops by some unknown force, lie heaped at the bottom in the most chaotic confusion. The slow thin stream has to find its way amongst these boulders, and now foams and filters through them. Our paths also lay through these great rocks thrown about in wild disorder. Often we had to avoid it, turning over the great stones on their sides or knocking them over. The camels had again to be taken one by one, and not only they but their loads came to grief. We were three hours doing less than one-third of a mile.

We halted lower down the river on old fields. A mile and a quarter further ahead of us were the mountains, and in them a dark defile, looking a mere crack, but the river wound its way through it, and through it lay our road. We entered this close, dark, stone cavern. Above, the sky was a mere blue ribbon; the river ran over the stony bottom. The gloomy perpendicular walls of rock depressed our spirits, but nearly three miles further on the gorge widened a bit, and our hearts were lightened. The stone walls gave way to slopes of clay, and the gloom of the gorge was lightened by green trees and shrubs. Here for the first time we found the Tograk poplar (*Populus Euphratica*); there were also willows, *Myricaria*, *Nitraria Schoberi*, *Nitraria sphaerocarpa*, *Eurotia*, *Atraphaxis*, *Zygophyllum xanthocylon*, two kinds of tamarisk, two of barberry, *Clematis orientalis* and another variety, large bushes of the rose (*Rosa sericea*?) twenty feet high, and covered with white sweet-smelling flowers like flakes of snow, magnificent bushes of the *Lasiagrostis splendens*, bright green rushes (*Phragmites communis*), two kinds of *Beaumuria*—*Tridina* and *Kashgarica*, and two of *Caragana*.

At the ninth mile the sides of the defile opened out, and we entered a fine, clear space of ground, formerly cultivated, and having the ruins of dwelling-houses (Sakli). Several dry watercourses from the neighbouring hills meet here. We followed one of them southward which terminated at a pass, whence we descended by a beautiful and original gorge of red sandstone. The strata of the sandstone were so disposed along its depth that its left side presented almost smooth surfaces inclining westward, and on its right the raised, broken, and jagged heads of these strata turned to the east. In the bottom now and then welled up some brackish water, only to disappear again. Before going far we once more came to tograk poplars and other shrubs and flowers, amongst which for the first time we found capers (*Capparis herbacea*), a variety which only grows in salt and desert places. From its pods are obtained capers similar to those of the European variety (*Capparis spinosa*). The sides of the defile opened out more and more, and grew lower and lower, and finally disappeared altogether in a desert plain, about five miles wide, bounded on the west by a range of red sandstone; on the east likewise by a lofty border, but of a greenish-grey colour, and probably of clayey schists. Both ranges have the same direction—from north to south; both are absolutely sterile and bare of vegetation; and both have their strata rising at abrupt slopes of 60 degrees, the highest on the east. The grey desert valley between them, its silence only broken at intervals by the monotonous chirp of the cricket, looked sad and dead, as if burnt up by the rays of the sun. It sloped away southward. Only the dry bed of a rain-stream reminds us that there is sometimes water here.

We had now travelled some distance; the caravan showed signs of fatigue, but marched bravely on. Before us we saw strips of green, and river-pebbles amidst

which now and then water glistened in the sunlight; but before reaching this water we were overtaken by a dust-storm, which came rapidly upon us, and as rapidly disappeared, only touching our flank. A black cloud stood before us, however, across the river, over a lofty isolated hill; across it flashed the lightning, peals of thunder shook the heavy air and were echoed by the mountains. It was hot and stifling; we longed for the rain-storm, even at the cost of getting wet through, but it passed on one side of us. Reaching the river, we halted on a flat piece-of-ground sown with barley and wheat.

The caravan had now done 27 miles this march. Half a mile below us, where the river, turning eastward, had washed a broad path for itself amongst the hills, is a Chinese picket-post; and there runs the high road from Utch-turfan to the fortress of Maral-Bashi. The commander of the picket sent a ragged soldier to demand our passport. I do not know whether this is the custom, or simply due to the curiosity of an idle Chinaman. Formerly we were never asked for passports anywhere, and in big towns we sent our passports by our own interpreter to the authorities to be viséd. Not more than a verst beyond the guard-house the mountains disappear, and a vast dusty pebble-strewn plain stretches away into the distance. On the horizon, through the dust, we could see the outlines of trees marking the oasis of Kelpen, a village with many huts. The entrance into these mountains was formerly guarded by small forts, the ruins of which are still visible on either side on the grass.

Here we bid these mountains farewell. In the north-west they are almost entirely of limestone formation, but pass into stratified sandstones and clay schists in the south-east. In that portion where the limestone formations predominate, the strata incline downwards from north to south. On the latter half of our route, that of the sandstones and clay schists, they incline downwards from east to west, the inclination sometimes exceeding 70°. The height of these mountains is not less than 11,000 feet, and that of the pass Dungaretma 8000 feet above the sea-level. I have never before seen such a number of dried-up channels, which, with their pebbles and rocks rounded and perfectly smoothed by water, bear witness to the terrific rain-storms which water these mountains, evidenced likewise by the worn slopes of the defiles. The comparatively rich flora could not exist without an abundant rainfall, and the flora determines the conditions of existence for man and his domestic animals. On the lofty and fertile meadows of this alpine district wander the Kirghis with their vast herds of sheep, cows, and horses. In winter, some of them descend to their mountain valleys, where in summer they have their fields; others go beyond the Taushkan-Darya. Amongst the wild beasts are wild goats (*Capra sibirica*), wolves, foxes, and tarabagans. Of birds, griffon vultures and bearded vultures circle in the air, ullars whistle over the rocks, jackdaws enliven the mountain gorges with their cries, hill partridges are continually running down to find water, and anxiously calling together their scatter-brained chicks; chattering magpies and ravens are everywhere. Once I heard the homeless cuckoo ever repeating his plain and monotonous song. Redstarts and other small birds curiously fluttering from bush to bush, and seeking insects for their weak infant progeny—this in a few words was all we saw in the mountains of Kara-Teke in the course of a 67-mile march through them.

The small river from which our attention has been temporarily diverted by the Kara-Teke mountains, after leaving them, is distributed through the irrigating canals (*ariks*) to Kelpen and the neighbouring homesteads, whither we now turned our steps.

The village of Kelpen is ten miles from the Chinese post, looking from afar like a beautiful garden amidst the barren desert. The poplars, like pyramids, are visible at a great distance; and, as you approach, several huts come into sight amongst the

fields or in the shade of the apricot and white willow trees. In the gardens are many peach and apple trees. The inhabitants are Sarts, and their only occupation agriculture. They sow wheat, barley, and maize in the fields, and in the gardens melons, water-melons, cucumbers, and other vegetables. A small trade in petty articles in their own bazaar serves more for pleasure than profit. They have few herds and flocks—some sheep, a few asses each, and only the rich, or those who have far to travel, horses. Their clothing is simple: trousers and long gowns of white Chinese cotton-cloth with strings on the breast, and girt round the waist with a strap of the same material; or, if rich, of the lighter stuff used for the head-dress. For head-gear the flat bonnet of the Bashkirs, a sheepskin hat or felt extinguisher, with brim turned up, and slashed in front and behind; on their feet the boots called *itchiji*, sometimes with goloshes, but most often they go barefoot. The women wear a *chapan*, i. e. a long wide chemise with long sleeves, serving all the purposes of pocket-handkerchiefs, made of white Chinese cotton-cloth, or of shirtings, red being the favourite colour. The rich wear chapans of silk, mostly green or red; the fastenings are metal buttons on the breast for married women, on the shoulders for young girls. The chapan has no girdle; the trousers, of the same materials, come down to the ankles. The women wear mostly the flat bonnet, sometimes of cloth of gold; not all of them cover their faces, and with those who do, it is chiefly to satisfy their jealous husbands, which does not prevent them from looking out from under their veils on the sly, and, smiling, showing their coal-black eyes and pearly white teeth. The old women and ugly ones carefully hide their faces. Many paint their faces, which spoils them greatly, as does a custom generally prevalent in the East and in Russian Turkistan and Bokhara, and even in Algiers, of joining their fine black eyebrows with blue paint into one straight line. The women wear slippers, or *itchija*, with or without heels; the poor go barefooted. The type shows Aryan descent; and both men and women are decidedly good-looking. They are gentle, not insolent like the Chinese and Mongols, but polite and willing to serve you. When the caravan drew near, whole groups of people came out, showed us the road, and endeavoured to make themselves useful.

Our halt on the outskirts of Kelpen was not altogether favourable; we had to bivouac on a clay field, formerly cultivated, and very dusty. We watered the ground where the tent was to stand, a plan we have had recourse to since; the villagers helped our men to unload the camels and let water into the dry *arik* near us. Sellers of apricots and apples, some with cakes, &c., made their appearance, and keeping, a respectful distance and squatting on their heels watched with curiosity our bivouac.

Next day, June 11th, our way lay over a good hard road, at first between fields of grain, but these soon gave place to sand and hillock covered with *kharmuik* and *tamarisk*, which continued for 13 miles, when we reached the river *Chilik*, which has cut for itself a channel 50 feet deep and 300 feet wide. In places the banks are still further apart, and here are thick beds of green rushes with single poplars (*tograks*) here and there, and bushes of tamarisk with great clusters of delicate pink flowers. We encamped on one of these islands close to the river-bank.

We met here, for the second time, the *Aksakal* of *Aksu* and a Chinese official (*Mahometan*) of the same place, both sent by the *Amban* to enquire after our health and our wants, and to arrange for our future journey, chiefly in the matter of finding a good guide. We wanted nothing from them, so after accompanying us to the station and receiving gifts, they rode back, leaving with us a Sart guide. We were from here to make for *Yakkakh-khuduk*, a station on the high road from *Aksu* to *Maral-bashi* and *Yarkand*.

We reached *Yakkakh-khuduk* on June 12th, at first traversing the same hilly

country, with bushes of tamarisk; then came patches of clay, blown up by the wind, and with salt surfaces; the land grew more and more arid, the fresh-flowering tamarisks rarer, their places being taken by dried-up bushes, with their branches twisted by the heat and drought, and here and there the withering trunk of a tograk poplar; the soil became porous, dry, and barren. The wind-blown, frozen tamarisk mounds, with roots sticking out, completed the desolate picture. Amidst these dead hummocks, on the horizon, we saw a yellow band of moving sand, with something green beside it. Coming nearer, we found, on the edge of the sands, high-growing poplars, which, accompanying us along the sands, grew into a thick forest, stretching far away to the east, in which, on an affluent of the river Yarkand, is the station of Yakkakh-khuduk. Coming within a mile of the place, we halted by the river side under the poplars. The high road passed the spot; we did not take it, however, but, passing the night here, and going through Yakkakh-khuduk, we turned through the wood to the left by a little-used path, the whole place being covered by a thick forest of poplars, *P. euphratica* and *P. pruinosa*, into which the sand-desert stretches its arms a little way now and again; whilst here and there are considerable spaces densely covered with green rushes. The river called Pshak-saidi nears the road several times on the right, and again diverges. This kind of scenery lasted all the way to the village of Pshak-saidi, about a mile beyond which we came to a halt.

The village of Pshak-saidi is in the forest, and does not force itself upon you like most of the villages standing in oases in the desert. Only the pyramidal poplars strike one, towering as they do far above the rest of the forest. The fields, watered from the river, are poorly cultivated; they are full of reeds and weeds, which in places quite overwhelm the crops. The village is very scattered, the mud huts far from one another, and almost buried in the green of fruit and other trees, poplars and willows, and djids and apricots, peach-trees, &c. The lake was about 600 yards long by 200 broad, part of the bank covered with reeds and tamarisks or, as the natives say, *djingal*.

Next day, the 15th June, our road lay through a wood of young but thick poplars, and after two miles we came to a glade, which we followed, noticing, on the edge of the wood, small dwellings for the herds who guard the cattle in summer, made of reeds and boughs, and, of the same materials, pens for the cows, sheep, and goats, which the Sarts bring to pasture here from villages even 60 or 70 miles distant.

A few miles further in the distance we saw the blue outline of serrated mountains—the Mazar-tag—to the west of which appeared some other ranges of barren hills. We had to go on to the lake Ak-kul, but the guide not knowing the way, we stopped short, at a small river flowing hidden through tall and thick reed-beds. Amidst these reeds, covering a vast space, are many lakes in which are silver and other fish. Numbers of water-fowl fly past our bivouac, with noisy cries, from one lake to another. Most of the lakes are out of the sportsman's reach, the banks being covered with gigantic reeds through which it is impossible to reach the open water, and in these inaccessible places the birds breed in peace, unless for a cunning fox, who may manage to get up to the sleeping birds by night; or their winged foe the eagle, represented here by many varieties. In the reeds, too, the tiger hunts the wild boar, which to judge from the tracks, are very numerous. The heat of the daytime gave way at sundown to something no less troublesome—the mosquitoes came out and worried us all night, quite preventing sleep.

On the 16th June, at 6 a.m., we continued our journey in this reed-covered plain, stretching out westward on our left with scattered lakes joined together by rivulets and ditches. On the 11th inst. we began to come across huts and farm-houses, the latter

bearing more the appearance of constant habitation. Here were fields with countless watercourses (ariks), planted with fruit and other trees loaded with fruit not yet quite ripe. The houses are built of unbaked bricks or of mud. As we approached the mountains, they stood out ever clearer and sharper, the outlines of separate cliffs and dark gorges growing ever stronger. The last three miles of this day's march were along a deep canal, beside which we finally halted in the neighbourhood of a small hut of plaited reeds. Many sheep and cows feed around; the pheasants crowsed from the surrounding tamarisk bushes, and near by were several lakes, but all unapproachable. The morrow's road should bring us to Mazar-tag, and we were warned that on the way was a place called the Five Bridges, difficult for the camels, and in fact at the fifth mile, across our road lay a lake, 100 yards long and 50 broad, very deep and with high crumbly banks. From the north-west side lead deep canals, with quaking bridges $3\frac{1}{2}$ feet wide thrown across them, of the most primitive construction; three poles are put across the canal, and over them are laid rushes and twigs with earth strewn above them. There are seven of these canals altogether, and as many bridges, the name Besh-kupriouk remaining from a time when there were only five. These ariks carry the water far over the country we had already traversed, and feed all the lakes scattered over it. The water is very abundant and irrigates a vast space called Lai-Moï and comes into the lake through a large affluent of the Yarkand river (?). Leaving behind us Besh-Kupriouk, we went through some gates, as it were, between two separate rocky groups of hills with almost perpendicular sides, absolutely barren, lifeless and wild. The left or eastern group was soon behind us; the right stretched to the south-west and its eastern declivity abutted steeply on our road. Before us to the south-east was the dark Mazar-tag, likewise desert burnt up by the sun and by the winds. To the left a little, some sand-hills scorched by the sun peeped up blown out of the lofty reeds. We journeyed over a dry and dusty tract covered with lank reeds, with an occasional poplar or tamarisk, then entered the Djemgela, and at the 23rd verst, halted on the bank of a big lake with high thick reeds, reminding me of Lob-nor, the same high reeds standing like a wall, the same hollowed-out canoes gliding over the water, and reed huts scattered on the banks. The place is deserted in winter, but in 'spring the Sarts drive hither their cows and sheep to feed on the young reeds; and in order to have better pasture in summer they burn up great tracks of old reeds, which are succeeded by juicy and succulent shoots. For winter use, they cut the reeds before flowering, dry them, tie them in bundles, and stack them.

By day it was hot and dusty, from time to time only came a light breeze bringing quantities of sand into our tent. We bathed and fished; crossed the lake in fragile dug-outs, threatening every moment to overturn. We spent a sleepless night in constant warfare with the mosquitoes. However, we went on as usual in the morning (June 18th) and passing through some reed-beds, came out at a stony footslope of the Mazar-Tag, along which we travelled in a south-east direction. On our right stood the silent mountains, on our left stretched the green reeds, scattered, with mirror-like surfaces of lakes glistening in the sun, and sand-hills amongst them. At the 17th verst we turned to the right into the desert schistose spurs of the Mazar-Tag. Crossing its chief spur we saw the Yarkand river flowing in a broad ribbon amidst green reeds or poplar woods. Beyond the river there was one continuous forest, stretching very far, and beyond it, through the smoke-like dust, a sea of sand, reaching hither from Lob-nor and Tarim, and broken in one place only by the Khoten river.

We made a steep descent by stony steps down into the dark pebbly plain, beyond which was a belt of reeds and the longed-for river Yarkand. Choosing a suitable place on its banks, we laid out our camp according to all the rules of art. The great

river with its muddy water rushes along at an irresistible pace; the reeds are thick, and great trees washed from the banks and entangled together, forming whole rafts, are swung round by the swift current. The undermined banks fall in with a noise and a dust and are swept away. Notwithstanding the muddiness of the water we were thankful to get it, and bathed ourselves and the animals, washed our clothes, and, resting a day, got the whole caravan into order. . . .

On the 19th, I proceeded to make a careful inspection of the camels. They had grown very lank, from the heat, the difficult marches through the passes of the Tian-shan and Kara-teke, and the ceaseless worrying of the mosquitoes and gadflies. The flies are specially unpleasant foes, for in addition to the unrest occasioned by their persistent attacks, they lay eggs in the nostrils and places worn bare, and the little white maggots, breaking from the eggs, bury themselves in the flesh, feeding upon it and causing the poor animals great suffering. The result of the inspection was to give me a clear idea of the bad state of the animals generally; the whole 86 had become very lean, and 44 of these had suffered injury besides, and could not be considered satisfactory. This state of things gave food for reflection, as we had to carry out the whole expedition with these same animals and make our way home besides. Colonel Pievtsoff decided therefore to change our plans a little, and march to the hills south of Yarkand in order to feed up the camels and rest them—spending there the hottest season, which was already exhausting us.

On the 20th June, we left by a road leading, not far from the river, into the hills on the right. On a spur standing out into the river is a burial ground with abandoned half-ruined ancient tombstones upon it; a little farther and our friend the Mazar-tag was left behind; the mountains drew off and the valley widened westward. From this place for a distance of 55 miles, to the village and post of Aksak-Moral, we journeyed, sometimes through reeds, sometimes through woods, frequently crossing affluents of the Yarkand, some of them dry. Vegetation improved and the number of kinds of plants increased to 27. Besides poplars, tamarisks, and reeds, there were whole tracts of *Apocynum Venetum* and *A. pictum* covered with red flowers, the latter being fed on with eagerness by handsome beetles of green metallic lustre of the family *Chrysomelidae*. Many bushes and trees were overgrown as with ivy by *Cynanchum*, climbing high and hanging down garlands of pale rose-coloured flowers. The modest asparagus hid itself amidst the thick branches of the tamarisk and *Hippophaë Rhamnoides* with its yellow fruit. The *Halostachys caspica* raised its clumsy sappy branches with difficulty from the ground. In the river, besides reeds, I found three sorts of *Typha* proudly raising their dark velvet heads. Several grasses and composite flowers made up the poor flora of this neighbourhood.

This watered strip extends along the left bank of the Yarkand all the way to Aksak-Moral, with a width of 17 miles; beyond, far away to the west, stretch the sands, which now and then push their arms right into this wooded belt. On the right bank is a similar belt, but much thicker and wider, with again beyond it the limitless kingdom of the desert sands, which hide in their bosoms many things curious and unknown. Many cities, once flourishing, happy, and well populated, lie buried there. The dwellers on the desert border sometimes venture themselves amongst the sands in search of valuables they dig up in the ruins of ancient towns buried in sand; but they never go farther than three or four days' journey. The limitless and mysterious nature of the unknown and awful waste that has become the cemetery of a once flourishing country, frightens people; and the time is far off when the daring European will traverse the desert in many directions and discover to the world the secrets hidden by the sandy ocean of the desert of Takla-Maklan, as the natives call it. Wild camels are apparently its only inhabitants. Nearer the river, tigers have trodden paths through the woods and reeds, and mercilessly wage war

against wild boar and morals (deer). There too, on the edge of desert, one meets occasionally the light and timid antelope, besides wolves, foxes, hares, and small rodents, which are found almost everywhere. In the rivers are fish, and snakes that feed upon them. In the evening toads give concerts, and sometimes, carried away by enthusiasm, continue them till morning. Gnats, gaffies, tarantulas, and scorpions are common. To keep the latter from our tents we water them round; but even that did not always serve. Against the mosquitoes we sometimes made smoke by burning tamarisk. Birds are rare, those of prey being most common. The population is very sparse; those who do live here, and they only are shepherds in summer in the reed-huts, are all Sarts, calling themselves Dolons.

On the 22nd, arrived Bogdanovitch, on his return from a geological excursion in the Kashgarian mountains, very well satisfied with the result of his journey.

Next day, the 23rd June, we nearly reached the village of Akak-Moral and halted beside a huge conduit (arik) bringing water from the Yarkand to Moral-Basha to help the Kashgar river which has not water enough to irrigate the lower lands. All its water in fact remains here, not a single rivulet making its way to the Yarkand. From Aksak-Moral along the conduit runs the high road to Moral-Basha, our road to Yarkand crossing the arch by a bridge over which all the camels got safely. Hence for 67 miles our road lay through a somewhat different country from what we had hitherto seen. Probably when the river is full the whole country is flooded, so that in the places most liable to inundation sluices have been constructed, stretching seven to fourteen miles and more, resisting the furious onslaught of the river; this enables the few inhabitants to dwell there, though in constant fear, and raise their sheep and cattle and plough, both in a very small way. The dwellings are partly plaited with boughs, partly built of mud. The ground along our route was much cut up by the dry beds of small rivers strewn with dams. As the streams dried up so the country became less humid and the vegetation began to perish; we came to places where the reeds and poplars and tamarisks were already dead. The withered trunks of the tograks stretched their arms in all directions as if seeking protection from the cruelty of man who deprived them of water. The parched and burnt-up tamarisks and reeds crackle under foot. The soil is porous, deep in dust, but the wooded belt is wider considerably and extends 35-40 miles to the sands. Tigers and wild boars became rarer, antelopes and morals, on the contrary, more frequent.

Sixty miles beyond Aksak-Moral the poplar woods grew thinner, being much cut for firewood, which is carried on donkeys to Yarkand. The population grows denser and a good deal of land is again under cultivation, while trees are planted of useful kinds and the roads are bordered by willows, poplars, and mulberry trees. It is here that, according to my ideas, begins the Yarkand oasis, and indeed, the people are mostly from that town. The wild vegetation is already to a great degree driven out by cultivation, and as we approached Yarkand and only 40 to 60 miles away, the population visibly increased; farms were closer together, the fields became continuous except in places unsuited to agriculture. It was difficult to find a place for our camp, without infringing on fields of wheat or maize. On the road we met many people on donkeys, on horseback, or on foot, both men and women; the majority of the latter, as if ashamed, covered themselves with their white scarves, and leaving a small opening, gazed with curiosity through it at the caravan of strangers. Many take advantage of the wind, allowing it to blow back the scarves altogether, as if by accident, to show themselves and coquet; other tricks they have with the same object in view, but always as if by accident. Whole caravans of donkeys laden with wood, straw, or sacks of produce, journey towards Yarkand, or come back empty, or with goods bought in the town. Alongside

the road, in the fields, harvesting is going on rapidly, with a view to sowing the second crop, generally maize. Most of the people are from Yarkand, some living here permanently in mud houses planted round with poplars and fruit trees, and either standing alone or grouped in villages; others live here only in summer, occupied in agriculture or tending sheep and cattle, living in dwellings of the lightest possible construction, sometimes even in arbours overgrown with vines or hop-bine, and in winter return to Yarkand. All along the road, beginning from Aksak-Moral and right up to Yarkand, the Chinese have placed posts, clay towers taking the place of our verst posts; they are supposed to stand two miles five furlongs apart, but in reality these are sometimes every mile and a half, sometimes every six miles, so that we cannot measure the road by them. At the stations (*langer*) where until the rebellion were established Chinese picquets—then massacred—are also posts according to the number of Chinese killed, but smaller ones, and answering the purpose of tombstones.

We were met on July the 1st by the Aksakal of Yangi-Hissar, sent from Kashgar by Consul Petrovsky with letters and papers. In the morning we caught sight of the vast mass of the Mustag-ata, mountains covered in eternal snow, about 120 miles distant, gilded by the rays of the rising sun—a beautiful picture soon hidden from us by the rising clouds of dust.

On the 2nd, the villages became continuous, the road was thronged with people, and was more like the street of a great town. With difficulty we found space to rest the caravan, all the ground being under cultivation. Our camp always attracted many gazers, for all passers-by, men and women, riders and walkers, stopped to look, while others flocked out of the neighbouring villages; and to do them all justice, notwithstanding their great curiosity to see the foreigners closer, they kept at a respectful distance, and only stared and told one another what they thought. They were always ready to help our men to load and unload the camels, nor did they refuse other services.

The 3rd, a little way from Yarkand we were met by a Russian Aksakal and some Russian subjects (*Sarts*) trading in the town, to the number of fifteen. We did not enter the town, being so large a caravan, but asked to be led to one side under the walls. These walls are of clay with loopholes, and as much as 28 feet high. We went round the town on the east and south-east; to our left (eastward) were endless rice-fields, stretching, we were told, six to ten miles to the river Yarkand, and there were similar fields to some extent on the south of the town. Rotten exhalations force themselves on the notice even of those whose noses are not over sensitive. Going round through the suburbs we soon came to the house of the Kashmir Aksakal, where we took up our quarters in tolerable comfort and with sufficient room, the horses and packs being with us, the camels not more than 200 yards off on a field already reaped. The house is without the walls of the town on the south-east, and consists of five fairly large rooms and a large balcony leading to a garden. The room next the balcony has a window looking on the garden, the large window, frame presenting a railing of most complicated patterns, the interstices filled with paper instead of glass, notwithstanding which there is plenty of light in the room, as the window occupies nearly the whole width of the wall. There Colonel Pievtsoff took up his quarters. In the other rooms, windows were replaced by holes in the ceilings or a grating in the wall at the very top. We all found room easily enough, and the packs were stored in the garden in front of the balcony, such things as were wanted being brought into the rooms; the horses were lodged in large stables in the courtyard, so that only the camels were separated from us, and Cossacks kept watch over them in turns. There are several conduits in the garden, and a square pond planted with willows and sycamores. From the balcony to the pond is a colonnade of pyramidal poplars, with which also the garden is planted round about along its mud

walls. There, too, in front of the balcony is an old vine or two with its hanging clusters yet green, and beyond the fruit-garden full of peaches, apricots, pears, apples, and quinces. To the left, across the pond, are the pomegranate trees with their dark leaves from which peer the fruit, and late flowers of bright purple-red, the emblem in the East of female loveliness. Next to the pomegranates is a well-kept kitchen garden.

The Aksakal brought us four men from Ladak who, he said, could tell us something of Tibet. One of them was a handsome, talkative, lively, young fellow; of the rest, two were unsympathetic, owing to their gloomy and mysterious silence; the fourth now lives permanently in Yarkand, a tall man of about fifty years, and evidently from his type belonging to another people, though wearing the white chalma on his head and differing in the rest of his dress no whit from the native inhabitants of Yarkand. He served for sixteen years the Englishman Dalgleish, killed in Kasbgaria, and in 1885-6 took part with his master in the Carey Expedition. He is now a trader in Yarkand. He told us much about the part of Tibet which adjoins Ladak, saying, amongst other things, that to the east of Ladak the country is inhabited by a nomad people of shepherds and robbers who have a treaty with Ladak, by virtue of which the people of that country may freely visit them and carry on trade; all others are subject to be attacked and made slaves of. Judging by these accounts the Tibetans of that part are very like the Egrafs, with whom we had an encounter on November 7th, 1879, on the Tan-la. Their appearance seems exactly similar; they wear the same long hair, cut short in front; live in the same black tents; always go armed, and never go far unless in companies. We failed, however, to obtain information as to the country most interesting to us, namely, that lying to the north and east. After the Ladak man came Chinese who, till then, had not put in an appearance. The Amban's deputy, an interpreter, and one or two others quite unceremoniously in their indoor dress came to gather the information they wanted, whence we came, and whither, and why we were going. We satisfied their curiosity, so they went their own way. During the following three days we made some acquaintance with the town. Colonel Pievtsoff went down with the interpreter and one Cossack to visit the Amban. Kozloff, Bogdanovitch, and I were invited by the Aksakal, and were joined by the Colonel on his way back. We stayed there four hours, our host detaining us all that time with true Eastern hospitality—treating us to sweetmeats, tea, and various dishes. The room in which he received us was strewn with Khotan carpets, with the intricate patterns dear to Eastern phantasy. In small niches in the walls were pieces of Chinese porcelain, various chishmas (a kind of pipe), clocks, a broken musical box, and Oriental triads in quantities. In one wall was the entrance door, and beside it, to the left, a stove; to the right, in the other wall, was a door with a padlock, leading to the women's apartment. The ceiling was composed of several beams finely carved in bas-relief, the spaces in between being filled by small planks, close together and crosswise. In the middle was a square hole of 28 inches, to let in the light, there being no other window. In winter this opening is closed, and the burning stove lights the room dimly and fitfully. A large table had been provided for our benefit in the middle of the room, laid with a clean tablecloth, and covered with quantities of Eastern delicacies.

We returned by the same road through the half-dark bazaars, narrow and muddy, covered above with awnings to keep out the sun. The variegated crowd parted to make way for us. Laden asses, people on foot and on horseback, buyers and sellers, mollahs, beggars, Chinamen, women, children, all swarming, shouting, hurrying to and fro. On the stalls in front of the shops were all kinds of goods; there were bakers' shops; smithies in full swing, scattering sparks on the passers-by; taverns and eating-houses, with suffocating smell; samovar-khans (tea-shops),

carpet-covered; Chinese shops, out of which peeped the Mahometan concubines, of whom the Chinese keep several at once; barbers' shops where the true believers are having their heads shaved in presence of the passing public; then the neighing of stallions, braying of donkeys, hum of human voices—all joined in one general roar. In these bazaars throbs the real life of the East. Hither come representatives of all the neighbouring countries; from India, now comparatively near, from Ladak, Kashmir, Tibet, Badakshan, and Russian Turkistan, not to speak of the Chinese, the lords of the land. Each brings the products of his own country, and they are distributed along the stalls; each brings his share of gossip and rumour from afar, which under the name of khaber is borne with the speed of the best telegraph to the most distant towns of Kashgaria. The more important natives have their caravanserails here, and chosen representatives—aksakals—who settle their quarrels and mercantile affairs and also communicate with the Chinese authorities in matters of great importances or which concern the whole colony.

I rode into the town with Bogdanovitch and three Cossacks, to get a general view, and took six plates (photographic). For this purpose we mounted a tower in the eastern portion of the lower wall. The turret commands nearly the whole town and a fairly wide horizon. Eastward lies the endless green of the rice-fields cut into regular squares and flooded with water. West, south, and north the town stretches far and wide with its clay houses and gardens. The crenellated battlements of the wall appeared at intervals amongst the green trees. Countless numbers of hovels lie scattered in confusion one behind another or buried in the soft green of willows and apricot-trees. There is as much life on these flat roofs as beneath them. In summer people sleep on them—work on them—clean cotton, dry fruit, receive their friends, drink, play music, and even dance. Many are sheltered from the burning sun by large shady apricot trees growing near and throwing their thick branches tent-wise over them. Many are planted with gardens of Indian pinks, marigolds, and asters, with which the local beauties love to decorate themselves, plaiting them in the tresses of their shining thick black hair.

The town proper of Yarkand consists of two parts, the Mussulman and the Chinese or new town (Yangishari) standing side by side, and touching one another. The walls of the Mahomedan portion, or, as they say here, of the town, contain from 35,000 to 40,000 inhabitants, a great bazaar, several mosques, and with the latter schools—higher, middle, and lower—where Arab and Persian are taught, and where people learn the Koran and the rest of the Mussulman wisdom and knowledge. The streets are muddy, narrow, and evil-smelling. On either side are clay walls of various height, behind which lie the flat-roofed houses; there are no windows on the street, but only the entrance doors, through which nearly always black eyes shine, and a murmur comes as of whispering and chattering, and at times is seen the end of a coloured chapán, likely enough displayed on purpose to attract the attention of the passer-by. However, by no means all the women and girls hide themselves; many, whose husbands are not jealous, and who have not a cross old mother, stand freely in the doorways and look with interest at the foreigners, biting the while the ends of their chapáns between their large white teeth. Their glances are sidelong, not bold but sly rather, and certainly not hostile. Little boys, half naked, bother one with their impertinence, following close at the horse's heels, or running just in front with outstretched black hands, asking for money. The whole population of the town consists of Yarkand Sarts, or Yarkandliks, as they call themselves; they have no idea whatever of any other derivations, and to all questions answer simply that they are Mussulmans and Yarkandliks. In the streets one meets many men and women with large goitres, a malady attributed to the bad quality of the water running in the town conduits, and drunk by the inhabitants in its natural

state. It appears in men at the age of puberty, and in women when they marry. The population of the town is engaged in trade and some few petty manufactures, also in gardening and agriculture in the neighbouring villages. Yarkand is not famous for anything; it produces nothing that cannot be found in other places, such as the carpets and silk of Khotan, and metalwork of Aksu.

Yarkand was built 500 years ago, and formerly was a capital city; it is now the most populous town of Kashgaria, and the centre of all its import trade.

The Chinese town, Yangishari, surrounded by a double wall, was built not long since. In time of popular rebellion it protects the Chinese against the fury of the people, who hate them, and are always dreaming of driving them away. A Chinese Amban resides there, always a governor of the district and other Chinese officials, two *mansi* of soldiers with their officers, and some merchants. There are, besides Sart merchants, who have established themselves here with their trade in the new bazaar. Both towns are surrounded by gardens resembling in general those of the Kashmir Aksakal where we are living. The vegetation of the oasis is fairly rich and varied, and therefore very agreeable to the sight when one comes here direct from the desert. The natives delight in growing in their gardens and on their roofs plants and flowers, roses, marigolds, balsms, Indian pinks, asters, &c. In the fields, besides the rice plantations, are wheat, barley, maize, millet, djugar, cotton flax (used only for ropes), hemp, poppies in small quantities and chiefly in the gardens. Near the houses and in the gardens they make arbours overgrown with hobbins and vines. The latter are often grown in whole vineyards; the grapes are of many varieties, and are used for food, fresh and dried, and some are sold. In the kitchen-gardens are quantities of first-rate melons, water melons, cabbages, onions, garlic, cucumbers, and a few potatoes, carrots, parsnips, &c.

We spent five days at Yarkand, and on the sixth (the 8th July) had to continue our journey. Early in the morning, having gathered everything the night before, we began to load the camels; the things had to be carried outside and packed there, which took some time; but soon after 7 a.m. we started, and journeyed nine miles to the river between rice-fields with occasional small villages. We reached the river at 10 a.m., and began the crossing in dug-outs, of which there were only six all told. The river here has a perfectly flat bank, strewn with pebbles; it is about a third of a mile wide, with very swift, muddy waters. Each boat took six camels and one man, the regular ferrymen, nearly naked, using their oars with great skill, so that in three hours the whole of our large caravan was safely across, and a little further on we camped for the night on an affluent of the Yarkand. At this point our good old Sart Lindjak, who had stayed with us all the time at Yarkand, left us, but not for good as he meant to overtake us again at Kargalik, where he had private business. We continued our way to the mountains, there to feed up our worn-out, unhappy beasts who had still to do so much for us in the future.

Here I propose to break off. Our journey to the mountains, the results of our sojourn there, and the road through Khotan and Keria and to Nia I will describe from our winter resting-place.

4th August, 1889.

VSEVOLOD ROBOROVSKY.

Since the above was received a further letter from M. Roborovsky has reached St. Petersburg, announcing the arrival of the expedition at Khotan on the 7th October, and its departure for Nia three days afterwards. At Nia Colonel Pievtsoff intends to winter, and in the spring to search for a route into Tibet, over the lofty Toguz Daban Range, the highest peak of which was estimated by Prejevalsky to reach a height of between 22,000 and 25,000 feet.

GEOGRAPHICAL NOTES.

Mr. H. M. Stanley.—In continuation of our brief record in the last number of the 'Proceedings,' we may state that Mr. Stanley with all his party arrived at Bagamoyo on the 5th of December, thus completing his wonderful march to the shores of the Indian Ocean. The general satisfaction on the receipt of this news was, however, overclouded by the lamentable accident which happened to Emin Pasha on the evening following, when, owing to his partial blindness, he fell from the balcony of Major Wissmann's house, a distance of twenty feet, and sustained injuries so serious that it will be many weeks before he is able to be removed. Mr. Stanley crossed over to Zanzibar on the 6th. On November 30th our President sent him the following telegram:—"The Council of the Royal Geographical Society congratulate you heartily on the success of your expedition and your great discoveries"; to which Mr. Stanley replied, "Have aimed at keeping my promise honourably towards all. I am grateful for your approval." The Council of the Society are making preliminary arrangements for the meeting at which the expected address of Mr. Stanley on the Geographical Results of his expedition will be delivered, and hope to secure a hall large enough to accommodate all Fellows who wish to attend, without curtailment of their usual privileges with regard to the introduction of friends. A special medal will be awarded by the Society in recognition of the geographical results achieved. The date of Mr. Stanley's arrival is at present uncertain.

Ascent of Mount Kilima-njaro.—According to a telegraphic communication, the persevering mountain-climber, Dr. Hans Meyer, accompanied by Herr Purtscheller, has succeeded in ascending to the summit of Kibo, the highest peak of Kilima-njaro. It will be remembered that on a former occasion Dr. Meyer failed to reach the top of the mountain.

Further Explorations of Captain Younghusband in Central Asia.—Captain F. E. Younghusband (King's Dragoon Guards) started last summer to explore some of the passes between Chinese Turkistan and Kashmir. He succeeded in traversing the Shimsal valley north-west of the Mustagh Pass, and entered Hunza by a route never before taken by Europeans. According to the *Pioneer*, Captain Younghusband was on his way, about the middle of November, to Gilgit. In his paper on his "Journey from Manchuria and Peking to Kashmir, over the Mustagh Pass," read before the Society in May 1888, Captain Younghusband mentioned that the path from the Shimsal Pass leading to Kanjut joined the route he took in 1887 at Suget Jangal; but on that occasion he was obliged to hurry on for fear of meeting the hostile Kanjuti.

Prince Henry of Orleans' Journey through Central Asia.—M. Bonvalot, the well-known Asiatic traveller, is now engaged in accompanying Prince Henry of Orleans through the most unfrequented parts of Central Asia. The latest news received was from Kuldja, on the 12th September last, when the two travellers were preparing to start for Lob Nor, intending to cross the Altyn-tag and make their way through North-eastern Tibet via the Ma-chn river to Batang.

Bogdanovitch's Exploration of the Mustag-ata Mountains.—An account of the excursion made by M. Bogdanovitch, alluded to in M. Roborovsky's interesting letter in a preceding page of the present number of the 'Proceedings,' is given in the current number of Petermann's 'Mitteilungen.' M. Bogdanovitch, the geologist of Colonel Pievtsoff's great expedition to Tibet, instead of accompanying the main body along the direct route from the town of Prejevalsk via Aksu and Utah-Turfan to Yarkand, left them at the first-named place in order to make a détour across the Thian Shan. On the 13th of May he arrived on the shores of Chatyr-kul, and from there made some excursions to the Aksai wells before setting out on the road through the Turugart Pass to Kashgar. Although this route is tolerably well known, M. Bogdanovitch made some interesting discoveries, of which the most important are— an extensive development of the Upper Devonian limestones with *Atrypa reticularis*, *A. aspera*, *A. latilinguis* and *spirifer*, many corals, &c., which form the greatest part of the Kara-teke and Kok-tan ranges. With the exception of this limestone, all the other sedimentary deposits of this region are devoid of fossils. Some slates overlying the limestone were considered to be Palæozoic. Between the Kara-teke and Kok-tan ranges tertiary sandstones appear, which in the upper Tojun valley have been penetrated by immense strata of a volcanic rock, recognised as dolerite: this rock does not appear to be of a purely volcanic character, and its eruption did not, according to M. Bogdanovitch, exercise a direct influence upon the orography of the country. On the contrary, the dolerite became thus exposed as the result of an immense and wide-reaching process of dislocation, which dislodged the tertiary sandstones and all older strata, and upheaved them in the form of steps. The low Artysh Mountains, which as the frontal range of the Thian Shan lie immediately to the north of Kashgar, appear also to be composed only of tertiary sandstones and conglomerates. From Kashgar it was the intention of the traveller to proceed through the valley of the river Goes to the Mustag-ata Mountains, but the valley was absolutely impassable, owing to the heavy rains and melting snow. He consequently made his way to the south, to Yangi-Hissar, whence he again visited the Kara-tash Pass through the river valleys of King-kol and Ridshek. From here he explored the central mass of the Mustag-ata range, which attains an elevation of over 26,000 feet, and subsequently he descended to

the little Lake Kara-kul. The snow-line on the north-eastern slopes of the Mustag-ata Mountains lies at from 13,780 to 14,760 feet, while on the south-western slopes it ascends to an altitude of from 17,225 to 17,715 feet. But there are no glaciers on the former, and all old-snow-fields are open to the south-west. Old moraines furnish clear indications that formerly upon the north-east slopes glaciers must have existed at an elevation of about 12,795 feet. On the other hand, there are no signs whatever to warrant the supposition of a former more extensive glacial covering of the south-western slopes. Mustag-ata and its subsidiary ranges are of gneiss formation, but the protruded granite comes to view. The strike of the gneiss was here only observed to be in a north-west to south-east direction. The supposed north and south direction was not seen anywhere. From Lake Kara-kul Bogdanovitch proceeded through the Ulug-rabat Pass into the Tagarma valley, and intended to pursue his journey further along the Yarkand-Daria, but was again prevented by the rains and melting snow. He was therefore obliged to take a side route along the Yarkand-Daria over mountainous country to the Kysyg-davan Pass, whence he travelled over the desert steppes of the Arpalyk-su, and reached Yarkand at last on the 19th June. Comparing the gneiss-formed Mustag-ata Mountains running north-west and south-east, with the ranges of the Pamir running east and west and north-east and south-west, M. Bogdanovitch comes to the conclusion that the former are older than the latter, and that this latter upheaval exercised apparently only a secondary influence upon the Mustag-ata Mountains, causing, however, some displacements in its construction. With regard to the formation of the typical "loess" which abounds in the neighbourhood of Yarkand, the traveller supports Richthofen's theory. Bogdanovitch remained one month in Yarkand, awaiting the arrival of Colonel Pietvsoff. On the 19th July the whole expedition entered the mountainous country to the south-west of Yarkand, hitherto completely unexplored, where a month was to be spent in survey work and scientific explorations; later in the autumn the journey would be continued further to the east.

An Exploration of the Mugodjar Mountains.—This range of mountains was explored last summer by a party of Russian savants, consisting of MM. Paul Venukoff, Levinson-Lessing, geologists, and M. Polejaeff, zoologist. One result of the exploration is to show that the range is distinctly a continuation of the Ural Mountains, although separated from them by a depression six miles in breadth. The highest point is Mount Airuk (1970 feet).

CORRESPONDENCE.

The River at the Southern End of Albert Nyanza.

CAIRO, 7th Dec. 1889.

In Stanley's letter of 17th August describing the geographical features of his journey, when giving an account of the Semliki Valley, he says:—"Alas for Mason Bey and Gessi Pasha! had they but halted their steamers for half an hour to examine this river, they would have seen sufficient to excite much geographical interest." He then describes the stream as he found it at a much greater altitude than that of the lake, 1500 feet at the least. As he did not cross this stream on his eastward and southward journey he did not see where it entered Lake Albert, and I think it must fall into the south-east corner. Both Gessi and myself noted a stream in the south-east corner of Lake Albert.* I append to this letter an extract from the log of H.H. steamer *Nyanza* for the 17th June, 1877, the day I tried to ascend what I believe to be the river in question.

The southern end of Lake Albert is covered by a very heavy fringe of ambatch, growing to a height of 20 feet, and completely intercepting the view. Moreover, the water shoals very rapidly on approaching this growth—I could only enter the various bays and inlets—and you will see on my map that I entered several. In this way I found myself at the mouth of the river which Gessi called the *Mississi*. Evidently I did not go so far as he did, and he gave it up after grounding in 18 inches of water (he had only steel whale-boats, and I had a steamer). Twice we grounded in 3 feet water among the papyrus and reeds. There was no possibility of conversing with the people on the banks, as they all fled at the sight of the unknown monster, (the steamer).

Gessi came down the east side of the lake and passed the night at Vacovia. I came down the western side of the lake, and had passed the previous night in a small bay. Both of us place the river *Mississi* in the extreme south-east corner. Both of us were struck by the reddish tinge of the water, and in my report to Colonel Gordon, I speak of water-logged floating matter.

Gessi says that the natives informed him that for nine months out of the year there was an abundant supply of water, but that in summer it was nearly dry—(probably during the months of the northern winter, when the sun reaches its extreme southern declination). Gessi was there on the 18th April, and I on the 17th June. During Gessi's visit there should have been more rain, and a stronger stream than in mid-summer when the sun was at its extreme northern limit. I certainly counted on returning to have another look at the river, and so probably did Gessi.

In the month of July 1877, Emin Pasha went down to have a look at that country, when he was on his journey to persuade Kaba Rega to send a mission to Khartum, but he seems not to have settled the question of affluents from the south.

I have not the honour to be a member of the Royal Geographical Society, yet the Society has been good enough to accept my figures for Darfur and for Lake Albert. The facilities that Gordon's work in Equatorial Africa gave us for transporting our instruments and books leaves no excuse for error. Stanley found the south-western side of the Albert, as sketched by Gessi and myself, very exact. I am

* 'Bulletin' of Khedivial Geographical Society, No. 5, Feb. 1878; 'Proceedings R.G.S.,' vol. xxii. p. 225; 'Proceedings of Italian Geographical Society,' vol. xiv, fascicolo 1, 2, Jan. and Feb. 1877.

still under the impression that the south-eastern corner was also properly reported and mapped.

In July 1878, whilst crossing the Suakim desert in company with General Gordon, we received a file of London papers, and learned that Stanley was returning from his expedition of that date. Gordon, on reaching Khartum, at once despatched to the Royal Geographical Society a copy of my report and plan, in order to assist Stanley.

Had we found a river in the south-west corner of the lake, I should not have been surprised, as there was a great forest-covered depression extending away to westward. This country he traversed on foot, and makes no note of a stream, so I am inclined to think that Gessi and I were right, and that we reported the only stream of any importance coming from the southward.

A. MACOMB MASON.
(Mason Bey, Cairo.)

To the Secretary R.G.S., London.

"Survey of Lake Albert Nyanza.—Extract from the log-book of steamer *Nyanza*, 17th June, 1877:—

H. M.			
6.45	N. by W.	} Half speed.	
6.52	N. $\frac{1}{2}$ W.		
6.55	..		
7	S.W. $\frac{1}{2}$ S.		
7.06	S.S.E.		
7.15	S.E. $\frac{1}{2}$ E.		
7.27	S.S.W.		
7.35	W. by N.		
7.50	..	Went into a hole.	
8.07	S.E. by S.	} Half speed.	
8.16	..		
8.25	N.E. $\frac{1}{2}$ E.		
8.57	N.N.E.		
9.04	S.E.	Entered river.	Bold sharp banks, from 800 to 500 yards wide. A large river, red in colour, with much floating dead matter, but very clean; slight current. Found no way of going higher, owing to the steamer grounding. There seems to be an end of things. Much high grass.
9.16	S.		
9.25	S.W. by S. $\frac{1}{2}$ S.		
9.45	S. by W. $\frac{1}{2}$ W.		
9.55	..	Grounded; backed out.	
10.48	S.E. by E.		
11.20	..	Turned back.	
11.30	N.E. by E. $\frac{1}{2}$ E.		
11.50	N.		
12	N.E. by E.	Observed latitude on natural horizon 1° 11' 03 N.	

Plot this, taking note of half speed, and you will have the line run by the steamer *Nyanza*. After 11.30 we were in deep water, steaming up the coast. The noon observation corresponds very nearly with Baker's *Vacovia*. It will be seen that from 9.04 to 9.55 we were going up the river, changing from south-east to south-west, and that, having touched the bottom, we went on for another half hour to south-east, after which we gave it up, as the steamer was always touching. After the first grounding it required fifty-three minutes to get the steamer clear and find a channel. Having no small boat, I was unable to properly sound out the channel through the grass, bush, or sudd. I gave it up for the moment, hoping to come back and have a better look at it with better means at my disposal. Fate willed it otherwise, for at the end of August I was at Khartum *en route* for the Abyssinian frontier."

REPORT OF THE EVENING MEETINGS, SESSION 1889-90.

Third Meeting, 9th December, 1889.—The Right Hon. Sir M. E. GRANT
DUFF, G.C.S.I., &c., President, in the Chair.

ELECTIONS.—*Clayton Bennett, Esq.; Arthur Frank Bowker, Esq.; Ebenezer Cayford, Esq.; E. A. Counsel, Esq.; George Crampton, Esq.; Charles Edward Fagan, Esq.; Thomas Patrick Fallow, Esq.; Professor W. H. Flower, C.B., LL.D., F.B.S. (Director of the Natural History Museum); Alexander Gibson, Esq.; C. J. Longman, Esq.; Robert Muir, Esq.; Robert Paul, Esq.; Edward Roper, Esq.; Captain Seymour Spencer Smith, B.N.; William Stock, Esq., B.A.; George Parker Thistlethwaite, Esq., B.A.; Rev. Andrew Craig Todd; Henry Wallach, Esq.; Anthony Walter, Esq.; Ethelbert George Woodford, Esq.*

The PRESIDENT announced that a telegram had been sent by him to Mr. H. M. Stanley, congratulating him on the success of his expedition and on his geographical discoveries, to which a reply had been received.

Mr. D. W. FRESHFIELD, Secretary, read the telegrams to the meeting (*ante*, p. 37).

The paper read was:—

Sir W. Macgregor's account of his Journey to the Summit of the Owen Stanley Range, New Guinea.

The paper was illustrated by lantern-slide views of Scenery and Natives, exhibited by Mr. A. P. Goodwin, who accompanied Sir William Macgregor as far as the top of Mount Musgrave.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Berlin.—November 2nd, 1889: BARON VON RICHTHOFEN in the Chair.—Dr. Ehrenreich read a paper on his recent journey from the Paraguay to the Amazons. This was undertaken with the view of following up the result of Dr. von den Steinen's second Xingu Expedition, in which the reader had taken part, its principal object being the solution of a series of ethnological questions by the study of the Indian tribes in the province of Goyaz and on the Araguaya. Dr. Ehrenreich set out on the 18th May, 1888, from Cuyabá, and reached on the same day the plateau of Chapara, the great Central Brazilian table-land, which slopes from an altitude of 2300 feet down to the Paraguay Valley. On the plateau the eye wanders over a boundless expanse of "campos," low hills covered with grass and small bushes, and numerous white-ant hills, between which in the intersecting valleys lie rich meadows; in the middle of the latter palm groves and dark-green river-woods reveal the presence of water-courses. The last fortified settlement is twenty-two leagues distant from Cuyabá. The only human dwellings from that point to the Araguaya are four military stations, each consisting of a large quadrangular open space, surrounded with palisades; three sides of which are taken up with the mean-looking mud huts of the soldiers and their families, and the somewhat better-built dwelling-house of the commander. These military posts cannot be said to justify their "raison d'être," which is the protection of travellers, the preservation

in repair of bridges and roads, and the attraction of colonists. After crossing the river-source of the Rio dos Mortes, the road trends far away to the south-east. The old direct route was abandoned four years ago on account of the wretched condition of the bridges, and also of the frequent attacks of Indians. The Indians belong to the race of the Bororos, who inhabit the whole country between Cuyabá and Goyaz. It is very necessary to be on guard against them, and to have good watch dogs. On the 17th June the traveller arrived on the Araguaya at the military station of Macedina, the region traversed being very hilly. The river is here over 100 yards in breadth. With the right bank of the Araguaya the province of Goyaz commences, and the route lies through the poorest parts of the province, which are most isolated from the world's commerce. In these districts there are only a few indescribably poor and half-abandoned settlements, where the passing traveller is solicited by the inhabitants for victuals. The ascent to the first terrace of the plateau of Goyaz is formed by the Serra do Moreco, which is about 1600 feet high; the mountains are bare upon the top, but their slopes are clothed with magnificent virgin forests. The second plateau terrace is the Serra do Itabira, from which in all directions a wide prospect is enjoyed over a confusion of table mountains, plateaus of great extent, resembling the walls of fortifications, and deeply-eroded valleys. The road from Torres to the Rio Conito is fairly good; every day some settlements with excellent cattle farms were passed. After crossing the great primeval forest, so well described by Castelnau, which, from Meca Ponte in the east to Rio Claro in the west, comprises the whole southern third of the province, the traveller arrived on the 10th July at the Villa boa de Goyaz, the celebrated old town of the gold-diggers, which lies in the deep trough of the narrow but rapid Rio Vermelho. In spite of its somewhat primitive life, Goyaz is a far more pleasant stopping place than Cuyabá, on account of its good postal communication. The postman from Uberaba, the last station of the San Paulo Railway, calls ten times a month; so that letters from Rio reach Goyaz in seventeen days. Almost every day large mule caravans and wagons drawn by yokes of oxen arrive from all parts of the province. European articles are naturally dear; the freight from Uberaba costs 20 shillings per 50 lb. Provisions, on the other hand, are astonishingly cheap. The chief ornament of Goyaz is the excellent public library with a good selection of scientific works and journals; there is also the newly-erected observatory. The large number of cultivated people, and the active interest in European affairs, the quiet and respectable tone of the press, are agreeable surprises. The rapid decline of the province, after the exhaustion of the gold mines, since the commencement of the present century, is beginning gradually to give place to improvement, and the two great American companies, which are endeavouring to render the Araguaya and Rio Vermelho navigable for steamers, give good ground for hope as regards the future. The Goyaz mining company has acquired a large tract of country (several thousand square miles) in the south of the province, with the right of exploiting the important gold and diamond deposits there; in return for this concession the company has contracted to settle some thousand colonists in that region. The Pará Trading Company is proposing to take in hand the trade with Goyaz, and the opening up of the forest regions on the lower Tocantins. The province of Goyaz has secured to the company a monopoly for ninety years, and granted a subsidy. On the other hand, the company has undertaken to compass the Itaboca cataract by a railway, and to render the Araguaya navigable for steamers. To regulate the current is out of the question, on account of the cost. The only practical way out of the difficulty is the construction of a railway, which would compass all the rapids of the lower part of the river up to S. Michael, then the whole of the middle course,

750 miles long, of the Araguaya would be opened up to commerce. But, unfortunately, the most populous part of the province, which is also richest in cattle, lies on the middle Tocantins, the navigation of which is much more difficult than that of the Araguaya. The country along the banks of the latter is as good as uninhabited and is unhealthy for colonisation. The more healthy southern portion of the province will soon be connected by railway with San Paulo, and will draw its requirements more easily and cheaply from the south. On that account the opening up of Goyaz to the world's commerce will proceed much more slowly than is imagined. On the 31st of July Dr. Ehrenreich started with the intention of navigating the Araguaya, which he reached at Leopoldina on the 6th August. The white sand dunes, the immeasurable expanse of water of the mighty stream, produced the impression that he had arrived at the shores of the ocean, for the Araguaya is the third largest river of South America. Although navigated one hundred and fifty years ago, it was explored for the first time in 1844 by Castelnau's expedition. But his survey of the river is not at all correct, and most of the collections of the expedition were lost. In the year 1859 the active governor of Goyaz, General Couto Magalhaes, had a small steamer transported on wagons, drawn by oxen, from the Upper S. Lorenzo, 100 miles overland to Itacain, in five months. This steamer was principally intended to tow the large boats, which come from Pará laden with salt, along the navigable stretch of 745 miles up to Leopoldina. Two other small steamers have been brought up through the rapids from Pará at great labour, but they are already quite useless. The Araguaya itself has a depth at Leopoldina in the dry season of from 12 to 15 feet. The voyage from here to Santa Maria can be made in from six to seven days, but ten days are usually occupied. The journey is fairly uniform. At the mouth of the Tapirapé the mountain ranges of the left bank come first into view; extensive sand banks, wooded islands, dense dark green woods lining the banks, the clearings in which afford every now and then a glimpse of the Campos lying behind, follow in endless succession. Animal life is not very abundant; numerous fresh-water dolphins, alligators, the dangerous thorn-back and the pirarucu, the giant fish of the Amazons, were met with. The right arm of the river, which cuts off the large and completely unknown island of Bananal under 13° south latitude, has hardly been navigated at all, even by the inhabitants living near, since the visit of Castelnau's expedition, because its approach in the months July to September is for the most part dried up. At S. Maria there is already a barrier of stones, which during the dry season compels the steamer to drop anchor. The direction of the Araguaya from Leopoldina to the southern point of the island of Bananal is not north-east but north; a Rio Alagado on the left bank does not exist—the Cristallino, which on the maps is placed at least half a degree too much to the north, should be put in its place. The small rivers, Rio Paxe and Rio Crixas, which on the maps are at least 120 miles from each other, should be placed 15 miles nearer to each other. The Tagirapés does not flow in at the northern end of the island of Bananal but about 93 miles more to the south. The life of the Indians can be studied to advantage on the Araguaya, being as yet untouched by civilization. The most important tribe are the Carajahis, who cling with great tenacity to their national customs. They do not enter into the service of the whites, their women are kept confined by stringent laws and customs, and they lead a domestic family life. Neither syphilis nor alcoholism has yet appeared among them, but tuberculosis is prevalent. The chief assistance they render is providing the steamer with wood; the captain of the vessel, a wideawake fellow, has contrived to win the hearts of the Indians, so that they consider themselves his protégés. The traveller commenced the difficult and dangerous boat journey from Santa Maria on the 12th September, and arrived on the 2nd November in Pará. On the way he found opportunity of studying the warlike

Chambiosas north of S. Maria, who possess a superabundance of victuals. Their villages are full of domesticated animals—araras, wild hogs (peccaries), monkeys, young alligators, &c. The island of Matiros, renowned in Brazilian folklore, which lies between S. José and the great cataract, exhibits Indian rock-carvings of the most beautiful description, with the figures of men and animals excellently carved. It is a most striking fact that the whole Castelnau expedition failed to remark these works of sculpture, so that Castelnau was able to deny even their existence. From here down to the mouth of the completely unknown Tacaiunas, the passage during the dry season is most difficult, on account of the numerous rocks, which abound in this stretch of the river, and of which nothing is seen at high water. Here the campo vegetation ceases, and dense primeval forests, in which the giant Brazil-nut trees (*Bertholletia excelsa*) are conspicuous, commence to clothe the banks. Between the last great cataract of Itaboca and Mocayuba, where civilisation begins, the traveller was fortunate enough to make the interesting discovery of the existence of a Caribbean tribe, the Apiacus, who, closely related to the Bakairi of the Upper Xingu, appear to form a connecting link between the Caribbean Guyanas and the Central Brazilians.

Geographical Society of Paris.—November 8th, 1889: M. Milne-Edwards, of the Institute, in the Chair.—The Society received news of the death of General Faidherbe, the well-known explorer and administrator of the French possessions in Senegal. From 1859 to 1865, General Faidherbe was actively engaged in directing missions into the then unknown regions bordering on the Senegal and Faleme rivers, and it is chiefly owing to his energy and the stimulus imparted to his successors that the map of this region has been so greatly changed during the last thirty years, and that the influence and protectorate of France have been so much extended. Since his work of administration ceased, General Faidherbe has occupied himself in scientific pursuits, and written several works, chiefly of an ethnographical character.—M. Daubr e forwarded an extract from a letter received from M. Martin dated 1st August, 1889 from Peking, from which it appeared that the traveller was about to start from Peking for Lan-Chau; he would proceed from there to Sin-ning over the hilly table-lands of the North of China, following a general line nearly parallel to the Great Wall; this region had not yet been visited by Europeans.—A letter was read from M. Gabriel Bonvalot, dated 12th September, from Kuldja, in which he stated that he was to start on that day in company with Prince Henry of Orleans, for Lake Lob-nor, having obtained the necessary permission to travel in that region. Their intention was to traverse Tsaidam and reach Batang by way of the Ma-ch'u. Thence their course would be directed towards Yunnan and Tongking.—M. Venukoff communicated some news from M. Dauvergne, who wrote on the 13th August from Shahidulla, to the south of Yarkand, to the effect that he had travelled from Ladak to that point with Major Cumberland and Lieutenant Bower, who were en route for the Pamir. M. Dauvergne also stated that according to news from Kunjut, Captain Durand (English Agent at Gilgit), Captain Mauner Smith, and Dr. Robertson had left Kashmir in June last with fifty native cavalry men, and by that date they would probably be at Hunza-Nagar. Captain Younghusband, with twenty-five men, had arrived at Ladak, and would join the Durand expedition.—M. Alfred Fournau informed the Society that he had just been entrusted by the Lieutenant-Governor of the Gabon-Congo region, with a mission of exploration in the country lying between the Ogow  and the coast, to the north-east of Gabon. The object of the journey would be to ascertain the water-divide for the rivers of Gabon, and the river Memy. M. P. Dolisie would be associated with him.—The Chairman gave a cordial welcome to the following travellers on their return home: Dr. Neis, who had returned from an exploration in the north of Tonking, and on the Chinese frontier, and M. Alfred

Marche, from a visit to the Marianne Islands, made in pursuance of a mission from the Minister of Public Instruction. The Chairman also intimated that the two Russian explorers, M. Piassetsky and General Kostenko, were present at the meeting.—In conclusion, M. E. A. Martel, read a paper upon his study of the Causes region in France, and of the subterranean waters there.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

EUROPE.

Asbóth, J. de.—An Official Tour through Bosnia and Herzegovina. Authorized English Edition. London, Sonnenschein & Co., 1890 [1889]: large 8vo., pp. xx. and 496. Price 20s. [Presented by the Publishers].

Herr Asbóth's original work was published in 1888 and noticed in the 'Proceedings' for March, 1889, at p. 186. The volume is an important contribution to our knowledge of these comparatively little-known countries, abounding as it does with information of every kind—geographical, historical, antiquarian and ethnological. Herr Asbóth spent four years in Bosnia, during which he accompanied the Governor of the province on all his travels through the length and breadth of the land. He had therefore opportunities afforded him of becoming personally acquainted with the country and people, and his own observations, together with facts derived from State documents, are embodied in the present work. A bibliography of works relating to Bosnia and Herzegovina is given at the commencement of the volume; there are, also, numerous well-executed illustrations, and an Index.

ASIA.

[Ainsworth, W. F.]—The River Karun, an opening to British Commerce. London, W. H. Allen & Co., 1890: crown 8vo., pp. xxviii. and 248. Price 6s.

The details of information on the Karun river and neighbouring country thrown together in this volume, render it interesting to the archæologist and geographer, as well as the politician, for whom the Shah's late concession has given to the question treated a special import. If it savours somewhat of haste in the compilation, it bears at the same time ample evidence that the compiler is not wanting in mastery of his subject. Colonel Mark Bell's contributions to 'Blackwood,' and those of Major Wells to the 'Proceedings of the Royal Geographical Society,' meet with well-merited consideration from Mr. Ainsworth.

Ball, V., LL.D., F.R.S. &c.—Travels in India, by Jean Baptiste Tavernier, Baron of Aubonne. Translated from the original French edition of 1676, with a biographical sketch of the author, notes, and appendices. London, 1889: 2 vols. 8vo., pp. lxx. and 420 and xviii. and 496, two maps, two portraits of Tavernier, and illustrations.

Tavernier came of a Protestant family, which originally migrated, as his biographer M. Joret supposes, from France to Belgium. They subsequently fled from Antwerp to Paris to avoid persecution, and soon accepted French naturalisation. Jean Baptiste, son of Gabriel Tavernier, was born in Paris in 1605, and early in life imbibed a taste for travel from hearing frequent discussions on geographical subjects at his father's house. By the time he was twenty-two he had already seen a good deal of Europe, and learnt several languages, besides having taken a not unworthy part in the stirring events of those troublous times. In 1631 he probably began that series of six journeys to India—the Persian travels are not included in this work—related in these two stout volumes. These journeys are interesting because of the picture they draw for us of India at the time when Portuguese supremacy had given way

before the attacks of the Dutch, many of the larger ports having been captured by these latter and by the English. The Portuguese Viceroy, however, Don Philippe de Mascarenhas, still held a magnificent court at Goa, and the Inquisition continued to exercise unlimited and irresponsible power. All this, and a great deal more, is told in Book I., enlivened with observations on the road, anecdotes, and personal adventures. Book II. contains a historical and political description of the Empire of the Great Mogul. Here the author's statements are, as we learn from a footnote, in conflict with those by other authorities. The latter part of this book treats of diamonds and other precious stones, and of Tavernier's visits to the mines of Golconda, Bijapur, and others. He was not, however, the first European to visit them, as he supposed; other travellers having, as his editor remarks, preceded him. Mr. Ball's special knowledge of mineralogy stands him here in good stead for the annotations, and he has succeeded in identifying the localities of mines mentioned by Tavernier, a task which had baffled investigators in this and the last century. Book III. treats of the religion of the Mahommedans and idolaters of India, and of the author's voyage from Surat to Batavia, and from Batavia to Holland. On returning to Paris from his sixth journey, Tavernier took the King (Louis XIV.) a parcel of beautiful diamonds, and had a very favourable reception, which was, he remarks, a glorious conclusion to his long journeys. In these he had passed nearly forty years of his life, and travelled 60,000 leagues. The editor gives in appendices at the end of vol. ii. some interesting information on precious stones, diamond mines, &c. An index and glossary conclude the work. We have not been able to compare this translation with the original, though we have no hesitation in saying that it is far better than the contemporary English version by Phillips, who omits passages, and renders others incorrectly. The general map of India is rather too small to illustrate effectively these travels. We should have preferred one on a larger scale, giving the old and modern names of all places identified.

In conclusion, let us observe that a few years ago it was reported to the Russian Geographical Society at St. Petersburg, that Tavernier's tomb had been discovered in a Protestant cemetery near Moscow. This statement now appears somewhat doubtful, as there is positive evidence to show that the great traveller ended his days, not at Moscow, but at Smolensk.—[E. D. M.]

Conder, [Major] C. R., R.E.—Palestine. (The World's Great Explorers and Explorations.) London, G. Philip & Son, 1889: 8vo., pp. vi. and 270. Price 3s. 6d. [Presented by the Publishers.]

This volume is in the main a popular history, not so much of Palestine Exploration as of the Survey of Palestine, carried out between 1872 and 1877, under the conduct of the author, Major Conder, as well as of the subsequent and only partially successful attempt to survey Moab, Gilead, and Bashan, which was impeded by political intrigue and the growing feebleness and perversity of the Turkish Government. Major Conder's object is to show that "not only in a geographical sense, but also as a contribution to the true understanding of the ancient history of the East, his labours were not in vain, and that his method was such as to give exhaustive results." The value of his explorations, he claims, was greatly increased by the fact that they were conducted in a scientific spirit, without regard to any preconceived theories, and with that reverence for facts which had often been found wanting in earlier writers, who knew nothing but their Bibles.

The promise of the title, *Palestine*, is, as to the extent of ground covered, not exactly borne out. Northern Syria is thrown in, while the great plains of the Hauran, and the volcanic regions of the Lejah, Jebel Hauran, and Jaulan, properly part of Palestine, are left out. This was a regrettable necessity arising from political and temporary causes which have rendered inaccessible of late years a region where twenty years ago Englishmen were (*experto crede*) warmly welcomed. From personal knowledge, we can promise to the first explorer who is fortunate enough to visit this country in detail, whatever his chief aim may be, a rich harvest. Kunawat is probably the most picturesque site in Palestine: the lava-built town of Shuhba, situated on the slopes of the volcanic cones which

created the Lejah, the most weird. On the top of El Kleib, the Hill of Bashan, are ruins which have, we believe, never been revisited or explored since 1868; the eastern slopes of the Jebel Hauran are most imperfectly known. The lava-fields of the Lejah, with the Roman cities built inside their wavelike ridges, deserve fuller investigation. Here, as well as in the region north of Damascus, houses of Roman governors, temples, and Christian churches stand almost as perfect as the day they were built. It is well, in the interests of future exploration, to insist at every opportunity on the call for further work in this, both physically and archæologically, most fascinating district. An Englishman who went to work quietly, and made friends with the Druses of the mountain, might even now find means of making many discoveries, and linking his name with that of De Voguë in the annals of exploration.

Well-worn as Palestine may seem as a subject, Major Conder has succeeded in making his volume fresh and attractive. His knowledge and interests are varied, and his personal adventures are happily brought in. Moreover, he has shown a wise discretion in supplementing his biblical illustrations by frequent references to the light thrown on the more recent history of the country by his researches.

Major Conder enjoys a great advantage over the ordinary traveller in having seen the country he describes at all seasons. He is able to describe the heights of Judæa in their bleak winter aspect; the exquisite flowers that in spring paint the slopes of the Jordan valley in royal reds and purple; the gold of the early harvest; and the browns of summer, when the snows have melted from Hermon, and the dust-storms sweep over the high plains of the Hauran. He has also plenty of hardships, adventures, and perils with which to enliven his narrative. Creeping along subterranean passages or exploring tanks of sewerage on a raft, braving fierce Bedawy in the Jordan valley, or perverse and violent villagers in Galilee, the officers of the Palestine Exploration Fund have often found their work dangerous and even fatal. Major Conder has blended his materials skillfully; his pages are full of information, but it is all put in a form that will stimulate to further enquiry. Among many remarks of scientific interest, we are told that the climate has not materially changed since the time of David, a conclusion which is borne out as to the whole Mediterranean by classical literature. The different classes of ruins in the country, from the prehistoric dolmens, to which Major Conder was the first to call attention, upwards, are distinguished according to their epochs, so that henceforth even the most casual tourist can have no excuse for confusing Roman and primitive workmanship. In Major Conder's own words, "The seasons, the climate, the fauna and flora, the crops, the native customs and speech, the remains of Hebrew architecture, art, engineering, and monumental writing," are in turn touched on. An introductory chapter deals with the early travels and maps that have come down to us. The historical setting to these brief bibliographical notices might have been advantageously made a little fuller. For the vicissitudes of the country between the fall of Roman rule and the Crusades are hardly matters of common knowledge to the general reader. And though the task may have been put aside as invidious, we should have been glad to see young readers specially recommended to a few among recent English writers. The French staff map of the Lebanon and the map of Palestine of Van de Velde, the best that 20 years ago could be put in a traveller's hand, certainly ought to have had special mention in a book dealing largely with survey work; and is it legitimate to draw unfavourable inferences as to the geographical knowledge of the 4th century from the Peutinger Tables—the one road-map which chances to have survived from that era? Surely the government which made the roads that intersect the Hauran and stretch away from the walls of Bostra into the eastern desert, which sent its legions from Britain to Bashan, must have known pretty correctly the relative position and distances of the great towns of Syria! The volume is well supplied with small maps, two physical and three historical. In the first, the high road from Beirut to Damascus has been omitted, and in the height given to El Kleib there is a misprint in the thousand column. Palestine is not an easy subject for book illustrations, for while the lines of the landscape are often tame, the colours are as a rule vivid. Hence the public gets a succession of gaudy daubs and characterless outlines. The woodcuts in this book are

topographically exact and good as far as they go, which is perhaps not far enough. Roberts's lithographs remain the most satisfactory representation of Syrian scenery, and will always be valuable as records of a time when Jerusalem was still an Eastern city. We read with dismay that it has now become "a Levantine town," surrounded by model cottages.—[D. W. F.]

Izvestija Imperatorskago Russkago Geographicheskago Obshestva. (Proceedings of the Imperial Russian Geographical Society.) Vol. xxiv., Nos. 1-6. St. Petersburg, 1888.

No. 1 is devoted to the geography of Northern Tibet. It contains a reprint of Chapter vii. of Prjevalsky's last work, and a translation of Mr. A. D. Carey's report on his journey in Chinese-Turkestan, and along the northern border of Tibet, from the December number of our 'Proceedings' for 1887. A map compiled from Carey's route map accompanies the fascicule.

No. 2 contains an article by I. V. Mushkétov on the earthquake of the 27th May, 1887, at the town of Verny; a sketch of the history of the development of the Caspian sea and its inhabitants, by N. Andrussof, with diagrams; a note on the area and population of Persia by A. M. Zolotaref. According to this last the totals are 29,985·6 square German miles, and 8,000,000 inhabitants, or 200 per square mile. Two appendices are bound up with this part, viz. Instructions for observations on the character and distribution of drift-sands, and Instructions for taking meteorological observations by travellers.

No. 3 contains: A sketch of the natives of the Russian shores of the Pacific, by A. A. Resin; on setting to music the national songs of the Russian peasants by N. E. Palchikoff; a few words on the orography and geology of Northern Persia, by K. J. Bogdanoff; on the level of the Baltic, by Colonel Mikhailof, chief of the Baltic survey; on the absolute height of Mount Airiuk, by A. A. Tillo; and an obituary notice on N. M. Prjevalsky, by J. P. Minaief. The appendices are: Instructions for observing sea coasts; on the study of the Lettish and Lithuanian mythologies, by E. A. Voltaire.

No. 4 is mostly filled with the reports of speeches delivered at an extraordinary meeting of the Society, held in honour of the late Nikolai Mikhailovitch Prjevalsky on the 9th November, 1888. There is a portrait of the traveller and a brief notice of the last hours of his life by his friend and companion V. Roborofsky. An appendix on the aims and scope of geography, translated from Gerland's "Beiträge zur Geophysik," by J. V. Mushkétov, concludes this part.

No. 5 contains: Turkestan and the Trans-Caspian country in 1888, being the notes of travel of the Vice-President of the Society, P. P. Semenoff. In this sketch the author draws an interesting comparison between the extent of the Russian empire in Central Asia at the time of his last visit in 1858 and its present extent. He also refers to the remarkable growth of our knowledge of the geography of this part of the world in the last quarter of a century, or rather more. M. Semeonoff was invited to take part in the opening of the Trans-Caspian railway, and accordingly landed at Uzun-ada, the present terminus of the line on the shore of the Caspian, on the 22nd April. He observes that the question of diverting the course of the Amu-daria into the Caspian has lost its practical significance since the opening of the railroad—the question of extending the line to Krasnovodsk and making the terminus at this port is, on the other hand, of a far more urgent character. The rivers of this part of the world will be of no use in developing communications; their part will be that of fertilising the waste lands of which 90 per cent. of the Trans-Caspian territory consists. The other articles are: the Kazbek glaciers, by G. Khatissian; the hydrography of the river Tavda (a left tributary of the Irtysh), and its economical importance in the Siberian transit trade (with a map); a sketch on telluric shocks, by M. Pomortseff; on barometric heights determined by R. N. Savélief in the Caucasus in 1888, by A. A. Tillo; and bibliography.

No. 6 contains a paper by B. J. Sresnefsky on the determinations of altitudes in European Russia on the basis of new isobars; a preliminary report on excursions in Lithuania and Imuda by E. A. Voltaire in the years 1884-1887; on barometric heights of the locality north of Petrozavodsk determined

in 1888 by N. V. Kaulbars, by A. A. Tillo; bibliography, &c. This part is accompanied by a map, showing the average annual atmospheric pressure in Russia for the years 1882 and 1883; a map of the region north of Petrozavodsk to illustrate Baron Kaulbars' aneroid heights; two plans (coloured) of the Kivatch waterfalls and Poor cataract from surveys by Henry in 1886 to illustrate the last-named author's paper, and an index to the whole volume.

Izvestija Imperatorskago Russkago Geographicheskago Obshestva. Proceedings of the Imperial Russian Geographical Society.) Vol. xxv., parts 1-3.

No. 1 contains the Imperial rescript renaming the town of Kara-kol "Prjevalsk," in memory of the traveller. The first article is a review of village schools in all parts of European Russia, according to recent statistical data by M. N. Raefsky. The next is on the results of astronomical observations for the determination of the geographical positions of places and barometric measurements for heights in North-western Dzungaria by M. Pevtsuf, who succeeded, upon the death of the late N. M. Prjevalsky, to the command of the expedition now believed to be exploring Northern Tibet. This number contains an excellent facsimile reproduction by photography of an old map of Russia by Hessel Gerard, dated 1614, and dedicated to the Tzar Michael Feodorovitch. General Stebnitsky, in a brief notice of it, says it differs so distinctly from every previous work of the kind that it may be called "geographical," and that it is based on a few measurements. The material which served for this map was doubtless the *Bolshoi Chertej* or "Great Survey" of European Russia produced under the auspices of the Tzar Boris Godunof. The comparative accuracy of Gerard's map between North and South, and its relative inaccuracy from East to West show that the latitudes determined by Englishmen at Archangel, Astrakhan, and other places, had been utilised; but the want of observations for longitude throw the meridional positions out as much as $7\frac{1}{2}^{\circ}$. The delineation of the Caspian is very incorrect, that sea being represented with a longer axis from east to west than from north to south. The inset plan of the city of Moscow is interesting. Baron Kaulbars contributes a note on snowflakes of an unusual shape observed by him in February in St. Petersburg. A diagram accompanies his remarks.

No. 2 begins with an article by A. A. Tillo, on the mean height of the land and average depth of the sea in the northern and southern hemispheres. This is a contribution to higher geodesy, helping to ascertain the figure of the Earth, and to what extent this differs from an ellipsoid. A comparison between Dove's earlier observations and Tillo's figures shows a considerable difference in the relative proportions of land and water in certain parallels; whilst their general results for the whole globe nearly coincide. Thus, according to Dove, there is 26.9 per cent. of land and 73.1 per cent. of water, while Tillo finds the quantities to be 26.6 and 73.4 per cent. respectively. The author speaks very highly of the map produced by Bartholomew to illustrate John Murray's article on the same subject, published in the Royal Scottish Geographical Society's Proceedings for 1887. Five tables accompany this article.

The next article is by N. I. Kuznetsov on his journey in the mountains of the Kuban, together with his hypsometric observations worked out by Tillo. This is followed by: a list of heights deduced from the observations of A. A. Antonof in the Southern Ural, within the confines of the government of Ufa, in 1888; observations with the pendulum at the villages of Jeltukhin and Great Sheremétief, by Professor T. A. Bredekhin, of the Moscow Astronomical Observatory, and a note by J. Stebnitsky on the results obtained by the above-named observer and by P. K. Sternberg, as compared with theoretical data. The number concludes with a brief review of the course of the Russian export and import trade during 1888.

No. 3 contains an article by J. P. Nadarof on the South Ussuri country, and its actual condition. The author, who passed some time in this region on a government mission, gives some interesting particulars of the inhabitants—Russians, Koreans, Chinese, Japanese, and others. He also speaks of the State-aided colonisation entering by the port of Vladivostok, of the trade, climate, and industrial pursuits of the settlers. General A. A. Tillo, president of the

Mathematical section, contributes a paper on the Hypsometry of European Russia. In this he reviews the work done during the last fifteen years and published in detail in the Memoirs of the Military Topographical Department. He points out certain corrections resulting from the more accurate levels run across Russia, e. g. Moscow is 21 feet higher than it had previously been shown, and the mean level of the Baltic at Cronstadt is only 16·9 inches above that of the Black Sea at Odessa. All the heights now observed have been entered on a map of European Russia on the scale of 10 versts to the inch, and upon the basis of this map horizontal-contouring lines have been drawn on another map, 60 versts (40 miles), reduced to one-sixth of the scale of the special map just mentioned. In this 60-verst map the northern sheets are not included for want of materials, neither is the Caucasus, of which there is a separate 40-verst map.

The next article is the Diary of a journey by land from Chin-kiang to Peking, by G. Kerberg. The author was acting Consul at Hankow during the temporary absence from his post of M. Dmitrefsky. On the return of the latter to resume his duties on the 28th November, 1886, M. Kerberg set out for Shanghai on his way to Peking, but finding on arrival at Shanghai that the regular steamers had discontinued running, he determined to reach his destination by land. The route from Chin-kiang, reached in twenty-seven hours from Shanghai, lies up the Imperial Canal as far as Tsing-kiang-pu, whence the author and his companion, a Chinese customs officer who had been in London for the Health Exhibition, hired carts for their further journey to Peking. The whole distance by the route travelled was 2302 li, and the time nineteen days. The last paper is a preliminary report on the Tauric hills in the Crimea, with special reference to the caves there.—[E. D. M.]

Izvestija Vostochno-Sibirskago otdiela Imperatorskago Russkago Geographicheskago Obshestva. (Proceedings of the East Siberian Section of the Imperial Russian Geographical Society.) Vol. xx., No. 3. Irkutsk, 1889: pp. 83.

The number before us contains an article by Vagin, on the provision supplies of Irkutsk. The author concludes by remarking that, dependent as this city is on distant sources of supply (Mongolia, Büsk, and trans-Baikalia for its meat, the trans-Baikalian fisheries for its fish), improved communications with these and other districts are urgently needed.

The next article is a sketch of the gold placers of the Amur basin, by Yakof Makerof, with two illustrations. Under the head of miscellaneous, there is an interesting account of the discovery and partial excavation of a mammoth in the Turukhansk circuit. The precise spot where the body of this monster was found lies between the river Balakhna and the Khatanghin Gulf, only ten miles from the Glacial Ocean. Owing to the exceeding hardness of the frozen soil, which neither axe nor pick could make impression on, it was impossible to say how much of the animal remained buried in the clay. According to the natives, who had begun excavating in 1887 and 1888, with the object of getting at the tusks, the parts then exposed were covered with skin, but air and water having been once admitted the process of decomposition has gone on till very little skin is left. The bones found near the surface were collected and placed in a hole in the ground, but it was impossible to obtain earth to cover them. Another mammoth has been found near the village of Sutrobuisimsk, about forty-three miles from Krasnoyarsk. This was accidentally discovered by workmen while digging a well. The skeleton is nearly complete, but it is that of a young animal, and the bones are exceedingly brittle. A third mammoth has been heard of in the circuit of Kansk. These new finds of *Elephas primigenius*, soon after the publication of Mr. H. H. Howorth's exhaustive and able work on the subject, are naturally attracting attention in scientific circles in Siberia. And we find in the same number recording these discoveries a translation in Russian of that author's letter to 'Nature,' of the 24th January, 1889.—"The climate of Siberia in the mammoth age." "Mr. Howorth, in rejecting a glacial epoch in Siberia," writes his Russian translator, M. Obruchof, "goes a little too far, for P. Krapotkin pointed out traces of glaciers in the Olekminak-Vitim system, and more recently N. M. Kozmin has collected a number of data in the smaller

tributaries of that system, which make the existence of a glacial epoch in Eastern Siberia highly probable, besides which there are traces of former glaciers in the Sayansk and Stanovoi ranges."—[E. D. M.]

Le Messurier, [Colonel A., R.E.].—From London to Bokhara, and A Ride through Persia. London, Bentley & Son, 1889: 8vo., pp. xvi. and 320. Price 15s.

It is, perhaps, unfortunate that the publication of Colonel Le Messurier's book was delayed by circumstances. Had it appeared when his notes were completed, two years ago, the volume would have had the advantage of being a quasi revelation, rather than the supplement to a revelation, in describing a region of immense political importance. Although divided into four parts, of which the first treats of the journey from London to the Caucasus, the second of Caucasia itself, the third of Trans-Caspia, and the fourth of Persia—its main, or Central Asian section, is its *raison d'être*: those which relate to Europe and the tracts west of the Caspian scarcely touch new ground, while the Persian route is along the best known highway of the Shah's dominions. But Colonel Le Messurier was conveyed in the Russian locomotive no further than to the Oxus; and Mr. Curzon is now not the only European traveller who has told the story of the Trans-Caspian Railway up to Samarkand.

Notwithstanding, however, the drawback of being late in the field, our author has supplied his readers with an amount of practical information which cannot fail to be highly serviceable to those among them who contemplate a first visit to any or all of the lands traversed by himself. No part of his journey is brought to a close without an abstract of route, time, and cost. The Appendix contains a list of kit required by the traveller, with dimensions of the "Gladstone," or other bag in which it is to be packed, besides time-tables for road and railway and details of steamboat service; and there is abundance of stray instruction of a technical and general nature scattered throughout the pages. There are, moreover, three illustrations of land elevation in Persia and Baluchistan which have much geographical value.

Proskowetz, Dr. Max [Von].—Vom Newstrand nach Samarkand. Durch Russland, auf neuen Geleisen nach Inner-Asien. Mit einer Einleitung von H. Vambéry, einem Anhang, 53 Original-Illustrationen von R. Hausleithner u. A., zum Theil nach Skizzen des Verfassers, einer Notenbeilage und 4 Original-Karten. Wien und Olmütz, E. Hölzel, 1889: 8vo., pp. xxv. and 532. [Presented by the Author.]

In this volume, rendered doubly attractive by appropriate illustrations interspersed freely among its pages, the author has really produced a comprehensive and valuable guide-book to the newly-opened countries of Central Asia, designed not merely to suit the purposes of the ordinary traveller, but, in respect of political, economical, commercial and industrial questions, deserving the study of statesmen and diplomatists. Dividing his subject into four parts, he describes in the first the now fairly-known Warsaw-Petersburg, Petersburg-Moscow, and Moscow-Nijni Novgorod lines of railway travel; the Volga route from Nijni to Tsaritain and Astrachan (including Kazan, Samara, and Saratov), as well as the line passing westward of the Volga through Varonesch, Novo Teherkask and Rostov, to Vladi-Kavkas. In the second, he treats of Daghestan and tracts west of the Caspian. The third unveils the mysteries, already in great part disclosed by Mr. Curzon and others, of the Trans-Caspian region, and conveys the reader from Baku to Bukhara and Samarkand. In the fourth part, Baku, Tiflis, Batum, the Crimea, Odessa, and Kiev come respectively under notice.

To Englishmen acquainted with the literature of Central Asian exploration, as carried on in later years—say from Vambéry to Curzon—the most interesting chapter of the Chevalier de Proskowetz's book will probably be that in which he relates his digression from the Turkman railway to Mash-had in Persian Khurasan. In the 5th section of Part III., we learn that he rode from Kahka, a station between Bába Durmáz and the Tejend, across the mountains which

separate the Russian possessions from Persia, into the valley of Mash-had, and up to the gates of the sacred city. More favoured for the nonce than our countryman—who at a recent date fruitlessly proposed for himself and friends a “little excursion” of similar character from Dushak, a station east of Kahka—he was permitted to do this “by fortunate circumstances,” though we are assured that the privilege accorded is denied to “high Russian officers of the Imperial staff.” He left Kahka at 11.30 A.M. on the 21st October, 1888, and arrived at Mash-had at 8 A.M. on the 23rd id., having been 30½ hours in the saddle out of 44½. On his return to Kahka the march occupied 36 hours, of which 26 were in the saddle. The distance is given as 138·9 kilometers, or 87 miles. In 1873, when proceeding to visit the fort known as *Kald-i-Nadir* the late Colonel Valentine Baker must have gone over part of the same route, as both travellers rested at Karleh, a little fort, the interior of which was, according to the English author, “a regular rabbit warren.”

A characteristic introduction by Professor Vambéry reviews, with dramatic illustration, the marvellous changes effected during the last quarter of a century in the heart of Central Asia. He takes occasion to note the literary labours of specialists such as Kharoshkin, Zagriajski, Fedchenko, Abramof, Grodekof, Lessar, Petrusévitch, Radde, Heyfelder, Kuropatkin, and Osten Sacken for Russia; Shaw, Hayward, Forsyth, Ney Elias, Baker, Macgregor, Marsh, Napier, O'Donovan, and the British members of the late Anglo-Russian Commission for England; Schuyler and MacGahan for America; Stumm for Germany; and Capus and Bonvalot for France. Speaking of the author of the volume under notice he says: “Herr Von Proskowetz has the happy gift of a brilliant and fascinating style: his descriptions are true and masterly, and it is much to be desired that the commercial and industrial circles of Austria-Hungary should turn their attention once again to Central Asia under the direction of this excellent and trustworthy guide.”

As to the further contents of this volume, mention should also be made of an Appendix, replete with useful data and varied information, and of maps bearing upon the routes described in the text.—[F. J. G.]

AFRICA.

Bryden, H. A.—Kloof and Karroo: Sport, Legend, and Natural History in Cape Colony, with a notice of the game birds, and of the present distribution of the Antelopes and larger game. London, Longmans & Co., 1889: 8vo., pp. xiii. and 435, illustrations. Price 10s. 6d. [Presented by the Publishers.]

Reminiscences of travel and sojourn in the Witteberg range, in Cape Colony. The volume mainly deals with the sport and natural history of the region embraced, and contains full information on the game to be found in the Colony at the present day. In the Chapters headed a Karroo Farm, The Boer of To-day, and The Future of Cape Colony, the author endeavours to indicate some of the present aspects of colonial life. The illustrations representing animals and scenery are reproductions from photographs, and are clearly executed.

Flower, Charles E.—Algerian Hints for Tourists. London, E. Stanford, 1889: 12mo., pp. 60, frontispiece. Price 2s.

This little volume is intended to serve as an appendix to the ordinary guide-books to Algeria. It embraces the following subjects—Guide-books, Hotels, Diligences and Railways, Climate, and Excursions, including those to (1) Fort National and the Kabyle country; (2) Milianah, Teniet el Had, and the Cedar Forest; (3) Blidah, the Gorge of Chiffa, and Hammam Rir'ha; (4) Biskra, Constantine, and Hammam Meskoutiu; (5) The Pass of Châbet el Akhira; (6) to Oran and Tlemçen.

[**Mr. Stanley.**]—The Story of Emin's Rescue as told in Stanley's Letters. (Published with Mr. Stanley's permission.) Edited by J. Scott Keltie. London, Sampson Low & Co., 1890: 8vo., pp. 190. Price 1s. [Presented by the Publishers.]

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

WORLD.

Climatology.—Linien gleicher Wärmeanomalie des Januar. (Thermische Isanomalien).—Linien gleicher Wärmeanomalie des Juli (Thermische Isanomalien). Entworfen von Rud. Spitaler. Petermann's 'Geographische Mitteilungen,' Jahrgang 1889, Taf. 17, 18. Gotha, Justus Perthes. (*Dulau.*)

EUROPE.

Elbe und Moldau.—Stromkarte der —, von Prag bis Hamburg von W. Platt. Scale 1:100,000 or 1.3 geographical miles to an inch. Magdeburg, Rathke. Price 6s. 6d. (*Dulau*)

Salzkammergut, Salzburg und Ost-Tirol.—Reise und Wanderkarte für das —, mit Angabe der Hauptansteigerungen aller häufig bestiegenen Bergspitzen, von G. Freytag und H. Hess. Unter Mitwirkung der Deutschen und Oesterreichischen Alpenvereines bearbeitet. Scale 1:250,000 or 3.4 geographical miles to an inch. Wien, Freytag und Berndt. Price 3s. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued during the month of November 1889.

1-inch—General Maps:—

ENGLAND AND WALES: New Series. Sheets 112, 174, 224 (in outline); 1s. each. IRELAND: Sheet 167 (hill-shaded); 1s.

6-inch—County Maps:—

ENGLAND AND WALES: Carmarthenshire: 48 N.W., 49 N.W.; 1s. each. Dorsetshire: 52 S.E.; 1s. Pembrokeshire: 26 S.E., 27 S.W.; 1s. each. Somersetshire: 33 N.W.; 1s. Staffordshire: 18 N.E., 37 S.E.; 1s. each.

25-inch—Parish Maps:—

ENGLAND AND WALES: Anglesey: X. 4, 3s.; XI. 1, 8, 4s. each. Cardiganshire: XIX. 3, 4s.; XIX. 8, 3s.; XX. 7, 4s.; XXIII. 4, 3s.; XXIII. 12, 14, 15, XXIV. 14, XXV. 1, 4, 4s. each; XXV. 10, 3s.; XXV. 11, 13, 14, XXVI. 5, 11, 12, 4s. each; XXVI. 13, XXIX. 8, 3s. each; XXX. 14, XXXI. 8, 9, 10, 11, XXXII. 1, XXXVIII. 8, XXXIX. 10, 13, 16, 4s. each. Carmarthenshire: V. 13, XIII. 11, 12, 4s. each; XXII. 4, 3s. Carnarvonshire: I. 12, II. 13, IV. 8, VII. 13, XI. 3, 12, XV. 8, 4s. each; XVIII. 8, XXX. 6, XXXIX. 3, 3s. each; XXXIX. 15, 4s. Devonshire: III. 9, 5s.; III. 15, V. 8, 8, XV. 6, 9, 11, 4s. each; XV. 14, 3s.; XV. 15, 16, XXI. 4, 15, 16, XXII. 16, XXIV. 11, XXV. 10, XXXII. 2, 4, 14, 15, XXXIII. 5, 4s. each; XXXIII. 8, 3s.; XXXIII. 10, 4s.; XXXIII. 12, 3s.; XXXIII. 14, 4s.; XXXIII. 16, 3s.; XXXV. 5, 8, XXXVI. 9, XLIII. 1, 2, 11, 12, 15, XLVIII. 11, LV. 12, 13, 15, 16, LVI. 3, 4, LVII. 3, 6, 8, LVIII. 5, 4s. each; LVIII. 6, 7, 3s. each; LVIII. 8, 9, 10, 4s. each; LVIII. 11, 3s.; LVIII. 13, 16, 4s. each; LIX. 2, 3s.; LIX. 3, LXVII. 12, LXIX. 6, 13, LXX. 2, 6, LXXI. 2, 5, 15, LXXII. 9, LXXXII. 2, 4s. each; LXXXII. 8, 3s.; LXXXIII. 9, 12, 13, 4s. each; LXXXIII. 1, 16, LXXXIV. 1, 11, 3s. each; XCIV. 1, 3, 4s. each. Dorsetshire: XXXVII. 2, 6, 11 and 15 (as one sheet), 4s. each; XL. 12, 3s.; LI. 6, LII. 4, LIII. 3, 4s. each. Lincolnshire: XXII. 15, XXIII. 13, LXXVI. 10, 15, 4s. each; LXXXIII. 8, 5s.; CIII. 16, CIX. 6, 6, 7, 4s. each. Merionethshire: VII. 15, 4s.; XV. 7, 3s. Norfolk: Area Books: Haveringland, Stratton Strawless, 1s. each. Pembrokeshire: II. 10, 15, V. 13, VI. 3, 7, 10, 13, 16, 4s. each; XII. 6, 7, 3s. each; XXVII. 4, XLI. 15, 4s. each. Radnorshire: IIIA. 16, 3s.; V. 5, 9, 4s. each; IX. 8, 3s. Somersetshire: XXXIII. 4, XLV. 1, 4, 6, 11, 3s. each; XLV. 15, LXX. 15, 4s. each. Suffolk: Area Book: Wickham Market, 1s. Warwickshire: XXI. 3, 4s. Worcestershire: Area Book: North Hallow, 1s.

Town Plans—10-feet scale:—

ENGLAND AND WALES: Barnsley, CCLXXXIV. 7, 14, 15, 18, 19, 20, 23, 24, 25; CCLXXXIV. 11, 3, 4, 5, 10, 15; CCLXXXIV. 12, 1, 6, 11. Barnsley is now complete in 16 sheets, 2s. 6d. each. Garston, CXIII. 12, 14, 15, 20, 22, 24, 25; CXIII. 16, 2, 3, 8, 10, 13, 14. Garston is now complete in 18 sheets, 2s. 6d. each. Newton Abbot, CIX. 12, 17; CIX. 15, 15; CIX. 16, 1, 6; 2s. 6d. each. Rotherham, CCLXXXIX. 7, 22, 23; CCLXXXIX. 10, 4, 5, 8, 9, 13, 14, 15, 20, 25; CCLXXXIX. 11, 1, 3, 6, 7, 8, 12, 13, 16, 17, 18, 22, 23; CCLXXXIX. 14, 5; CCLXXXIX. 15, 1, 2, 3; 2s. 6d. each. Wednesbury, LXVIII. 1, 10; 2s. 6d.

(*Stanford, Agent.*)

ASIA.

Cochinchine Française.—Carte de la —, dressée pour la Cochinchine, d'après les travaux de MM. les Géomètres du service topographique de Cochinchine, la carte du Comm. Bigrel, les cartes et Observations Astronomiques du Dépôt de la

Marine, les excursions et reconnaissances en Cochinchine, les voyages du Dr. Neis, etc. Pour le Cambodge, d'après les travaux de la Marine, le Rapport de M. l'Ingénieur hydr. Renaud, la Carte de M. Pavie, etc. Pour l'Annam, d'après les travaux de MM. les Officiers du Corps expéditionnaire de l'Armée, les voyages du Dr. Neis, les excursions et reconnaissances, etc. Par le Commandant AL Koch. Scale 1:400,000 or 5·5 geographical miles to an inch. Publiée sous les auspices de M. Étienne, sous-Secrétaire d'Etat aux Colonies. Paris, Challamel et Cie., éditeurs, 1889. 4 sheets. Price 12s. (*Dulau.*)

The sources from which the material has been obtained in the construction of this map are set forth at length in the title. It is well-drawn, and conveys a very accurate idea of the physical features of the country. The boundaries of arrondissements, telegraph lines, railways, &c., as well as the extent of rice and other cultivation, are shown, and on one sheet a map of the country round Saigon is given. Great judgment has been shown in the selection of the colours in which the map is printed, the lettering is remarkably distinct, and it is altogether a very fine specimen of cartography.

AFRICA AND MADAGASCAR.

Deutsch-Ost-Afrika.—Karte von —, nach dem besten und neuesten Material bearbeitet von Franz Moises. Scale 1:6,000,000 or 82·2 geographical miles to an inch. München, Moises. Price 1s. (*Dulau.*)

Deutsche Kolonialkarten.—No. 9. Schauplatz der Wissmannschen Expedition. Redigirt von J. I. Kettler. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Weimar, Geographisches Institut. Price 1s. (*Dulau.*)

Klerksdorp Gold Fields.—Map of the —, situated in the District of Potchefstroom, S.A.R. Scale 400 Cape roods to 1 inch (English). London, E. Stanford, 1889.

Madagascar.—Carte de —, par E. Laillet Ingr., et L. Suberie, explorateurs de l'île, d'après leurs documents personnels complétés à l'aide des cartes de la marine, et les itinéraires suivis par divers voyageurs. Paris, Challamel et Cie., éditeurs, 1889. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Price 12s. 6d. (*Dulau.*)

This map has been carefully compiled from all the latest available material. Soundings all round the coast, and the heights of the mountains are given in metres, the routes followed by travellers are laid down, and where the rivers are navigable a note is given to that effect. The hill shading is effective, the extent of the forests being indicated by a light tint of green. Villages which are fortified are distinguished from those which are not by symbols, and where the position assigned is doubtful it is marked with a note of interrogation. On the N. E. portion of the map the Comoro Islands are shown, and an inset map of the Island of Réunion is given. A comparison of this map with that of Père Roublet, published in 1885, shows a considerable difference in the physical features of Madagascar as exhibited on those two maps.

South-African Telegraphs.—Map showing the —, prepared by the Eastern & South African Telegraph Company. Drawn by Captain J. Hales-Dutton, R.N.

AMERICA.

Rand, McNally & Co.—New Commercial Map of the United States, Canada, British Columbia, and Northern Mexico; showing all the Railroads, Counties, and principal towns up to date. Constructed from the latest Government and Railroad Surveys. Scale 1:3,200,000 or 43·8 geographical miles to an inch. 1889.

- New Railroad, County, and Township Map of the New England States, showing adjacent portions of New York, Canada, and New Brunswick. Scale 1 : 511,000 or 7 geographical miles to an inch. 1889.
- Indexed Map of Ohio. Scale 1 : 390,000 or 5·2 geographical miles to an inch. 1889.
- Indexed Sectional Map of Illinois. Scale 1 : 506,000 or 6·9 geographical miles to an inch.
- Indexed Sectional Map of Nebraska. Scale 1 : 506,000 or 6·9 geographical miles to an inch. Rand, McNally & Co., Chicago. (*Stanford.*)

ATLASES.

Hachette et Cie.—Atlas de Géographie Moderne, édité par Hachette et Cie. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, diagrammes etc. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Librairie Hachette et Cie. 1889, 7e Livraison. Price 10*d.* (*Dulau.*)

The present issue of this atlas contains a very fine photograph of a relief model of France, and portions of the adjacent countries, and although some of the defects inseparable from this system, are apparent, it is a very good example of what may be done in the production of physical maps by photographs taken from accurate models, the difficulty being to control the depth of shade, which, in most cases, as in the present instance, exaggerates some of the heights. Sheet 58 is a general map of North America; the scale is necessarily very small, but is sufficient for most purposes of reference, and the same remarks apply to map 62, South America. As is usual with this atlas, each map is accompanied by explanatory letterpress, on which are given many diagrams, and small maps to illustrate the political, physical, and ethnographic conditions of each country. As an example of the care that is taken to keep this portion of the atlas up to date, a notice is given in the letterpress descriptive of map 62, stating that since the map of South America was printed, Brazil had become a republic, and that notes on the political condition of that country will be correctly given on map No. 64.

Johnston, W. & A. K.—The *Multum in Parvo Atlas of the World* (second edition). W. & A. K. Johnston, Edinburgh and London, 1890. Price 2*s.* 6*d.*

As the previous edition of this atlas has been noticed in the 'Proceedings,' it will only be necessary to say that it is convenient in form, contains a large amount of statistical information in addition to the maps. It is likely to prove useful as a work for general reference; but where detailed information is required, other and larger works must of course be consulted.

Stanford, Edward.—Stanford's London Atlas of Universal Geography. Quarto edition. Forty-six Coloured Maps, and Alphabetical Index. Third edition, revised and enlarged. London, Edward Stanford, 1889. Price 1*l.* 10*s.*

In this edition of the London Atlas of Universal Geography, two important additions have been made in the form of two maps of India and the countries round the Mediterranean, each on two sheets.

In the map of Africa the boundary of the German sphere of influence is drawn across Victoria Nyanza and continued west as far as the Congo Free State; although this is so shown on some German maps, it is not at all clear that there is any authority for doing so, as the line of delimitation has always been understood to reach no farther than the east shore of Victoria Nyanza. The maps have all been corrected, where necessary, to bring them up to date.

CHARTS.

United States Charts.—No. 1169, Port Santa Barbara and approaches. Surveyed by the officers of the U.S.S. *Despatch*. Commander, W. R. Bridgman, Comdg. 1882. — Pilot Chart of the North Atlantic Ocean, December 1889. Published at the Hydrographic Office, Navy Department, Washington D.C. 1889.



PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

*The Great Central Asian Trade Route from Peking to Kashgaria.**

By Colonel MARK S. BELL, R.E., V.C., A.D.C.

Map, p. 128.

FROM Peking, Kashgaria is reached (1) by the Great Central Asian trade route, a cart road, passing through the province of Shansi to the Wei valley at Si-ngan-fu, and thence through Shensi, Kansu, and the New or Sin-Kiang provinces of Kashgaria; and (2) by the Ala-shan route, i. e. that usually taken by camel caravans via Kwei-hwa-cheng to Barkul. By the former it is reckoned to be 75 days to Hami, 95 days to Urumtsai, now the Chinese Hung Miotsa, and 113 days to Ili (Kuldja). By the latter it is reckoned to be 12 days to Kwei-hwa-cheng, 67 days to Barkul, and 104 to Ili. Lieut. Younghusband, King's Dragoon Guards, was the first Englishman to traverse the latter, and I the first to travel along the former route in its entirety. This we did in 1887, separating at Peking, and expecting to meet at Hami.

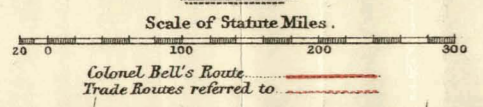
The actual lengths of the journey were, by the great trade route (68 days, 7 halts), 61 travelling days to Hami, and 73 days to Urumtsai. Other routes, skirting the Yellow river or striking across the Ordos country, leading to the north-western part of Kansu, exist and are taken by travellers; the Belgian Catholic missionaries often traverse them, and they have recently been brought into prominent notice by Prejevalski. Kwei-hwa-cheng is the terminus for the Mongolian (Uliassutai, &c.), and Tian Shan camel trade routes, and Si-ngan-fu the Chinese centre for the cart and pack animal routes leading to Kashgaria, Koko-nor, and Tibet; these are the points of contact of China with Central Asia, and hence they derive their political and commercial importance, as I hope to explain presently.

Since the days when the conquests of Chenghiz Khan and his successors levelled all political barriers from the frontiers of Poland to the Yellow Sea, and opened Asia to the inspection of Christendom, few

* Abridged from the author's original MS.; we have been unable also from want of space to reproduce more than a few of the illustrations accompanying the paper.—[Ed.



MAP
to illustrate paper by
COLONEL MARK S. BELL, R.E., V.C.
on
**THE GREAT CENTRAL ASIAN TRADE ROUTE
FROM PEKING TO KASHGARIA.**



Europeans have traversed this main trade route leading from the Irtish and Semirechensk province to the Wei valley, the commercial and strategic centre of Mid-China. In 1874-75 the Russian Colonel Sosnoffsky explored it to the vicinity of the Wei basin, and on to Han-kau, and reported that this diagonal, leading from the valley of the Irtish to the north-west provinces of China, united all the conditions (length, time, cost, &c.), for becoming the most important artery for the trade between Russia and China, and that even as it existed as a river-route, camel-track, or cart-road, its advantages were such that it was capable of competing with the sea route to Russia. He gives figures to prove this. From the Wei valley the route from Si-ngan-fu, through the loess plains, hills, and valleys of Shansi, and over the alluvial plain of Chili, has ever been of commercial importance. Let us now proceed to its description.

The length of the journey I here describe is so great, viz. 3500 miles to Kashgar, that I can enter into little detail, and where I do so more at length, it will be in the lesser known parts of Shensi, Kansu, and Kashgaria, now the Chinese Sin-Kiang or New province.

From Peking the route, passing through Paw-ting-fu, the capital of Chili, runs over the great alluvial plain of Chili for seven days (218 miles) to Khavailu; and thence for five days, over the hills separating Chili from Shansi (157 miles), and rising 4500 feet and over before descending to Tai-yuen-fu, the capital city of Shansi. The Chili plain is a flat expanse rising to an elevation of 600 feet, a thickly populated and moderately well cultivated country. Cotton is largely grown; the soil is loam, loess, sand, and fertile alluvium. The road is generally broad and in good order, but rutty in places; it is unmetalled and suited for a double line of cart traffic; the carts run in ruts without difficulty at the rate of $2\frac{1}{2}$ to $3\frac{1}{2}$ miles an hour. It crosses the various streams rising in the hills, separating Chili and Shansi, and which drain the alluvial plain lying in the direction of Tien-tsin, and give access to it by river junks. When not in flood these streams are crossed by rough bridges of piles and fascines, and by ferries at other times.

The front range of Silurian rocks, bordering it to the northward, rises to a height of 2000 feet and more above the plain; coal and iron are found in them, but in insignificant quantities compared with the deposits of Shansi.

Late in March the day temperature here rises to 60° , and at night 7° to 10° of frost may be registered; a high wind prevails in the spring, which fills the atmosphere with dust, and obstructs all distant view. To Ching-ting-fu (197 miles) the route followed is the Great Southern highway; here the Great Central Asian highway leaves it. A railway to Canton would probably follow approximately the line of the Great South road, keeping to the eastward of the Shansi hills, and striking the Yang-tsze about Han-kau, whence an easy line can be

taken to Canton. Such a line is to be preferred to that taking the general direction of the Grand Canal, which keeps too much to the low ground. The country to the eastward of the 112th meridian is not hilly, as shown in our maps, and a wheelbarrow road runs from Fau-cheng on the Han to Honan. A branch line along the valley of the Yellow river, through a difficult loess country, will connect the Wei valley with this north and south trunk line, and be eventually extended through Kansu. Such a line combines both commercial and strategic advantages, and all Chinese lines of rail must be projected to meet the requirements both of commerce and defence, in order that the former may pay for the latter; they must be designed also to meet the wants of the internal trade of the country, to develop its resources and to give employment to the greatest numbers, and to increase her exports. They alone can enable China to make her empire secure, both internally and externally; for they alone can render political and military reforms possible by bringing the distant provinces under the control of Peking, the nervous centre of the empire. Without them provincial governors have in the past, and may again in the future, defy the central Government.

From Khavailu (Huo-lu-hien), an important commercial centre supplying Shansi, for 130 miles to Sze-tien, the road traverses the loess hills, which extend from the Peking-Kalgan road in a south-west direction to the Yellow river, and which are passable throughout this length only by the Great Central Asian trade route to Tai-yuen-fu and by the Tung-kwan, Honan, i. e. the Yellow river route. This loess, which extends for about 1400 miles along the Great Central Asian route, is, according to Baron Richthofen, a sub-aerial formation formed in a region without outward drainage, and the collective residue of uncountable generations of herbaceous plants, assisted by the large amount of material which was spread over the prairie by wind and water, and kept there by the vegetation. He thus describes it:—"The loess is a solid but friable earth of brownish-yellow colour, and when triturated with water not unlike loam, but differing from it by its highly porous and tubular structure: these tubes are often lined with a film of lime, and ramify like the roots of plants. Amongst the constituents, very fine sand and carbonate of lime predominate next to the argillaceous basis. It spreads alike both over high and low ground, smoothing off the irregularities of the surface, and its thickness exceeds often considerably 1000 feet. It is not stratified, and has a tendency to vertical cleavage. The loess is full of fossil land-shells, and contains bones of land quadrupeds, but no remains either of marine or of fresh-water shells. It is very fertile, and requires little manure."

The road is often rocky, and difficult for carts, but is a good pack-animal road. After rain some of the inlines become next to impassable.

The first section of low hills is more densely peopled than the western

section beyond the Shi-tien-men, and the road over it, where not rocky, is easy, the worst gullies and inclines being met with in the latter; for miles at a stretch it is nothing but a deep, winding, narrow gully (8 to 10 feet wide, 10 to 50 feet deep), bordered by perpendicular sides; numerous are the blocks and difficulties one gets into by meeting carts — fortunately for the traveller not very many, otherwise there must be a complete block: pack animals chiefly use the road. The loess hills are so cut up by numberless ravines as to be impassable, except by a few tracks. It will now be seen how the province of Shansi is cut off from the rest of China to the eastwards. To its westward lies a mass of more rocky hills, passable only by carts to the north-east, i. e. towards Khwei-wa-cheng, in Mongolia, and in no other direction are they to be passed except by mule tracks. To the eastward of the Yellow river lies a mass of hills. Those to the north of the city are of loess similar to those to the eastward, and rise to heights of 5000 feet and over; the outer range is rocky. This (Shansi) province is very rich in coal and iron, but does not grow enough grain for its own consumption. To develop its resources, the Nankow pass should be made passable to carts, and roads opened across the hills from the Chili plain to Lu-ngan-fu and Ping-yang-fu.

Tai-yuen-fu, the terminus of the first cart stage, is a walled city of 50,000 inhabitants, but of no commercial importance, the trade-centres of the basin being Ping-yau and T'ai-ku. The succession of loess basins or broad, fertile valleys or plains stretching from Ta-Tung-fu in the north to Tung-kwan, on the Yellow river, i. e. the basins of Tai-chau, Hin-chau, Tai-yuen-fu, Ping-yang-fu, Ho-chau, and Kiai-chau, are important on account of both their mineral and vegetable productions. They are supposed to mark the sites of ancient lakes, through which one of the channels of the Yellow river flowed to the sea.

Under an enterprising government, the neighbourhood of Ta-tung-fu, which possesses a large amount of fuel, is destined to become an important manufacturing centre, for Mongolia is a large producer of raw material, such as camels' hair, wool and hides; and the region Ta-tung, Hsuen-wa, Kalgan, Khwei-hwa-cheng is traversable by carts, and were the Nankow pass passable to carts, Peking could be reached by it by cart road from Northern Shansi.

In the Tai-yuen-fu basin the thermometer in winter sinks to 4° F., and in summer rises to 96°. Little snow falls; a heavy fall is considered a blessing. In January the minimum temperature is about 4° F., and the maximum 36°. In February it averages between 2° and 45°; the rise of temperature in March is considerable; early in April the midday temperature is 55°, and the night minimum 20°. The heaviest rain falls in the months of June, July, and August; the valley roads then become practically closed, and the Fuen-ho floods the country to a considerable distance on either side.

The port of Tai-yuen-fu is Tien-tsin which is reached by river from Pau-ting-fu; a cart road leads to Khwei-hwa-cheng and Mongolia; communication with the Yang-tsze is by Kaifong; the more direct roads to Han-kau lead through the hills, and are rendered at times difficult by snow; a mule road leads direct by Ningsha to Lan-chau-fu, which is reached in twenty-one days, for three of which a desert is crossed.

From Tai-yuen-fu to Ping-yang-fu is a journey of 185 miles, down the valley of the Fuen-ho. The roads over the loess basin are narrow



THE FUEN-HO.

gullies, similar to those over the hills, with steep inclines. The Hansing-ling pass between the two basins is elevated 4000 feet, the elevation of Tai-yuen-fu being 2260 feet, and that of Ping-yang-fu 1800 feet. Ping-yang-fu is a city of about 20,000 inhabitants displaying no commercial activity, Huo-chau carrying on the more active trade. Traffic chiefly avoids the cart road just described, and merchants prefer to send their goods across the hills on pack animals to gain the water-way, the Wei-ho and Grand canal, to Tien-tsin. Within the hills to the eastward are several thriving towns; hsien cities are also numerous along the left bank of the Yellow river to the westward.

The Chinese have to suit proper names to the limited number of sounds expressed by their pictorial characters. I rejoiced in the name of "Bey-law," a word having an excellent meaning, which is everything in China. At Ping-yang-fu I took to Chinese dress of blue cotton leggings, blouse, travelling cap and spectacles, and so disguised saved myself many a mobbing. Hair, eyes, and tight clothing, such as breeches, must be hidden from view, as they most astonish the provincial Chinese.

From Ping-yang-fu to the important centre of Si-ngan-fu (elevation 1700 feet), the capital city of Shensi, and once the capital of the Empire, is 253 miles—still over the loess; the Yellow river is crossed at Tung-kwan, 93 miles from Si-ngan-fu, or at Tai-chin-kwan, a few miles below Puchau-fu. Tung-kwan (elevation 1560 feet), on the Honan and Shensi frontier, is one of the principal gates of China, and has been the scene of

numerous dynastic battles, and is on the main line of traffic between east and west, and south-west and north-east China. Situated amidst loess narrows, it occupies an important commercial and military position. North of the Tung-kwan bend no important commercial road crosses the Yellow river; an unimportant traffic passes at Pau-te-chau and Potoo, leading to the Ordos country. This so-called fortress forms most effectually the Eastern gate of Shensi and Kansu, and is the key to them, as well as that of the north-east provinces of China, to an enemy occupying the Wei basin. The road to Honan-fu passes through an intricate loess region, and is a difficult cart road on this account.

The most natural port for the outlet of the trade passing through the Tung-kwan gate is Lao-ho-kau on the Han river; most of it hitherto has taken one or other of the roads to Tien-tsin i. e. via Tai-yuen-fu and Khavailu-hien, or by Tau-kau-chin and Ho-nan-fu.

This proud position of Tung-kwan, Baron Richthofen has pointed out, is likely to be wrested from it in the distant future by the rise in importance of the area Ju-chau, Ho-nan-fu, and Hwai-king-fu so soon as railways are introduced; it will then become the gate of Central Asia, for the Ho-nan-fu passage is the only railway inlet to the north-west; there is no one possible further south, nor any to the north, excepting one perhaps through Hsuen-hwa-fu, and southern Mongolia, a thinly inhabited and poor producing region. There being no water communication in north-west and north China, including the rich province of Honan, and freight by land being twenty to forty times more expensive than it is by water, we may conceive how the advent of railways will increase the produce of Honan, Shensi, and Kansu; these provinces abound in coal and probably in iron ore. The cost of land transport at present keeps trade down to its lowest possible limits. Coal, which costs next to nothing at the pit's mouth, rises to seven taels per ton at a distance of 60 miles, and generally 30 miles of land carriage equals the cost of 600 to 800 miles of water carriage.

After leaving Tung-kwan, a granite range borders the road to the south at a variable distance from it to Si-ngan-fu.

The province of Shensi now traversed, produces abundance of grain, and for days around Si-ngan-fu the traveller passes through one vast wheat-field. Shansi exports coal, iron, and salt, and imports cotton, cotton goods, wheat, tobacco, and opium; Shensi exchanges with her these latter for the former; to Kansu cotton and wheat are sent in exchange for cotton, rhubarb, furs, skins, felts, mules, cattle, and sheep. Si-ngan-fu imports silk from Che-kiang and Sze-chuen, tea from Hupé and Honan, sugar from Sze-chuen, and sends these and other merchandise on to Kansu, Kashgaria, Ili and Russia, in fact, it does a large collecting and distributing trade. On the line taken, the chief traffic was going eastwards, and consisted of cotton, straw hats, tobacco, sheepekins, mules, &c.

Si-ngan-fu was founded in the 12th century B.C., and since then has suffered many reverses of fortune, but its position between the central and western provinces of China and Central Asia has always assured for it importance. It was the capital of China for 2000 years (1122 B.C. to 1127 A.D.). A sprinkling of Mongols, Tibetans, and Tartars is found amongst its population. It is a fine city, with a circuit of eight to ten miles, lofty walls, massive gateways, and walled suburbs. In it are many fine shops. It seems unrivalled for open drains, and there are manufactories of dry-earth manure within its walls to add to its many other odours; otherwise it is a clean city with narrow streets, many of which are paved. Carts pass with difficulty, but delays are thought nothing of in China.

The country from Ping-yang-fu to Si-ngan-fu is an agricultural one. All animals are stall-fed, there being no grazing. Live-stock does not appear to be numerous, and oxen, donkeys, and mules are chiefly used to plough. All China's cart and pack animals come from Mongolia, Kansu, and Western Shensi. Cut off from this supply—and these districts now approximately border on Russia—she would be much crippled. Mules do all the transport of North China whether cart or pack; as the north-west provinces are approached ponies are seen gradually taking the place of mules, and in Kashgaria horses and ponies altogether replace them. In the district now under consideration, with water within 15 feet of the surface, but little irrigation is attempted; here and there windlasses worked by two or four men were seen. Villages with inns are met with every 3 or 4 miles along the main road, and haïen towns every 10 or 11 miles. The masonry and architecture of the district are in good taste; the basins and valleys are crossed by numerous sunken roads, and the loess hills on its border by good mule tracks. The Yellow river freezes in winter but does not bear traffic, nor do boats use it; it is here valueless as a communication; coal is rafted down.

The difference of temperature between Shansi and Shensi is very marked. About Tai-yuen-fu and Ping-yang-fu the temperature rose to 75° daily (April), and west of the Yellow river to 95°; as we progressed northwards the temperature rapidly sank again, and at Lan-chau-fu, a fortnight later, it was 15° cooler.

Notwithstanding its important position, as a centre of communications, Si-ngan-fu is rather inaccessible by good roads. Westward of Honan extends a belt of hills, crossed only by mule roads, and to get to Han-kau, on the Yangtze, the best way from Si-ngan-fu is to return eastward to Tung-kwan, and by cart road, viâ Honan to Fan-cheng and thence by boat. This is the only cart road to Han-kau. The best mule road keeps up the Wei valley to Pan-ki-haïen (available for carts so far), and thence across the hills to Han-chung (the great Szechuen road), whence Han-kau is reached by river. The foot post, which reaches

Han-kau in twenty days, takes the cart road to Fancheng (550 miles), whence it is seven days on by river. A mule road also goes to King-tse-kwan or Ting-tse-kwan (330 miles), and thence by boat to Han-kau (seven days). Traders prefer this route on account of its shortness and cheap freights. The boat journey up from Han-kau to Han-chung takes five months in summer, and under the most favourable circumstances it takes two and a half months.

The down journey takes twenty days under favourable circumstances, and may occupy as much as two months. The river is at times too swift, at others too low, or the boats top-heavy, or the wind unfavourable. It is a hot summer journey, and the land journey is more certain. The cart road via Honan, Nan-yang-fu, &c., is greatly to be preferred to any other route. During the summer months only small steamers could reach Fan-cheng, or Lao-ho-kau, 60 miles above it.

The hills between the valleys of the Wei and the Yang-tze-kiang are granitic and rocky throughout. Those towards Lan-chau-fu are chiefly loess. This town can be reached either by Pin-chau, the road taken, or by Tsin-chau, further west, whence an indifferent cart road (travelled by Sosnofsky) and a more direct mule road lead there. The road to Tsin-chau is fit for carts only to a few miles west of Fang-tsiang-hsien, from whence it is a mule road.

The great barrier of communication with the south has ever been the Tsing-ling-shan range, which, stretching westward, joins on with the mountainous region of Koko-nor. Sixteen hundred years ago an artificial road was opened across it to Han-chung-fu, which is still the only practicable route between the north of China and the province of Sze-chuen. To the south-east, however, a natural road opens into the Tan-ho valley, which falls into the Han at Lao-ho-kau. It establishes an easy communication with the whole of south-east China, and will enable railway communication to be opened between the Wei and Han valleys, and to the Yang-tze-kiang. This natural highway will, as pointed out by Baron Richthofen, prove of great future importance.

From Si-ngan-fu, Lan-chau-fu, the capital of Kansu, was reached in twelve days, travelling over a difficult hilly country, the road crossing heights of 8000 and 10,000 feet, and during the greater part of the time being at an elevation of 6000 to 7000 feet. The distance is 449 miles. The road is at times a fine highway, 100 feet wide; at others for miles and miles 8 to 10 feet wide, and running in deep gullies in the loess. It is practically suited for one line of cart traffic only. Many of the inclines are very steep. Cart roads lead from Lan-chau, to Hami; to Si-ning (nine days' journey), whence the trade route goes to Lhasa; to Tsin-chau in the Wei valley, and round, westward of the Yellow river, by the desert and Mongolian route on to Peking (1300 miles). Mule roads exist in plenty. The Mohammadan rebellion lasted for seventeen years, and as its result the whole country traversed from Si-ngan-fu is

depopulated and its villages destroyed. A few of the walled towns alone escaped. Out of fifteen millions of inhabitants before it took place only one to two millions probably now remain. No confidence has yet returned to the people, for it is fourteen years since the rebellion ceased, and the greater part of the land is still untilled. The Mohammadans are still feared; they are braver than the "Heathen Chinese" who is demoralised more or less by opium-smoking. The rebellion was not put down, as is generally supposed, by the prowess of the Chinese soldiery, but by bribery, starving the garrisons out, and the distribution of buttons of rank to the Mohammadan Akhuns or leaders. The missionaries state that the accounts of the rebellion given to them by the Chinese who were partakers in it read like extracts from the book of Joshua; 500 heathen would fly at the sight of one Mohammadan; terror seized them, and they were slaughtered, man, woman, and child. Consequently the only cart line of communication from the Wei valley to Lan-chau, the intermediate base of operations towards Kashgaria, for 450 miles passes through a depopulated and for several hundred miles an untilled country, over hills up to 10,000 feet high, having soil of loess, slippery in wet weather, with rivers running in deep gullies, and with a Mohammadan population on either flank holding their heathen brothers in no estimation.

The ease with which the loess soil is tilled, and the readiness with which it gives good crops without manure, other than a top dressing of its own dust, has enabled a considerable portion of the Wei basin to be recultivated. Although no villages were seen, many square miles of fine wheat covered the soil for many miles after leaving Si-ngan-fu.

A railroad is necessary to bring Lan-chau-fu into communication with Si-ngan-fu; it will be a difficult and somewhat costly undertaking for about 200 miles of the distance. The Wei valley itself is 800 miles from Peking. The mandarins on the borders of the empire do much as they like, and the city bears a bad name for all sorts of iniquity—lying, thieving, opium-smoking, and sodomy; female children are sold as slaves, and bring, if good-looking, 50 taels each; they eventually become the concubines of the family. Opium-smoking seems to dull family affection, and causes women and female children to be looked upon as so much property only. During the rebellion cannibalism was practised pretty universally. The above-named vices are destroying the vitality of the better classes, and indeed of all. Government in China is very decentralised by reason of want of intercommunication, and though the advancement of a province much depends on the honesty and capability of local governors, yet the life led by a mandarin in the remote parts must lead to sensuality and laziness. They have no interest except that of making money during their three years of office, no sports, no modern literature, &c. They know little about their districts, for to observe too minutely would be wanting in dignity.

These considerations will give some idea of China's position in Kansu, and yet its capital is 1300 miles from Urumtsai, the administrative and strategic centre of the Sin-kiang province, or Kashgaria. The Great Wall at Kia-yu-kwan lies still 500 miles to its northward, over a still depopulated and devastated country, with its richest oasis alone yet brought under recultivation. Therefore I have concluded that, unless China improve her communications by running strategic railways, the country bordering Russia up to the Yellow river and the Great Wall, must fall to her whenever she wants it.

Travelling over clay hills, a depopulated, untilled, treeless country, with poor inns, the dust ankle deep, at times whirled in clouds overhead, obstructing all view, is scarcely pleasant; but it is lucky for the traveller if it be dust only that he has to contend against, and not the mud and swollen streams that result from a moderate rain. The water throughout the district is brackish, but I think wholesome.

Let us enter into a few more details.

After crossing the Wei river at Hsien-Yang-Hsien, where it is 150 yards wide, flowing in a flat sandy bed 500 yards wide, by a rough wooden pile bridge, the loess districts traversed, often undulating and richly cultivated (wheat, poppy, abundantly grown), in 70 miles gains an elevation of 4700 feet, and becomes worn into a mass of huge, terraced, and cultivated hills. Passing through Pin-chau (elevation 2620 feet) and Pin-liang-hsien (elevation 4450 feet), shortly before reaching Hwa-ting-shien (230 miles, elevation 6000 feet), beyond which lies the water-parting of Kansu, the character of the country changes, and rock becomes prevalent. Caves are numerous in the steep loess cliffs along the whole route, but the majority are unoccupied; they are often very deep, and constructed in tiers, the upper tiers being reached by ladders or steep steps cut in the nearly perpendicular rock. Such cave dwellings are lasting, and impervious to changes of temperature. Sheep-grazing is generally plentiful, and flocks of sheep and herds of cattle are now for the first time seen in any numbers. The country so far presents few difficulties to the construction of a railway; its difficulties now increase.

The cart road bifurcates at Hwa-ting-hsien, one branch leading to Lan-chau-fu, the other via Ku-yuen to Ning-sha-fu. The gradients on the latter are easy, no high range being crossed by it, and it may give the best line for a railway to Lan-chau-fu. From Ning-sha a cart track leads to Peking, keeping west of Alashan and the Yellow river.

Beyond Hwa-ting-hsien, on the Lan-chau-fu road, the watershed of the Yellow and Wei river is crossed at an elevation of 8700 feet; from it nothing but barren hills are seen to run east and west, and to the front lie a series of ridges rising the one above the other. Between these ridges, hidden from view, occur the cultivated valleys. Hence to Lan-chau-fu the general character of the country is hilly. The ascent is gradual to Hwa-ting-hsien if the valleys be followed. Beyond Lung-to-

hsien, 243 miles, the hills traversed become more intricate and out of cultivation; they offer, however, no great difficulty to the construction of a line of railway. A tunnel three miles long, chiefly through loess, would be required to connect the valleys of the King-ho and that in which Lung-to-hsien lies. About Kho-ja-pu, 288 miles, the hill terraces ceased to be



HILLS OF KANSU.

cultivated for want of cultivators only. Thence the country to Hui-ning-hsien is hilly, with narrow and shallow valleys and streams running in deep gullies; also depopulated and generally uncultivated; about Shi-gun-i, 347 miles, it is composed of a number of treeless flat valleys, from half a mile to a mile broad, bordered by treeless loess hills, with slopes more or less steep (up to 45°), rising 1000 to 1500 feet over their valleys and communicating with each other by similar or narrower valleys, or ravines. The streams, of no size (except when in flood, when they are dangerous to cross), flow in deep-cut beds with perpendicular sides into which open similar ravines, cutting up the valleys and making movements, except under the border hills, difficult. Some of the hill-sides are terraced, others not.

An-ting-hsien, 370 miles, the junction of three valleys, is one * of the granaries of Lan-chau-fu; more life was seen in this valley than in the others traversed, and many of its ruined villages were re-occupied in part. It contained fewer walled and defensive enclosures than had been hitherto met with, showing the greater amount of security that is felt there. Valleys one mile broad, like that in which An-ting-hsien lies, are rare, and are reached by crossing hills separated by narrow and intersected ravines. From the ridges one sees nothing but waves of hills, rising one over the other, beyond the immediate valleys

* Its other granaries are the Ho and the Si-ning valleys.

below. The most difficult section of the road lies between Kho-ja-pu and Kan-san-dien, a distance of 100 miles. Coal is plentiful along the whole line and costs from 300 cash to 1000 cash (1500 cash = 1 tael) the picul (133½ lbs.), according to the distance it has to be carried. No iron was heard of, and that in use came from the vicinity of Han-kau. With a dry air and not too rigorous temperature, the district traversed must be a very healthy one.

Snow lies in the Lan-chau valley till April, and sheep-skins are in wear till the beginning of May, and at this season the thermometer in the deserts northward of Lan-chau will read as low as 5° F. The winter nights about Lan-chau are very cold, water freezing in a room warmed by a fire, but the sun is always warm, and in a sunny room no fire is required at midday. The summer heat is not excessive, maximum of 95° in the shade in August, and the nights are always cool. Thunderstorms occur in June and July, and are followed by two months of rain, August and September. Little rain falls at other seasons, and although the agriculturist generally gets enough for his crops, famines are of periodical occurrence in Kansu.

Lan-chau-fu (elevation 5500 feet) is comparatively a fine city of, it is said, 40,000 houses. It has some fine shops. The Roman Catholics in the city number 80; in the neighbourhood 200, and in Kansu 2400. Tobacco is largely grown and exported. The Yellow river is here 250 feet wide, with a rapid current, and spanned by a bridge of twenty-two boats. Ice covers it from November to February, during which season carts cross it.

Direct Russian trade reaches this point; it flourishes at Urga, Kobdo, and Uliassutai, where merchants are established and have opened shops. When I was in Lan-chau, twenty cart-loads of Russian goods, with six merchants, one of whom had his wife with him, had just arrived from Tomsk, coming by Biisk, Kobdo, to Su-chau-fu, on camels, and thence on carts. Russians here work by their own, and not Chinese agency. Mr. Spingear, a Belgian and a Chinese mandarin, is stationed at Su-chau-fu to conduct all dealings with Russian traders, and prevents indirect taxation being levied. This is the only way of preventing the mandarins from "squeezing" the traders. They will, unless we take the necessary measures, probably drive British goods from Kansu and Shensi; for, although a foreign customs order should pass these free of "lekin" to Han-kau, yet imposts are imposed by delays, stamping invoices, opening bales to count goods, &c., so vexatious as to force the boatmen to pay the unjust demands.

I will now give a short description of Kansu and its borders. The province itself comprises the best parts of the ancient kingdom of Tangut, which was destroyed by Chenghiz. Its hilly western districts submitted to China about 1700. The Tangutans resemble gypsies, and are zealous Buddhists.

From the Kansu-Tibetan border, about Si-ning, Kumbum, Labrong, to the westward, there are no villages, and the country is there occupied by nomad Tibetans, who supply many mules to this part of China. The Chinese Inland Mission propose to open stations on the Tibetan border. The country from thence to Llassa is described as a gradual but undulating slope up to the water-parting, and thence a gradual undulating descent to Llassa; the main route passes through Si-ning, and cannot be very difficult, for an old Tibetan woman, who described it as above, went there and back by it in five months, walking all the way. Huc has given an excellent account of it. Prejevalski has, I think, too hastily thrown discredit on the works of this talented Jesuit, to the pertinency of whose remarks, and to the accuracy of whose observations, whenever and wherever I have been able to test them, I desire to pay tribute. The mandarins use the Chentu-Bathang, the official route, described by Huc as a very difficult and arduous one. Tsaidam and the country to the east of Su-chau are inhabited by Buddhists, Mongols, and Kalmucks. At Koko-nor are found Chinese, Mongols, Tibetans, &c., a mixture of races; indeed the population of Tibet seems to be centred about the frontier of Kansu and the Sampu valley.

To the westward of the line Liang-chau to Su-chau Mongols are found of the Shara Ugárah and Hára Ugárah. The inhabitants of Kansu itself are not purely Chinese, and northward of Lan-chau the change in the facial features of the people becomes marked; the nose becomes larger and more prominent, the eyes more open, and the general expression more pleasing to the European eye. Several of the border tribes have their special rulers and their special laws.

We thus see how the Chinese have driven a wedge into Central Asia, between alien peoples and colonised it, so, as it were, to form a road for conquest and commerce to reach it. It is the natural line of intercommunication between the extreme east and west, only readily accessible by the natural inlets given by Kulja, the Black Irtish valley and the passages between its neighbouring mountains. To strengthen the position the Great Wall was carried to Kia-yu-kwan beyond Su-chau-fu, at a distance of 500 miles from Lan-chau-fu, and every exertion has been made by China in all ages (for 2000 years, Han dynasty) to retain possession of it, for she understands its military value.

In 1737, the Peh-lu and Nan-lu, the great arteries to the north and south of the Tian Shan, were added to it. The late Mohammadan rebellion robbed China not only of the Kashgarian roads, but also of the greater portions of the province of Kansu and that of Shensi to Ning-hia and Sí-ngan-fu. This wedge, from a political and strategical point of view, is of extreme importance to China, yet with what a loose hold does she hold it! it may slip from her grasp any day! To strengthen her position here, China must run a railway through it as already pointed out, but which cannot be too often repeated.

To the north and north-east of the line Hua-ting, Ping-liang, Kin, lies an undulating plateau, easy to traverse, now depopulated, but in former years fairly covered with towns and villages. To the westward of Ning-sha the roads are passable by pack-animals only to Ting-uen, the seat of a Mongol king. From Ting-uen to the west and north of the Great Wall is an easy country to Lan-chau and Po-toe, traversable by carts; in part, desert. To the south and westward of the great Central Asian trade route described lies a hilly country, traversed by mule-tracks, and which extends to the cart road passing from Tsin-chau by Fu-chiang, Ning-uen, Kung-chang, Titao to Lan-chau-fu. There are Muslim centres about Ho-chu, Si-ning, Salar, and Tsin-chau.

To the westward of the line Tsin-chau to Lan-chau are the rocky hills separating China from Tibet. Mule-roads are plentiful in them to the vicinity of Chau-i, the residence of a Tibetan prince (Yang); to Labrang Llamasery; to Suin-hwa, in which neighbourhood live Salor Turks; to Bayar Sing, Kunbum Lamasery, &c., all Tibetan localities. The roads to Lhasa viâ Si-ning from Lan-chau, Ping-fang-hsien, and Liang-chau are of importance, as Lhasa is the Mecca of the Buddhist religion, the resort of strangers from the steppes of Central Asia, and where collect Kalmuks, Mongols, Tatars and traders from Ladakh, Kashmir, and Nepal—a centre of communications, the seat of Government, and of the Dalai Lama.



HIGH ROAD IN KANSU.

From Lan-chau-fu, Su-chau-fu, distant 482 miles, was reached in sixteen days' travelling in May. The road passes twice over heights of 8000 to 9000 feet by such gradual ascents and descents as to be unnoticed. It traverses a narrow wedge of cultivation between the inhabited Nan-shan Mountains on its one side and the desert on the other for a

part of this distance; for the rest it runs over a barren salt plain or amongst low hills. There are no great difficulties of topography met with likely to trouble much the railway engineer; soil of sand, gravel, clay, and loess are met with.

Let us now give a few details of the route. From Lan-chau the road, taking one line of cart traffic, after crossing the river on the bridge of boats, shortly leaves the valley, and traversing a series of cultivated valleys separated by low necks and bordered by cliffs of clay, gains the fertile and extensive Ping-fang valley. From Ping-fang a cart-road leads to Si-ning, a populous and fertile district on the road to Lhassa, and whence (from Kunbum Lamasery) caravans leave yearly for Tibet. Continuing up the valley, at Chen-chiang (elevation 9100 feet), 81 miles, the Ping-fang river is crossed and the Wu-so-ling pass (elevation 9900 feet) over the Nan-shan range, the watershed of the country, traversed by long gradients of 1 in 12 to 1 in 15. Winding thence through clay hills, by grassy valleys and narrow ravines pent in by steep and lofty snow-clad hills, rising 13,000 feet and over, with their lower slopes crowned by the Great Wall to the north, the extensive plain of the Lian Gobi or Little Gobi, called by Prejevalski the Ala-shan plain, is reached, at the southern extremity of which, and at the junction of two important gorges, lies the town of Ku-lang-hsien (elevation 6900 feet, distance 138 miles). Its position is one of commercial and strategic importance. The hills of Kansu are now practically left behind. The plain is in places very fertile, in others barren; over the former the road often runs through loess, or over a rich sandy clay soil, and in the latter over stony gravel or sand or a spongy salt soil. Its cultivated and culturable portions (leaving the Gobi desert out of consideration) exceed in extent the barren stretches. It is a plain well watered, and of great extent and possibilities. Its oases are most fertile. In July the heat renders travelling by day very trying. The Great Wall is here of mud, six to eight feet high and but a few feet thick; it is often wanting.

A cart road leads to Ning-sha, twelve days distant. All the villages are in ruins, and ruined farmsteads with attached low mud towers are closely dotted over the fertile plain, much of which lies untilled.

Liang-chau, 180 miles (elevation 5050 feet), is an important walled town of 20,000 to 30,000 inhabitants; the direct roads from Shansi and Chili reach Kansu here. The direct road to Tai-yuen-fu takes 26 days, and passes through Kwang-wu and Yulin; stages or villages are met with along it at distances of 25 miles. The usual road taken to Peking goes by Ta-tsing, Kwang-wu, the Roman Catholic station and bishopric north of lat. 40°, across Ordos to Pau-to, and so on to Kwei-hwa-cheng, and Hsuenhwa. It is a cart road, but tents must be taken for desert use. There is a direct road also to Ning-sha, suited to carts. It skirts the hills, leaving them to the left. A caravan camel route also runs via

Ning-sha, Pau-to to Kwei-wa-cheng, i. e. Huc's route approximately. This route is also said to run 60 miles or two days north of Ning-sha through Fu-ma-fu (?Din-yuan-ing of Prejevalski). By it Peking is reached in 50 to 55 days. Tents are required. Grass is always found in sufficient quantity except for two days when crossing sandhills. Wells are met with at intervals; generally speaking an immense prairie is crossed; provisions of grain must be carried; the Mongols along the route are shy of Europeans. They pasture large numbers of sheep, cattle, and horses. The spring of the year is well suited for the journey, but the cold of winter, although severe, is preferable to the heat of summer.

After leaving Lanchau little traffic was met with, and the pigs in the ruined villages were as numerous as the men to be found in the few huts reoccupied by them. A few Chinamen alone occupy the cultivated wedge; coal is abundant and cheap, 200 cash the picul in the Ping-fang



PASS NEAR KULANG-HSIEN; THE GREAT WALL ALONG THE CRESTS OF THE HILLS.

and Kulang-hsien basins. Millets form the main harvests of the country, and are sown in May. Beans are largely grown, and bean cake exported. Grapes grow plentifully and produce excellent wine (not made, except by the priests). During the winter the thermometer sinks to 3° F., and during the summer rises to 95° F. Very little rain or snow falls, and the climate of Kansu is very dry, especially from October to May; the country is very healthy, and there are few illnesses except

the preventible ones of small-pox, &c. A Lazarite bishopric has been established here for eight years, and their converts around the city number some 600 souls. They have stations at Kan-chau, Ili, Kashgar, and along the Yellow river, besides numerous others along the route taken. I found the Chinese Inland Mission firmly established along the route taken, and doing an heroic work as far as Lan-chau-fu. They work for "Love," and are deserving of the support of all; they should join hands with the American Missionaries of Armenia and Azarbeijan, who are excellent Turki scholars, and establish joint stations in Kashgaria, where both languages are needed by them. The people here are described as excessively poor, and without heart; there are no markets for the produce of the country. They are generally inoffensive, and given to no special evil practices; the police are considered to be the greatest thieves. Few sheep or cattle were seen.

The country northward of Liang-chau is practically a plain, across which it would be easy to run good roads or railroads. The width of the cultivated portions is variable, and the general characteristics of the fertile portions are clay soil, with detached walled farmsteads and small villages, often in ruins, dotted here and there; irrigation by streams from the snows of the mountains to the south is general and extensive; grains, poppy, beans, &c., are grown. Rhubarb grows in the hills; coal abounds also in them: that in use in the towns and villages is coal dust, which, mixed with clay, is an economical and good fuel. The desert tracks are gravelly or sandy, and heavy for carts. The deserted lands around some of the ruined villages are full of pheasants of magnificent plumage. The country along the south-east border of the Mongolian plateau—Alashan, Ordos, &c.—is described by Huc and Prejevalsky. The Lazarite missionaries who have traversed it give a better account of its climate than Prejevalsky.

Kan-chau, our eleventh stage from Lan-chau, and distant from it 313 miles, is elevated 5300 feet, and contains from 15,000 to 20,000 inhabitants. Morasses within the walls render it unhealthy, and croup is very prevalent. It is the headquarters of a military district, with a fair trade. There are 350 Christians here. Its opium is of noted quality, and costs 190 cash the tael weight. Coal-mines are five days' journey distant; coal dust costs 100 cash the picul, and lump coal 800 cash.

As a rule, the climate is dry, and but little snow falls. In May, however, we experienced much wet for four or five days. In summer, a temperature of 93° is not unusual. The cold of winter is severe, and all then wear sheepskins. The climate is variable in the spring—one day hot, the next cold. Cotton is said to grow well in the district. Goitre is prevalent.

Beyond Kan-chau the route runs within view of the snowy range, and after passing through several well-watered oases growing wheat, beans, peas, &c., of a sandy, clayey soil, a partially cultivated prairie is

crossed, partly of a saline, spongy nature. Salt is found in the neighbourhood, of excellent quality. Su-chau lies in an extensive oasis, a good deal of it fallow, and much of it under grass. The streams crossed are liable to be flooded; given a hot sun and a little rain in the hills, and a flood ensues; this must be so, for the hills rise like a wall from the plain, and there is no large river system to carry off the water resulting from the melting of the snows. The day temperature of Su-chau in May averages 60°. It is elevated 4800 feet and has about 10,000 inhabitants, including the suburbs, and 200 shops. Opium is largely grown and consumed by men, women, and children.

Within the Nan-shan, 30 miles off, are pasture lands occupied by nomad Tibetans, called by the Chinese "Shi-Fanza," i. e. the Tangutans, described by Prejevalsky, and Mongols. To the east are Mongols; the wedge is alone occupied by the Chinese. These races do not intermingle. It is easy, it is said, to travel amidst the Nan-shan; pasture is abundant; range after range is met with, but easy passes exist. Milk can be obtained from the nomads; millet and flour must be carried; wild yaks, dogs, hares, partridges, and pheasants, abound in them.

It is not very hot about Su-chau in summer, and the winter cold is bearable when clad in skins. The nearness of the snowy range which rises abruptly out of the plain—a magnificent sight—tempers the summer heat. The abrupt rising of the Kan-su marginal range is stated by Prejevalsky to find its full development only on the side of the Ala-shan Plain; on the other side the declivity is short and easy. This is as I heard, and have stated. During March the nights are calm; at 8 a. m. a strong and cold wind springs up, which lasts till 10 a. m. It blows again from the north-west during the afternoon. The dry north wind chaps the skin. In April icy cold winds blow about Su-chau, accompanied by snow, rain, and mist. In July rain is to be expected; in the spring the season is very variable. We experienced, as stated, much rain for four days in May, and a few days later so dry was the air, that the seats of both my saddles split across and contracted an inch. One harvest only is gathered; in the winter nothing is done. In their season, grapes, apricots, peaches, apples, and pears are plentiful.

The Mongols trade here, bringing felts, skins, and European goods from Kalgan, taking grain in exchange. The Chentus or Turks bring dried fruits, cotton, &c., in exchange for skins for their caps and tea. There is about double traffic outwards to what there is inwards; a good deal of the traffic hence takes the line by Pau-to to Kwei-wha-cheng. There are no posts, but official despatches reach Peking in fifteen days by special mounted couriers. There is a Russian merchant established here, who keeps a large store, where Russian cottons, cloth, clocks, soap, candles, and all manner of odds and ends are sold.

To summarise now as regards communications between Peking and Suchau, the base for preparations to cross the Gobi to Hami, in the

extreme north-west of Kansu, an oasis in the desert, for over 50 miles of barren waste has to be crossed to reach it from Lan-chau-fu. The Wei valley, we have seen, the remote base of Kashgaria, 930 miles from Su-chau, is connected with the Yangtze valley via Honan-fu by two cart-ruts over a clayey soil, and with Tien-tsin by two cart-ruts over a similar soil and crossing loess hills 4500 feet high, the former ruts being from 600 to 700 miles long, and the latter about 800 miles. Mule-paths and navigable rivers exist, but I have been at pains to show that the latter, though affording cheap transit, waste much time, and as we do not live for ever, this waste is a consideration. Roads are unmetalled, and for miles and miles nothing but the narrow bottoms of deep perpendicular gorges, 8 feet to 10 feet wide, allowing but one line of wheeled transport, and liable to be closed to traffic after heavy rain or snow.

From the Wei valley northwards these four ruts become two, and remain so to Hami, 1350 miles. This is bad enough even if they passed through a fertile and populous country, but its depopulated and uncultivated state throughout its greater part, from Si-ngan-fu to Su-chau, 930 miles, must be seen to be appreciated. Scarcely a village has been left standing, although some of the walled towns escaped destruction at the hands of the rebels and the soldiery.

In six days from Su-chau, Ngan-si-fu (elevation 4120 feet) was reached, distant 178 miles. It is a poor place, where one lays in stores for the desert journey to Hami. On the road narrow strips of well-irrigated cultivation are met with at intervals, at times desert is traversed, at others fair grazing ground. Four considerable streams are crossed, from 50 to 150 yards wide, and deep and rapid. The villages met with are in ruins; a few are in part occupied; the country is generally depopulated and out of cultivation. This narrow strip of communication, occupied by Chinese alone as heretofore, is still bordered by the Nanshan Mountains, and the desert, occupied by Tibetans and Mongols.*

At 18 miles from Su-chau, Kia-yu-kwan, celebrated as one of the gates of China, and as a fortress guarding the extreme north-west entrance into the empire, is passed. The Great Wall circles round the town and across the neck, and is now left behind and seen no more.

Ngan-si-chau is a town of 400 to 500 houses and a few shops, of 1000 yards side; there is little or no cultivation about the town, and the water is brackish. Sand is heaped up against its dilapidated walls to such an extent that you can walk over them. A route runs to Sa-chu or Tengwan, a rich oasis, which is reached in four days.

* These Mongols, or Western Tatars, so called by Hue in contradistinction to the Manchus or Eastern Tatars, are the living representatives of the Huns, and the yet more ancient Scythians. Under Attila they reached the Rhine and the Mincio; Chenghiz Khan led them to victory in Asia and Europe; his memory still lives, and their ancient spirit is probably but dormant, for they desire to supplant the Manchus, in whom they see a rival race in possession of what was formerly theirs, viz. the Empire of China.

No information concerning the ancient trade route to Keria and Yarkand could be obtained. Governor Tzo sent a party to discover it, but they never returned, and are supposed to have been either overwhelmed by sand or to have been murdered. The Chinese say that bad men have closed the road, and refuse to act as guides. This only means that the route is not now in use, but that it can still be traversed. No doubt also the route from Tsaidam traversed by Prejevalsky along the valley between the Chaman-tagh and Kuen-lun, by which Cherchen is reached, was an ancient trade route. No Chinaman here had ever heard of Cherchen. These desert routes present no difficulties to well-prepared caravans.

From Ngan-si-chau, Hami (elevation 2650 feet), distant 240 miles, was reached in eleven ordinary cart-stages or days, over the Shamu (Gobi) desert, which for 200 miles is almost an absolute desert, in May, along the main caravan route by which we travelled; water can be readily obtained and is often close to the surface, and springs (brackish, but potable) occur apparently at intervals of 20 to 30 miles in any direction. It could be readily stocked with grass, for the country, 30 miles south of Hami, is a vast grassy prairie. Travellers like to make much of crossing the desert, but it has few hardships; and before we left Kashgaria we had reason to think the Gobi days pleasant in comparison with the Kashgarian desert hills and flats, and forests swarming with myriads of mosquitoes and horse-flies. The accounts of several travellers which I have read must be received with caution, for they appear to have mixed up the leaves of their note-books, or to have written from memory, and to have guessed at heights and distances.

Hami is a rich oasis of no size, not over 30 miles in any direction. The scent of its vegetation was marked, and we all made for the first stream of sweet water and halted to give the ponies a taste of green grass. The desert water is more or less brackish, but one has got used to that long before the Gobi is reached, and it is pleasantly cool and refreshing in June. We got over the eleven desert stages (240 miles) in eight days. The Chinese are behaving most foolishly at Hami. They give the Russian merchant established there no protection or justice, and we spent most of the day together chatting over his grievances. They will probably pay dearly some day for their foolishness for Russia is quick to take advantage of such folly when time is ripe to do so. The mandarins also treated me uncivilly, and I was greeted as a "foreign devil" at the Yamen as soon as my Chinese disguise was penetrated. Neither civil nor military mandarin would see me, and neither returned my card. I left a letter at the Yamen to be delivered to Lieut. Younghusband, and when, five weeks later, he called for it its receipt was denied. In Kashgaria proper I met with the greatest civility. Incivility from the authorities is met with only between the Gobi and Karashahar, a tract of country occupied by the scum and

overflow of the Chinese populations of the frontier towns of Liang-chau, Suchau, &c.

Let me now give a few details. Leaving Ngan-si-chau and crossing the desert stream, the Sula-hu or Buluntsir, 50 feet wide and $1\frac{1}{2}$ feet deep, a barren gravelly flat, heavy for carts, is crossed. At the first stage, Pahtungza (4850 feet), is a small stream of brackish water, which is said never to run dry, and some ponds fed by it. The second stage to Hung-leo-chuan (5500 feet) is through low hills, the Pejsan range of indurated clay and diorite, by easy slopes; the bordering low hills are crowned by *obes* or piles of stones built seemingly to mark the route, but said to have a religious meaning. On the 27th May the sun's rays were hot, and the temperature at times 92° ; on the 28th a bitterly cold wind blew from the north-west with a temperature of 42° , a fall of 50° . The climate of Kansu was found to be most variable in the spring. Roads branch off laterally to Yui-min-hsien and Tengwan from Sin-sin-sha, Ku-shui, and Huan-lu-gan. About Sin-sin-sha the hills are granitic and felspathic, or of sandstone or limestone veined with felspar. No mica was seen. All the stations, consisting generally of two or three inns, and perhaps as many huts, are held by Chinese, who charge high prices, but carters carry grain and chopped straw for their horses and food for themselves for the journey. There is a little grazing here and there. The desert ceases a little to the south of Chan-mo-shui where a stream of sweet water occurs, and the last stage is for the most part over a grassy prairie (grass one foot high and over, of the reed variety, but excellent forage). The Turks avoid this route, along which the inns are kept by Chinese, and take a route of their own. As several of the carts seen had no tires to the wheels, the alternative routes would seem to be over an easy soil. The camel-road from Huan-lu-gan (Hami oasis) to Yui-min-hsien keeps under the hills, where grass occurs.

There would appear to be no difficulty in laying out several cart roads over the desert, as water can generally be found close to the surface; soil, gravel or sand. The hills met with offer no steep inclines, and are traversed by wide valleys. They bear evidence of water action and rain of tropical force. The brackish water is potable; the roads could be stacked with grass, and provisions procured from Hami, Sachu, Ngan-si-chau, and Yui-min-hsien, &c. The general character of the road over the desert is the same throughout, viz. two cart ruts 6 inches deep, generally over a sandy gravel; at times over rock, and at times the gravel is more stony than at others.

In the suburb and old town of Hami are some 5000 souls, and in the Mohammadan town about 2000 souls, Taranchis, wearing turbans and the Turkish dress—unmistakable Turks. The shops in the old town are small, but well stocked with goods, chiefly Russian.

The indoor temperature at Hami (elevation 2600 feet) in June varies between 80° and 85° . The greatest heat experienced in summer is about

100° indoors and 122° out (in the shade). The winter temperature is bearable (8° F.). Snow or rain rarely falls to the south of the Tian-shan, from Hami to Toksun, but to its north both fall abundantly. The oasis produces wheat, millets, barley, maize, melons, water-melons, pumpkins, grapes, and various fruit. Opium is also produced. Its melons are famed. Russian merchants have been established here for six years. They receive consignments of miscellaneous goods, cottons, hardware, sugar, soap, candles, lamps, clocks, matches, vodka, &c., from Moscow, Nijni-Novgorod, Omsk, and Tomsk, viâ Biisk and Kobdo, where they have a branch house, two or three times a year. They employ their own camels. At Uliassutai there are four Russian shops, and at Kobdo, three; the Russians indeed supply all the out-stations of China with wines, tobacco, hardware, candles, cloth, cottons, &c. They report the Mongols to be an easy people to deal with. From Hami nothing is sent back to Russia; transactions are in lump silver. Uliassutai and Kobdo are each about 22 to 23 camel stages distant. Everything is very dear except flour, which costs 1 tael the picul (133½ lbs.) The town is well supplied with coal; also pine wood from the Tianshan, 30 miles distant.

Colonel Sosnoffsky crossed the desert in August by an alternative cart route. If his report be a true one, the line taken by him is far to be preferred to the main caravan route taken by myself, but this is not likely. Throughout his journey from Han-chung he appears to have slept a good deal in his cart, a more dignified thing to do in China than to ride on horseback, note-book in hand.

At Hami the two cart-ruts already described open out into four; two going to Kulja, or Ili (800 miles), two to Kashgar (1200 to 1300 miles). Here also a good camel road joins in from Peking, distant by it 1250 to 1300 miles. It passes through the desert, and supplies have to be carried; but, as camels can be levied from the Mongols, it is a practicable military route for an Eastern army; the journey is one of 70 to 80 days' duration. It is, however, chiefly used for the conveyance of war *matériel*.

From Hami I took the Ili road as far as Hunga-Miotza or Urumtsi, 408 miles, crossing the Tian-shan by its most easterly pass, a very easy one, elevated 9000 feet. Barkul is reached in 3 days, over a rich pasture country beyond the pass; the Barkul oasis is a small one, but is capable of being largely extended. At present its farmsteads are in ruins. From Barkul, for 130 to 140 miles, the Tian-shan range is traversed by an easy cart track, leading through natural valleys, with good pasture here and there, but otherwise all desert. Pines are plentiful in places under the northern snow-clad crests. On leaving the hills, to Hung-Miotza, 200 miles, a few towns are met with, and at intervals desert, pasture, and most fertile oases alternate. These well-watered oases are paradises of birds, trees, and vegetation, and the richest that we passed through, richer than those of Western Kashgaria, Kashgar, and Yarkand. They are only in part reoccupied. Towns

and villages are in ruins, and a rank growth of high grasses chokes many of the fields.

Hung-Miotza or Urumtsai, is now the capital of the province of Sin-Kiang, the new Chinese frontier province formed to include Kashgaria, Outer Kansu, Ili, Zungaria, &c., and extending to the Russian border



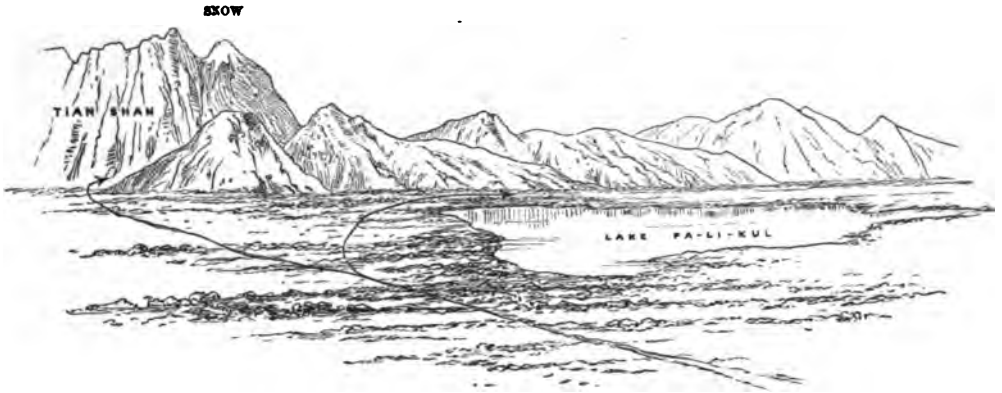
NEIGHBOURHOOD OF URUMTSI.

and Mongolia. Here the Chinese have concentrated their chief military strength, and here they are building a new city, and what they think to be an impregnable walled town; unfortunately they do not possess the military knowledge to see that they are occupying an indefensible site; there are some 2000 Taranchis here. One meets few Chentus (Turks) till Karashahar is reached, in the interval they are sparsely scattered, but get more and more numerous as Hung-Miotza is left behind. Neither are Tunganis, Chinese Muslims, met with in any numbers eastward of Karashahar; the Chinese are colonising the rich oases; they may serve to form excellent Russian subjects in the future. The cart road leads on to Ili, about 400 miles distant, and presents no difficulties, passing through a varied country, resembling that between Barkul and Hung-Miotza, desert and oasis, becoming more hilly and barren towards the descent into Ili.

A few more details may be interesting. From Hami a gravelly glacia reaches to the foot of the Tian-shan, 30 miles distant; thence the road winds up one of its stony ravines, averaging 150 yards wide, by a gradual ascent, i. e. from 5700 feet to 9000 feet in six hours; the hills are of indurated shales, the top slopes of which are clothed with pines, larch, and juniper; the descent is steep, and amidst clay hills, to an exceedingly rich pasture valley (elevation 6750 feet), whence an easy road continues down the widening valley, the pasture becoming less rich, to Barkul, the Chinese Pa-li-kul (elevation 5300 feet) distant 85 miles. The place consists of the Manchu and the Chinese cities, the former occupied by 1000 Manchu and 1000 Chebing soldiery (local militia); the latter by 1100 Chinese and 70 Tunganis. Camel roads lead to Kobdo, Uliassutai, and Kwei-wha-cheng—18, 22, and 54 to 58 days off respectively. Officials get

to Kwei-hwa-cheng in less than a month by the official route. Carts can go to Uliassutai. The elevation of the lake is about 5100 feet.

A cart road leads over the hills to Pechan and Turfan. From Barkul the road continues over the basin in which the lake lies, skirting the



PA-LI-KUL (BARKUL).

low, rocky and barren outliers thrown out from the main Tian-shan range, and at 19 miles beyond Gu-kei enters low gravelly hills, and finds by natural valleys, 100 yards to 400 yards wide, an easy passage through them, rising to 7320 feet. The Tian Shan here lowers in elevation, and is not snowclad. To the north and south, the hills, confused masses of cones of gravel, clay, and shale, afford pasture; springs are not plentiful, and streams almost wholly wanting. Nearing Spi-kho, 177 miles (elevation 5300 feet), the highest flat-topped part of the Tian Shan range, which again lowers considerably here, is traversed at an elevation of 5400 feet, and a view obtained over the Gobi to the south. The falling slopes are here barren and broken, and an easy passage down the valleys looks likely; indeed a cart road finds its way amongst them to Turfan, which is reached in five days; the hills 10 to 12 miles to the northward rise to a considerable elevation.

Baron Richthofen describes how, there being no outlets to the ocean for the silt brought down by the waters between the Kuen-lun and Tian Shan ranges, these results of denudation are washed or blown into the valleys, and the country is buried in its own detritus. I found this supposition to a certain degree true in all parts of the Tian Shan and its foot ranges traversed by me along the line Barkul, Hung-Miotza, Toksun, Karashahar, Aksu, and Kashgar; all the valleys and ravines are filled up, so that they are traversed by natural inclines, and the narrow rocky bottoms, the result of water action, are unknown; but the filling in is often of a size and nature—gravel, sand, and shale—to suggest other action than that of the wind alone as the levelling agent.

The hills are rocky and splintered ; of loose and rocky shale, and all are rounded in outline. There is pasture in the clayey bottoms, and ruined hamlets here and there. The lower range of hills here fronting the Tian Shan are rounded in outline, and covered with grass. Snow now again occurs on their summits. Wild sheep, mutton, antelope, and gazelle are found within them, and, they also say, wild horses. Before reaching Sang-kong-hsien (elevation 4850 feet, 216 miles), the Tian Shan are left behind, and their northern glacis traversed by an easy track, affording camel-grazing and pasture at intervals. After crossing the Mu-lai-ho, 240 miles, extensive oases of cultivation and pasture occur at short intervals.

Gu-chen is a place of importance and trade (elevation 2650 feet, 240 miles), occupied by 1000 Chinese, 25 Manchu, and 40 Turk families, with a garrison of 500 Hunan braves and 500 local militia.

Camel roads lead over the desert to Chuguchuk and Kobdo, and to Peking, 78 days ; to Uliassutai, 22 to 24 days. Camel roads also lead to the Zaisan prefecture ; water is scarce along them, and that by Biisk, over the Altai, is to be preferred. Coal is plentiful in the Tian Shan, both bituminous and a natural coke. The bullocks of the country are of a fine stamp and numerous, and the watch dogs, guarding the camel caravans met with at intervals, are exceedingly savage, and twice I had to canter for life with three or four of them jumping up and snapping at my legs and horse's nose. The feature of the landscape for many days before reaching Urumtsi is the Bogdo group of three uplifted snow-covered peaks of considerable grandeur.

At 16 miles beyond Fu-khan (elevation 2000 feet, distance 270 miles) the glacis plain penetrates into the main range, which here wholly breaks away, and through a cultivated grassy and wooded valley, the undulations overlooking Hung-Miotza (elevation 2900 feet, distance 408 miles), are reached. The town has a side of about 1000 yards, and contains a population of 20 Chinese and 100 Turk families, besides 1000 Chinamen without their families ; its shops, large and small, number 500, many of them kept by men from Hunan, and many by Turks and Chinese from Su-chau and Ping-yang.

It is the headquarter town of the Sin-kiang or New province. The town occupies a unique position in an undulating valley five to seven miles broad, penetrating into the Tian Shan range, the ground rising to the south of the town to form the watershed. Coal costs $1\frac{1}{2}$ to $2\frac{1}{2}$ taels per 1000 catties (1333 lbs) ; flour 2 taels the 100 catties, and all provisions are about twice as dear as at Gu-chen. The winter is here severe ; three feet of snow lies, but does not block the road to Ili. It falls in May.

Urumtsi, the " Bish-balik " of the middle ages, has played an important part in history, and must always do so, because of its position on the Peh-lu the chief route from Zungaria to China, and commanding the

Nan-lu from Hami to Kashgar. Here the Ili route was left, and the Tian Shan recrossed to gain Tok-sun, 103 miles distant on the southern road from Hami viâ Turfan and Aksu to Kashgar. Between Urumtsi and Ili there are no passes fit for carts over the Tian Shan to Aksu and the southern road. The only passes for pack animals leading through Chinese territory are the Mustagh and Yulduz routes. The donkey transport is of an excellent stamp.

Imperceptibly from Urumtsi the road gains the watershed, and finds an easy passage over foot-hills of the Tian Shan, which range, indeed, is here, as stated, wanting altogether. The highest elevation reached is 4400 feet—hills, of shale with veins of felspar. The route is generally a barren one to Toksun: distance 103 miles; elevation 350 feet. High winds blow across the re-entering plain and over the depression, but little rain or snow falls in the locality. Hills rise out of the gravelly skirts of the range, which have been formed by the filling up of all the intervening valleys. Amidst this gravel occur now mica, felspar, and gypsum. Shale is held up in fan-like masses against some of the slopes, and all valleys are flat-bottomed.

Toksun is a town of military importance, and Kashgaria may be said to be here entered, for although Yákúb Beg extended his authority over Turfan and Hung-Miotza, yet nothing to its eastward was held except under a precarious sway.

The population consists of 400 Turk, 200 Tungani, and 15 Chinese families. Its climate is hot and oppressive. The oasis is a small one, lying in the lowest depression of this section of Asia. Toksun is elevated 350 feet, Hami 2600 feet, and Lobnor 2200 feet. Cotton thrives, and is of an excellent quality. The oases of Kashgaria are well suited to its growth. The direct cart road runs through Turfan (40 miles) to Hami (270 miles) keeping south of the Tian Shan, along its glacis or through its gravelly and shaley foot-hills. Lob-nor is reached in eight days.

From Toksun to Karashahar (150 miles) a hilly country is chiefly passed through—offshoots of the Tian Shan; road heavy for carts, over sand and shingle, and chiefly through deserts, the oases passed through being of very limited area and poorly occupied. Mosquitoes occur in myriads as soon as the wastes bordering the Baghrash lake are entered; they nearly killed our horses. The road is a natural one, over the gravelly and sandy slopes of hills and through the beds of the broad-bottomed basins; all is barren. During the second stage it is bordered by high perpendicular cliffs of indurated clay rock, and lies along a brackish stream, at times a torrent carrying everything before it. Granitic boulders occur towards the top of the highest pass crossed, i. e. 5600 feet. Kamish and Ushtaba are small oases, and Chinzi-kurza is a small village of twenty to thirty huts and a few shops. Near Kamish the low hills are of indurated clay, forced up by granite and gneiss. Water is fairly plentiful along the route, and of good quality.

All the valleys amidst the shaly hills and hillocks traversed are as heretofore filled in with shingle and triturated shale; near Ushagu the filling-in is granitic; it is more generally of shale. The Tian Shan, and these its offshoots, would be very difficult to traverse were it not for the natural roads thus formed over and through them. To the westward of Chinza-kurza several (four) well watered and wooded but narrow and unoccupied oases are traversed. This was the best timber seen along the whole line. The traffic met was not large—only one solitary traveller and a few carts.

The water of Baghrash lake is said to be fresh, and to be chiefly fed by springs rising in Tacheng, 30 miles from Wo-ho-bola, a station in the pass. It abounds in fish. We crossed streams at Ushtaba (212 miles), Chinza-kurza (236 miles), and between it and Karashahar.

Nearing Karashahar grazing gives way to cultivation, flies suddenly take the place of mosquitoes, and the poppy thrives. The oasis is chiefly a pastoral one. Mongols principally occupy the town and vicinity, and the hills to the north. The town, which lies on the left bank of the river, about 40 miles from the foot of the hills whence it flows, has a side of between 400 and 500 yards, with a surrounding rampart of mud with flanking bastions. It contains 460 Tungani, 250 Turk, 100 Chinese, and 400 Mongol families, with a garrison of 500 Mongol cavalry and 500 Shensi braves. In the vicinity are 1000 to 2000 Mongol families.

The reason for the existence of the town would seem to be to supply the wants and the requirements of the nomads of the Tian Shan and towards Lob-nor, and because of the strategic position it occupies. The country to Hung-Miotza produces little, and is a heavy ten days' journey for carts. By a hilly pack-road it can be reached in six or seven days. Lob-nor is ten days distant; grass is found on the road, but water is scarce. Ili is reached via the Narat Pass (10,600 feet), the Ungut Pass (6800 feet), and the Upper Kunges valley, a distance of about 280 miles. From the Narat Pass Urumtsi is also reached, distance 309 miles (180 miles from the Narat Pass, which is 173 miles from Kulja).

From Karashahar, Aksu, 373 miles distant, was reached in fourteen days; their respective elevations are 3550 and 3750 feet.

Karashahar is the natural eastern limit of Kashgaria, Toksun being its outpost to the east. On its west lies the difficult pass leading to Khur, 33 miles off, whence the 340 miles to Aksu consists of much desert, a little pasture land, with oases at intervals, some of them large, i. e. Kuchar, Bai, &c., producing grains and fruits plentifully. The Karashahar river, or Haidin-kua, or Kaidu-gol, or Koncheh-daria, has a width at the city of about 500 yards; a sluggish current, yellow, and loaded with silt; average depth 3 feet, with 2 feet of banks showing above this level. The high reedy grass, the characteristic of

the country on this side of Hami, and south of it, on the deserts towards Su-chau, grows abundantly to a height of 2 feet 6 inches; beyond the river, passing a ruined city, sand-hills soon occur, and beyond Szuni-Chenza, 14 miles, the road gradually descends. Skirting the river Karashahar, the rocky, steep, and barren hills are entered, the road becoming a broad and undulating ledge on its right bank, and at 32 miles the fertile oasis of Khur is reached (elevation 3100 feet). The pass and the approaches to it on either side are easy of defence; in the pass the river is a rapid torrent; coal is found in the hills, and pits are worked by the roadside. The town contains 2000 Turk, 50 Tungani, and 10 Chinese families. We here see how the Turks predominate in numbers, and therefore judge that the true Kaahgaria is being entered. Twenty-five Mongol cavalry garrison it. Corn is largely grown in this rich oasis, and is the chief grain given to horses. The mulberry tree grows plentifully, as well as in all the oases to Kashgar. Ili can be reached by bridle-paths through the hills in five days; grass is plentiful within them.

The route to Sa-chu by Lob-nor, and that by Lob-nor to Khotan, are not now in use; and to exemplify the general ignorance of the Chinese of geography, I may state that their idea is that the waters of Lob-nor flow under the sand to issue again near Sa-chu and Barkul, and to flow thence into the Yellow river. This would mean that the water flows up hill, for the level of Lob-nor is 2200 feet; of Barkul, 5100 feet; Sa-chu, 3700 feet; and the Yellow river at Lan-chau-fu, 5500 feet.

The Kunges and Yilduz Valley route to Ili is described by Prejevalsky, and the country between Korla, Lob-nor, and the Altyn-tagh mountains, 13,000 to 14,000 feet high, by Prejevalsky and Carey. With well equipped caravans there is no difficulty in traversing these inhospitable regions.

Beyond Korla the cart road runs along the foot of the barren hills skirting the oasis, which is about 10 miles long, when all becomes a desert waste of sand and gravel, with the exception now and then a growth of tograk trees and tamarisk. Cherchu is a small oasis occupied by 30 Turk and two or three Tungani families, at an elevation of 2900 feet, beyond which the road again continues over a plain of sand and gravel and amidst low sandy hillocks. Tamarisk and a coralline shrub plentifully cover it, and at intervals tograk woods are traversed; the woods are crowded with mosquitoes, which insect, however, ceased to be a pest at Khur. Yeh-in-go (91 miles) is a small oasis, capable of extension; the same may be said of Chedir (101 miles), whence to Yang-i-hissar is through bush, or a growth of grass. The large village and oasis of Yang-i-hissar (distance 118 miles, elevation 3370 feet) is occupied by 800 Turk and five Chinese families; wheat and the poppy are largely cultivated. The population of these oases I calculate to average 200 per square mile. Thence to Bugur, with the exception

of a little grass, the country is barren; this is a large oasis occupied by 1500 Turk, 15 Tungani, and eight Chinese families. The waters of all the streams irrigating these oases are warm, and loaded with silt, although their sources in the snow-clad hills are not far distant. The indoor day temperature reaches 90°; that of the night, still influenced by the snows of the Tian Shan, falls to below 70°. Seven miles out of Bugur the river Chan-bar-kai-chor is crossed, a rapid stream two feet deep, with a bouldery bed, rapid current, and difficult to ford; it is said to fall into Lob-nor. Five miles beyond it cultivation ceases, and a gravelly waste is traversed to Yangi-ábád (elevation 4600 feet, distance, 164 miles). Here live 270 Turk families, amidst muddy streams, ripening fields of corn (June), and a luxuriant growth of Indian corn and poppy. To Yaka Arik (29 miles) the waste grows nothing but desert shrubs and tamarisk.

Some of the Chentu women simply wear a handkerchief tied lightly round the head and falling behind; others wear fur hats of a dark brown colour (like seal-skin), pyjamas and loose blouse bound round the waist; the latter, of chintzes, generally part red, which is a favourite colour. They have the Mongol class of face, that is, round and bloated; but not so the men, who generally have thin faces and features. They call themselves "Hassan," i. e. Shiah Mohammadans. All ride, and the women then wear top-boots. Many of the boys are good-looking and slim, with olive complexions, aquiline features, fair eyes, and brown hair. It was pleasant to look upon the comely, buxom, good-looking Turk woman, after that distressingly hideous deformity of her sex, the Chinese woman. Woman in Kashgaria takes her proper place and does her proper work. She never dreams of hiding her rosy cheeks and large black eyes. The men are tall, 5 feet 9 inches in height on an average, and well made, and the women also have good figures. They develop early, marry young (12 years), and make helpful wives; a family of five or six children is common. The people thus multiply rapidly, and will in a few years overflow their present limits into Kansu, and history would seem likely to repeat itself and the people of Kashgaria to return to repeople Kansu if only a long interval of peace ensue, and they become tributary to an aggressive power. A man marries as many wives as he can afford; they are cheap, costing but a few clothes and 15 rupees each. Temporary marriages are the custom. I heard of a woman having had thirty-six husbands, and thought it no shame. This is bad for the children and the country, and the result of centuries of Chinese heathen rule.

Excellent milk, cream, curds, fowls, and eggs, can be obtained in abundance in the oases; sheep, goats, and cattle are fairly plentiful. Some of the inns are of a superior class. From Yaka Arak small unoccupied oases extend at intervals to Kuchar, a walled town in a rich oasis occupied by 3050 Turk, 1200 Tungani, and 30 Chinese families.

There are in it 300 shops kept by Turks and 150 by Tungani and Chinese. No English cloth is sold here. Kashgar and Russian cottons find a good market. In the district are said to be 7000 Turk families. Copper ore is found in the neighbouring hills in nodules and concretions in red and white sand, or a sandy clay. The ore from about Aksu occurs in thin layers of a dark-brown colour. The Turks have plenty of donkey and pony transport; mules are rare.

Beyond the oasis the road ascends the barren skirts of the range here running across the front, and passes through a sea of low and intricate sand-hills, formed by water action on an elevated level of deep sand, by a broad and gently inclining roadway. The top of the pass has an elevation of 5000 feet, beyond which the broad shallow Muzart valley opens out to view for many miles; in it lie several oases, amongst which the road passes through Khwordza (elevation 3950 feet), Bai-chen (elevation 4150 feet), Selimu and Charki (elevation 4770 feet), whence its barren border hills of indurated clay and sand to the south are traversed by a natural ravine with, as usual, its bottom filled in level with gravel and sand; beyond, a broad basin of coarse felspathic sand leads to Yargum, a small village of 30 Turk families, elevation 4050 feet.

In the town of Bai-cheng are 1100 Turk and 140 Tungani and Chinese families, and in the district 40,000 souls; in Selimu and district are 4000 Turk families. Beyond Khwordza lies the Kizil-su, 100 yards wide and one to two feet deep, a branch of the Shah-yar, and beyond Bai-cheng seven streams are crossed—each rapid, one to two feet deep and from 100 feet to 100 yards wide—before the Muzart is forded, a river 400 feet wide, rapid, and $2\frac{1}{2}$ to 3 feet deep. Its valley is well cultivated and irrigated, with good grazing, 30 miles broad, and remarkable for the fine clumps of dark green poplars growing about several of the villages.

From Yargum the road passes through a growth of tamarisk and through cultivation to Yamatai or Jam, a village of 140 Turk families, and thence through cultivation to within a few miles of Aksu, before reaching which a barren sandy plain is crossed. The ground becomes uneven at Aksu, and the town, 373 miles from Karashahar, lies in a hollow surrounded by sandy clay cliffs. Houses mount up their sides; all are built of clay, flat-roofed, low, and entered by narrow doors—a very poor class of dwelling; the town looked squalid and a hotbed of disease, such as fevers and small-pox. Goitre and eye diseases are also prevalent. In the Aksu circle are 180,000 souls; its district extends to within three marches of Maralbashi and two of Bai. In the town are 4010 houses; there are 100 foreign traders here (mostly Russian subjects, Andijani), three only are Panjabi; an Afghan Aksakál or agent looks after their interests.

Rice is largely grown in the valley; apples and apricots and fruits generally are abundant in season, and in July the markets were well

stocked with vegetables. In my passage through the bazárs a Chentu accompanied me, informing the curious that I was a Farangi, i. e. one of a race known as the conquerors of India, and the successors to the inheritance of its Moghul dynasty; of which I hope my readers are as proud now as I was then, for this fact connects the British in the mind of the Oriental with the dynasty of Chenghiz and Timur. A Chinaman or a Mohammadan Chinaman, a class who have retained all the facial and other hateful characteristics of the Chinese, such as pride and impudence, would, however, never fail to equally proclaim that to him I was a *yanquesah*, a "foreign devil."

The Turks are not considered to be brave; they like the Chinese, who do not interfere with their religion or customs, and give them their daughters in marriage. The country needs to be fostered, and this the Chinese do not do. They take what they can, one-tenth of the produce, and one-fortieth of the value of the merchandise sold, but do nothing to improve the country. Rule scarcely exists, and money is all powerful. The Turk Beys, who work as sub-officials under the Chinese, themselves oppress the peasantry if the opportunity offer. Both English and Indian goods are sold in the bazar, coming by way of Leh; but prices are unremunerative, and trade is not brisk; as the Chinese buy little and never make presents; the rich Turks are ruined, and the peasantry have no silver. The Russian cottons and chintzes sold far outnumber the Indian varieties. They are of thicker texture, brighter and faster colours, and more suited to the cold of Aksu, elevated 3750 feet. The Chinese have built a new and fine walled city, 7 miles from the Turk town. The work was done chiefly by forced labour at a low rate, and it is said that several hundred men died during the construction from accidental causes; the Chinese are oppressive in this way at times.

From Aksu to Kashgar by the cart road is 310 miles, the intervening country consisting of forests, deserts, and oases, some of the latter of considerable extent. The stretches of forest are 30 to 50 miles wide, and must be passed by forced marches at night; from dawn till dusk horse-flies occupy these tracts in millions, and the horses suffer fearfully. A few details of the route may be interesting. From the Chinese city of Aksu, the road passes through cultivation for 3 miles to the Janart valley, the stream flowing in a broad shallow bed bordered by low cliffs of clay; several streams, 100 and 200 feet wide, with rapid currents, are crossed before the main stream of the Janart, 300 yards wide, is reached. It is crossed in a ferry boat, the horses swimming; thence the road, often winding and narrow, traverses cultivation before reaching I-crow, a village of 500 Turk families crossing a meadow stream 50 to 60 yards wide by a rough combination of earthen piers and waterways. Wheat is harvested here in the middle of July.

Two and a half miles beyond Soi Arik (elevation 3500 feet, distance

31 miles), a desert waste is entered, with a saline soil in places, and a sparse growth of tamarisk, which continues to Chilian, a village of 30 poor houses on the confines of the Maralbashi district; continuing over a more or less barren waste, and passing through Jaidi, a few huts and a little grazing, the track often heavy, and amidst sand-hills or tograk woods, traverses the stations of Yaka Kuduk and Chadir before reaching Tumshuk (elevation 3600 feet, distance 120 miles), a village of 40 Turk families drawing its water supply from a pond. From Jaidi the country is almost unwatered by streams; thence the track winds through forests and amidst sand-hills to gain a passage through the low hills here stretching across the plain.

Before reaching Chahar-Bagh (elevation 3600 feet, distance 138 miles) the Kashgar river is lost in canals and streams which here intersect the country: grazing is plentiful, and it would seem possible to reclaim land here and to Maralbashi before reaching the cultivation of which oasis (distance 154 miles), the Kashgar river, a sluggish stream flowing in a sunken bed 50 feet broad, is skirted.

Maralbashi is a walled town, with about 2000 Turk families living outside its walls. Indian merchants trade here from Yarkand, bringing cottons, tea, pepper, ginger, and sugar, &c. Those settled in Kashgaria like the country, because of the facilities, already mentioned, of taking many wives; a poor man can afford to keep two, whilst in India he can only keep one.

The present rule is preferred to that of the Badaulat, Yakub Beg; it is a slack one, and the Indian traders complain of being unable to recover bad debts, and of the cost of buying justice, and of the confiscation of their teas. The indoor temperature in July rises to 85° at 9 a.m., and at 9 p.m. is about the same, but reading 95° in the open air.

The oasis is comparatively a poor one, but is well watered. Leaving it at 4½ miles, a more or less barren country, with stretches of tamarisk growth, and of forests infested by horse-flies, with stations at intervals, is crossed to Faizábád (elevation 3920 feet, distance 265 miles), a village of 450 scattered houses, each accommodating two or three families; it is noted for its local cottons. Passing through the rich oasis of Shabdár, the road crosses a rapid stream at 16 miles, into which our carts upset in the darkness of the night, the stream having washed away the road; and keeping a mile or two to the south of the Kashgar river, reaches the Yangi-shahar of Kashgar, whence it is five miles to the Turk city, a collection of mud huts and enclosures, with trees plentifully scattered here and there, without any building of architectural beauty, and perhaps but one of interest, i. e. the mosque raised by the Kashgarians to the memory of the Badaulat.

The Turks are poor architects; their mosques are most primitive constructions, as a rule, and their minarets are crooked and winding. Here pack roads radiate to Ili, Osh, and a cart road to Yarkand, Ladakh,

and India. The most direct road to Ili is viâ the Terek Pass, which is a fair pack-track; the easiest road is that viâ Chakmak and Chadir Kul. Carts can reach Chakmak, and but for low passes, over which it would not be difficult to construct a cart-road, they could reach the Russian postal cart-road at Narin (180 miles).

The Osh roads leading to Fergana are pack-tracks, difficult to cross in the spring from the melting snows and in the autumn from swollen streams. September and November are the best trade months. The cart-road towards Leh leads to Kargalik (235 miles), whence it is a pack-track to Leh (400 miles) and Srinagur (660 miles).

A Russian Consul is settled in Kashgar, with an escort of fifty Cossacks under two officers. He is assisted by a secretary, and has his wife with him. The detachment is not in favour with the people. In the Kashgar district there are said to be 160,000 families, and in that of Yarkand 300,000 families. A fertile district lies between these two towns, and the latter (Yarkand), a town of 29,000 families, is the centre of trade from India. Goitre in Yarkand is extremely prevalent, almost universal.

The stouter Russian cottons and chintzes sold here, as elsewhere, are preferred to the finer Indian varieties; they are cheaper, and look to be of better quality, so that they are even retailed by Indian merchants. Chinese tea alone is allowed to be sold, and there were in 1887 some 300 to 400 horse-loads of Indian tea practically confiscated. The Kashmiri shops had been closed in the Turk city and ordered to be re-opened in the Chinese walled town, much to their disgust. I have never heard whether they were actually opened there, or whether money bought a remission of the order.

There are reported to be some 15,000 souls in Western Turkistan who look to England for help in trading, viz. Badakshis, 8000; Kashmiris, Pathans, Hindustanis, 3000; Baltia, 2000, &c. An Englishman in Western Kashgaria is regarded by them all with esteem, as belonging to a nation able to help them. At least this was the impression I formed from their words and their uniform attention and kindness.

We have many advantages to gain by organising the Oriental trading material at our command. Enterprising Kashmiris are found in Western Kashgaria in large numbers, as stated; and as in Nepal, Tibet, and parts of Central Asia, they carry on a large trade with India. They are the chief merchants in Lhassa, a centre of communication and of influence. Pathans also exhibit great trading enterprise, and are found as far east as Aksu. Shikapur Hindus are scattered over Russian Turkistan, where they chiefly, however, live by usury. By associating these scattered elements with large Indian and Parsee firms, and by regularising our trade with China on the footing of that enjoyed by the most favoured nation, much good might be effected.

Several roads lead from Yarkand into Kashmir. The Mustagh route,
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some twenty or thirty years ago, was the shortest; it is now closed by glaciers. The Kugiar road is a good one; there are no high passes on it, but during August the streams met with cannot be forded. The Kilian route is now in universal use, by order of the Amban. The Sanju road is the best, but is not allowed to be taken by traders; there are, comparatively speaking, no high passes along it, and it is better than the Kilian. The Khálik pass is described as the most difficult of the four.

Taking the Kilian route, the cart road is followed to Kargalik across a fertile district; thence the pack track commences; the animals most suited to it are the Bactrian camel and the Yarkandi, Badakshi, and Kirghiz ponies. All have to be trained to endure its hardships; still to them, even, it is a passage through "the valley of the shadow of death," for remains of their fellows are strewn along it at every 500 yards during a considerable part of the route. It should be made into a good track three feet wide; a few seráis should be built and stocked with grain, and the growth of grass and shrubs encouraged at intervals. The chief passes along it are the Kilian, elevation 17,000 feet; the Suget, 17,100 feet; the Karakorum, 18,500 feet; the Sásir, 17,800 feet; Karawal Dawan, 14,100 feet; the Khardung, 17,700 feet, above Lq̄h. After crossing the Karawal Dawan, the Nubra valley is entered, and the traveller passes from death to life, for he will probably not have seen even a Kirghiz tent since leaving Shahidulla.

To summarise: Kashgaria must, I think, be considered to be an unnatural dependency of China, impossible to defend against Russia, so long as Chinese troops are not both trained and led by European officers, and communications by rail exist between it and the Wei valley, and with Peking. For it lies on the wrong side of the Gobi desert, an obstacle almost, if not altogether impassable to an army, if its only outlet, Hami, be held by an enemy; and impossible to cross at any time except by small detachments of troops at intervals of both time and distance, without very considerable preparation, such as the Chinese do not seem likely to give to it.

The chief points regarding the route connecting it with China, the Great Central Asian trade route, and main communication between east and west are: the great length of this one-cart communication—(1) Peking to the Wei valley 770 miles; (2) Wei valley to Hami 1322 miles; (3) Hami to Ili 800 miles; (4) Hami to Kashgar 1347 miles; i. e. 3439 miles to Kashgar, and 2892 miles to Kulja.

It is for very many miles suited for a single line of traffic only, passing through deep and narrow gullies in löess hills; unmetalled throughout, becoming impassable after heavy rain or snow; and even light rains halving the rate of progress over it.

It passes for hundreds of miles, between the Wei valley and Hami, to a great extent, through a depopulated and uncultivated country, partly

peopled by Chinese Mohammadans inimical to the Chinese Government, and who are thought to court the opportunity to again revolt; a people who have proved themselves to possess a prowess much superior to the Chinamen amongst whom they dwell, and by whom they are feared.

The people of Kashgaria, although not disaffected against their present masters, would not aid them against Russia, whom they are gradually being taught to regard as their future mistress; and the troops along the whole line are either of the Green Standard, i. e. Chinese braves, practically uninstructed, under totally uninstructed officers, of no value against a trained European force; or Chebing, i. e. a local militia, a force of negative value, because requiring to be clothed and fed.

Mr. Carey, who travelled through Kashgaria, considers that the chief characteristic of the country is its extreme poverty. "It may, indeed," he writes, "be described as a huge desert fringed by a few small patches of cultivation. In fact the only really good strip of country of considerable size is the western portion, comprising Kargalik, Yarkand, and Kashgar. To the north a succession of very small oases extends along the foot of the Tian-shan mountains, the stretches of intervening desert becoming larger as the traveller goes further to the east. The eastern extremity of the province is desert, pure and simple, and so is the southern extremity as far west as Kiria, with the exception of the small oases of Cherchen and Chaklik. The central portion is chiefly desert, excepting that pasture of a coarse and inferior description is found in the neighbourhood of the Tarim river and of parts of the Lob-nor system. There are probably many districts in India in charge of a single collector and magistrate which are richer and better worth having than the whole of this huge province, extending over not much less than 30 degrees of longitude and 6 degrees of latitude."

This will doubtless be the opinion of all who regard the Sin-kiang province as a unit of territory, and not as a part of an integral empire. The merchant or soldier, however, sees in it a territory fairly rich in the precious metals, producing cereals in abundance, besides cotton and silk, of a healthy and enjoyable climate, rich in all fruits—grapes, figs, apricots, melons, &c., and vegetables—well watered by cool streams, and supporting over two millions of a hardy race, of excellent physique: affording two secure lines of communication, both cart roads—the Peh-lu and Nan-lu—the natural and only lines of conquest and of commerce leading from the West to the East, from Russian Central Asia to the Central and South-western Provinces of China, and to fame and fortune.

True it is that cultivation is almost limited to the narrow strips of rich oases traversed by them, excepting as noted, in the extreme west (Kashgar, Yarkand, Khotan), but they suffice to meet all military requirements of good communications, can be stocked with supplies of food for man and beast, and pass through large towns capable of supply-

ing all the refitment requirements of an army. Its peoples are easily ruled, are not fanatical, and will, with assured peace, increase rapidly in numbers and constitute a rich store whenever emigration may be directed into neighbouring and under-populated regions—Kansu, for instance. It is certainly a possession not to be despised, one whose inhabitants have never had an independent past, but whose possible dependent future must surpass its most palmy days of old under Chenghiz Khan, when it attained its greatest degree of prosperity.

One cannot travel through Eastern Turkistan without forming a very high opinion of Russian enterprise. Russian goods, cottons, chintzes, candles, sugar, cutlery, &c., are found everywhere. Russian merchants settled in Hami, and dressed as Chinamen, in Suchau and Lan-chau, press the sale of their goods. Their cottons and chintzes, as already noted, are strong, well dyed, and suited to the country; could the lighter Indian varieties reach Toksun and Hami they might sell.

Acknowledging that Russia cannot compete with western nations for the maritime trade of China, Prejvalsky writes: "But in the provinces beyond the Great Wall, and, indeed, in the north-west provinces of China proper, Kansu and Shansi, the trade of which has long taken the direction of Mongolia and Tibet, we may be able to develop and consolidate our commercial operations." As the injurious causes operating against the development of Russian trade in Central Asia and China, such as the absence of large capitalists, insufficiency of financially sound trading firms, &c., are gradually remedied, competition with ourselves will become more keen and require on our part corresponding exertions. Throughout the journey I was struck with the want of British commercial enterprise in the interior of China, when compared with that exhibited by Russian Central Asian merchants.

British merchants are content to settle at the treaty ports, and to lose sight of their goods when once they leave them; but travelling for trade purposes is within our treaty rights, and there is always the fear that, if we do not avail ourselves of these rights for any length of time, the Chinese may be apt to consider them as lapsed; for China exhibits in a marked degree one of the characteristics of a barbarous people, viz. that of regarding intercourse with foreigners as a deplorable violation of that isolation which it is its greatest aspiration to preserve. She desires no reciprocity.

The solitary exception to our want of enterprise in Central Asia was Mr. Dalgleish, who deserved well of India, for in Yarkand his name stood high amongst all classes; the prestige gained for us by such men of enterprise and morality is great; unfortunately he was murdered whilst passing by the route I have briefly described between Leh and Yarkand, the year after I passed over. At Su-chau a European agent of the Chinese Imperial Customs Department is stationed to regulate Russian trade. In sending caravans to Lan-chau the Russians have stretched their treaty rights to the utmost. Goods left unsold on

arriving at Suchau may be sent inland to find markets, but eight tons of unsold goods which have never been unpacked is a somewhat large unsold surplus!

Poverty instigates Russian commercial enterprise, and wealth causes ours to retrograde; and throughout China, clerks and agents of Continental birth are supplanting those of the British nation, even in British mercantile houses. It is very necessary now that China should regulate her trade by European customs agencies at Kashgar, Ili, Uliassutai Chuguchak, Kobdo, Urumtsi, &c., that is, that she should add a frontier branch to the Foreign Treaty Ports Customs Department.

Commercial enterprise would seem to be a marked instinct of the Russian race, and the completion of the Siberian line of railway, and its connection with the Trans-Caspian line, will cause them to turn their attention to the construction of a feeder to it by the Kulja, or one of its adjacent inlets, via Urumtsi, Hami, and Su-chau to Lan-chau-fu, to gain the trade of the north-west, mid, and centre China, and another further to the eastward to Peking, if the Chinese do not do so. By such means she will add largely to her customers and to her imports and exports. These lines cannot be built without the conquest of trans-mural China.

Prejvalsky's last utterances show that he travelled not in vain, and that he justly appreciates China's weakness in the west, resulting, amongst other causes, from want of rapid communications, and his views on the necessity of a Russian occupation of Kashgaria are very plainly expressed. He considers the leading characteristics of Chinese rule there, to be "crying injustice, espionage, rapacity, grinding taxation, tyranny of officials—in a word, entire absence of all ideas of legality in all administrative or judicial matters." My impressions do not altogether agree with those of the eloquent explorer quoted. The Chinese have learned a lesson from the late rebellion, and now treat the Kashgarians well. They are lightly taxed, as content as they can be in a country wherein no law exists, and as wealthy as they can expect to be without an increased trade. They are lax Muslims, and have in Kashgaria a Muslim's paradise on earth, where a poor man can afford two wives; to gain these joys they are content to put up with their masters, to whom they even give their daughters in marriage. They fear the advent of the Russian tax-gatherer, and prefer to suffer a little injustice to the certain evils of his presence amongst them. In proof of what I say, all the Indians I met with praised the Chinese rule, and have settled permanently in the country, preferring it to India.

Mongolia is equally at Russia's mercy, granted that she pushes on her communications and China does not. Mongolia gives easy access to Chili and Shansi, and Kashgaria to Kansu, the rich Wei valley and Thibet. Good communications alone can make these provinces defensible in the future, and China is slow to perceive their necessity.

GEOGRAPHICAL NOTES.

Mr. H. M. Stanley.—Mr. Stanley and the English members of his Expedition arrived in Cairo on the 14th of January. He informed us the day following by telegram that it was his intention to remain about a month in Egypt.

The First Ascent of Kilima-njaro.—When two years ago Dr. Hans Meyer returned from the visit to Kilima-njaro which has since resulted in the production of his interesting and excellently illustrated work, 'Zum Schneedom des Kilimanjaro,' it seemed almost ungracious to point out that his success had been incomplete, inasmuch as having failed to attain any point on the highest crest of the mountain, he was unable to describe the extent, the conformation, and the volcanic features of the summit. But Dr. Meyer, wiser than some of his friends, agreed with us that something important remained to be done, and he very pluckily determined to do it himself. He secured as a companion Herr Purtscheller, a practised Alpine mountaineer, and they took out ice-axes, rope, and snow-spectacles. The result has been all that could be wished. In the last number of 'Petermann's Mitteilungen,' Dr. Meyer gives a tolerably full account of his exploration of the hitherto untrodden summit of Kibo and the peaks of Mawensi. He lived for sixteen days over 13,000 feet, made four ascents to the summit-ridge of Kibo, and on the second occasion climbed the rock-peaks that form its highest eminences. It is only possible here to give a very condensed summary of Dr. Meyer's clear and spirited narrative. The travellers reached the flanks of Kilima-njaro at the beginning of October. They found much less snow on the mountain than on Dr. Meyer's previous visit in July 1887. On the morning of the 4th, at 2.30 a.m., they set out by lantern-light from a camp (14,270 feet) on the saddle between Kibo and Mawensi. They ascended by what Dr. Meyer calls "the great glacier valley." At 6.30 they passed a lava dyke (15,980 feet), which, as well as the side of the valley, bore unmistakable signs of glacier action. At 16,400 feet they found the first patches of snow. Here the rarity of the air made itself felt, and the climbers had to rest every ten minutes. In their subsequent ascents, made much faster, they do not seem to have suffered at all, thus proving once more how much mountain sickness is a matter of training and habit. When at 8.15 they halted for breakfast, the tawny crags of Mawensi were already well below them. Clouds were slowly creeping over the plateau of the saddle, which had hitherto been spread out as a relief model; rosy-tinted *cumuli* floated over the plains, which were only indistinctly visible; while close overhead the icy dome of Kibo glittered seemingly close at hand in the sunshine. At 17,650 feet they encountered the steep ice-slope which runs round the peak, and had defeated the former attempt; the angle was 35°. This is

obviously the only difficulty in the mountain. Herr Purtscheller with his ice-axe and rope now came to the front and cut steps; in less than two hours the ice-slope and some crevasses in the glacier above it were conquered; an hour and a quarter's more exhausting toil up the final snow-slope led to the summit-ridge. This proved to be the circular edge of a great crater, which was reached at its eastern curve at 1.45 p.m. The highest peaks lay to the south at some distance, and the climbers had not time to reach them that day. Only three days later, however, the energetic travellers returned to the attack. Sleeping this time in a roomy cave (temperature $- 12^{\circ}$ C.) at 15,200 feet, and using their old steps they gained the summit-ridge at 8.45 a.m., and the 260 feet higher "wahrscheinlich höchste Spitze 'deutscher' Erde" at 10.15, regained by three their bivouac, and two and a half hours later their tent. We give these "times" because of the remarkable illustration they afford both of the difference between a first and second ascent, and of the result of habit in resisting the effects of the atmosphere. Dr. Meyer thus describes the appearance of the summit from the highest peak, which he estimated (by aneroid only) to be, in round figures, 6000 metres (19,684 feet). "The great Kibo crater is from this point admirably seen. It is about 2200 yards in diameter by 650 feet deep. On the north and east the icy mantle sinks steeply in terraces to the floor; on the west and south steep lava cliffs break down from the crowning ice-cap. Near the centre of the crater rises a cone of brown ashes to a height of 500 feet from the floor. Its top is bare, its sides enveloped in the girdle of ice and snow which sweeps out of a gap in the western wall of the crater as a glacier." The length of this glacier, according to the map and sketches which accompany Dr. Meyer's paper, is over a mile and a half, of which the greater part lies inside the crater; its lower termination is given as 17,900 feet. In great part of the crater lie fields of névé (the term "nieve penitente" used by the author is borrowed from the Andes, where muleteers, struck by the resemblance to kneeling figures of some of the masses of snow left unmelted and protruding from the upper snow-fields, have given this name to what is in Europe called simply névé).

To Dr. Meyer's further explorations and ascents of the upper region of Kibo we can only refer. He found a hunter's bivouac, the highest trace of man, at 15,400 feet, several small glaciers, he obtained extensive panoramas of the surrounding country, in short, material for an exhaustive description of the great mountain. He further made three ascents of the peaks of Mawensi (16,260 feet), and although he did not reach the highest pinnacle, obtained by dint of hard climbing a complete knowledge of this wild group of peaks. He declares that their broken and fantastic forms pass all description, and compares them to the dolomites. The mountain is the skeleton of a far older volcano than Kibo. On its eastern flank the travellers looked down a precipice 6500 feet deep

to the low country. On the afternoon of the 15th October a fall of fresh snow covered the travellers' tent.—Dr. Meyer pays a warm tribute to the pluck of a negro, Muini Amani, who alone remained with him and Herr Purtscheller in their high bivouacs, and without whose aid as camp-servant they could hardly have lived so long on the mountain. The travellers intended to visit the mountain district of Ugueno and the western side of Kibo before returning to the coast.—[D. W. F.]

The Karambar Sar Lake, in the Hindu Kush.—In a recent letter we have received from Peshawur, Colonel R. G. Woodthorpe says :—"I have lately had an interview with M. Dauvergne, who is in charge of the carpet manufactory at Srinagar, and who has made a remarkable journey along the northern slopes of the Hindu Kush, to the Taghdumbash and Baroghil Pass, and thence along a hitherto untrodden path by the Gazkul, or Karambar Sar, down to Gatuch, on the Gilgit river. It has long been a theory, upheld, I think, by Hayward, that this lake had two outlets: one draining into the Yarkhun, or Mastuj Valley, the other flowing due south into the Gilgit river. The native explorer M—S— said that he had traced the Yarkhun river up to the lake, and his description, 'of circumstantial detail full,' was to the effect that he came upon a vast expanse, 15 miles long, of calm, blue water, lying among the snow-capped peaks at an elevation of 14,000 feet above the sea. The elevation seems to be more or less correct, but I am afraid the rest of the description is imaginary. He said he saw at the far end a mass of rock and glacier at the mouth of a gap through which, according to the natives, the water found its way into the Ashkaman Valley. M. Dauvergne now tells us that instead of one there are two lakes, separated by a small, low, rocky watershed, and that from the smaller, named Gazkul, which is only about half a mile long, flows the Yarkhun river; while across the watershed, a few hundred yards eastward, is a lake, the Karambar Sar, 1½ mile long, which gives rise to the Karambar, or Ashkaman river. It always seemed to me, from what we knew of the nature of the country, very improbable that a lake in this region could have two outlets, and it can only have been due to a misunderstanding of native information, or misrepresentation, that the notion of a double outlet can have arisen."

Caucasian Photographs.—It is not perhaps generally known in England that the late Quintino Sella, the Italian statesman, was a keen climber and President of the Italian Alpine Club.* This mountain enthusiasm has descended to his two nephews, like himself, natives of Biella, at the foot of Monte Rosa. Last summer the Signori Sella visited the Caucasus, from which Vittorio Sella, who is an admirable photographer, has brought back over a hundred photographs, many of them superb examples of the photographic art as well as of high topo-

* See in 'Alpine Journal,' vol. xi. pp. 477-9, an obituary notice written by his old friend the late Mr. John Ball.

graphic interest. First in importance, to the geographer at any rate, are the three panoramic views taken respectively from a height of 16,400 feet on the eastern peak of Elbruz, from a point in the main chain south of that mountain and near the Betsho Pass* (12,400 feet), and from the summit of the Leila (13,400 feet). In the view from Elbruz the picturesque effect is greatly heightened by a shining floor of clouds, the roof of the lower world, which cover the valley of the Baksan and the distant steppe. The wavelike forms of their upper surface are curiously distinct. Above the clouds, which lie at about 9000 feet, the main chain, with its great spurs, its lateral ranges, and its glacier basins, is spread out in the clearest detail as far as the central group. On the farther side, seen over it, lies the hollow of Suanetia. The photograph has the precision and conveys much of the information of a relief model on a great scale, such as those shown by officers of the Swiss Federal Staff in the recent Paris Exhibition. Those who have never seen a great mountain view may look on this presentment and form some accurate idea of the reality; those who have said that there is nothing to be seen or learnt on great peaks may look at it—and repent. The second panorama is taken from a point in the chain looking eastwards. Here the twin crests of Ushba dominate a mass of wild crags and glaciers. The view from the Leila is less successful in reproducing the splendour of nature, because in the original colour plays so great a part. The sparkling white of the thousand towers of the Suanetian villages, the gold of the barley fields, the varied greens of the forests, have to be filled in from memory by the few, or imagined by the many. The physical geographer may possibly be misled by the comparatively few glaciers visible into underestimating the number and extent of those on the southern side of the chain. From Adish westwards the icefields are masked by a subsidiary range of schists, which here runs closely parallel to the granite crest. Some of Signor Sella's photographs have a special personal interest, as representing the Ulluz glen and the side of Dychtau, first attempted by Donkin and Fox. Others illustrate the scenery of both sides of the range. They are by no means limited to a succession of snow-peaks, rocks, and glaciers. Among them will be found some beautiful forest scenes in the Nakra Valley, a charming glade of flowers (No. 615), together with some groups of natives (dance at Bezingi, No. 553), Suanetian shepherds (No. 654), Suanetian women (No. 644), an old Suanetian church with traces of a fresco on its walls at Mestia (No. 649), and photographs of M. Delbisheff's collection of Ossete antiquities (No. 662), a few specimens of which will be shown on the 10th February at the Royal Geographical Society's meeting. The whole collection, together with the views taken this year by Mr. Hermann Woolley, and enlargements of a few of Mr. W. F. Donkin's last views, will be shown in the Society's Map Room in the first half of February. Signor V. Sella has conferred a great boon

on all lovers of mountain scenery by the production of this magnificent series, and has done much to correct and enlarge our knowledge of the chain illustrated. Messrs. Spooner, of the Strand, have at all times catalogues both of the late Mr. Donkin's and Signor Sella's Caucasian views. Applications for copies must be made through them.—[D. W. F.]

Prince Henry of Orleans' Journey through Central Asia.—Some further details respecting the expedition of M. Bonvalot and Prince Henry of Orleans, to which we briefly referred in our last number, have been received by the Geographical Society of Paris. The party, which includes a Belgian missionary, M. de Decken, who acts as interpreter, left Kulja about the middle of September last, and arrived at Korla, near Lake Baghrash, after a journey of 22 days across the Tian Shan. The route followed was first of all to Mazar, and then along the valley of the river Kash; the first mountain pass led them into the valley of the Kungez, a second pass into that of the Tsakma, a third into that of Yuldus, and a fourth into that of the Khaidu-gol or river of Karashahar, which is described as a gorge. Great variations of temperature were experienced during this short journey; 104° (Fahr.) in the shade in the valley of the Kungez, and zero (Fahr.) in the Yuldus valley. The greatest altitude reached was at the pass of Narat, which is about 11,500 feet high. Forty specimens of birds and mammifers were collected. The travellers were *en route* for Lob Nor.

Pievtsoff's Expedition in Central Asia.—Since our last issue further news of the progress of this expedition have been received. From its winter quarters at Nia, Lieut. Roborovsky had discovered a practicable route across the mountain range into north-western Tibet. The country beyond was found to be a tableland, 12,000 feet above sea-level, desolate and uninhabited. The expedition will move forward at the beginning of April, and pass the summer on the plateau, descending thence in September and travelling *viâ* the Cherchen river to Lob Nor.

Captain Kund, the Congo and Cameroons Explorer.—We learn that Captain Kund has returned from the Cameroons in a lamentable state of ill-health. He was suffering from a second attack of apoplexy, and had lost the use of his voice. We are glad to hear, however, that the doctors give hopes of his recovery.

Death of Dr. L. Wolf.—We hear with regret of the death of Dr. L. Wolf, the well-known African traveller, which happened suddenly on the 26th June last, in Togo Land, while conducting an expedition across the borders against the kingdom of Dahomey. Dr. Wolf was chiefly known in connection with his explorations in the South Congo Basin. In 1884-5 he took part in Wissmann's great Kassai expedition, being appointed second in command. Upon Wissmann's return to the coast

through ill-health in July 1885, Dr. Wolf continued the work of exploration, which resulted in the opening up of the Sankuru. Subsequently he was chosen to conduct an expedition into the rear of the German territory of Togo Land, where he was engaged up to the time of his death in surveying the country, founding stations and discovering fresh routes. The results of the recent excursions made by him and Lieut. Kling have been embodied in a new map of this region constructed by Lieut. v. d. Vecht.

Explorations by Dr. Zintgraff in the Cameroons Region.—Dr. Zintgraff, to whose travels in the country of the Cameroons we have before alluded,* has recently made an interesting journey from the Cameroons to Adamaua. At the end of December 1888 he set out from the Barombi station, and on reaching the country of the Banyanga had to force a passage, owing to the hostility of the natives. After a compulsory stay of three months in the territory of the Bali, he proceeded in April to the Bafut, but in consequence of a threatened attack by this tribe he was obliged to make a toilsome *détour* of five days' march through a partly uninhabited region. At Donga his surveys come into connection with those of Flegel. The last news received from the traveller was from Ibi on the Benue (11th June, 1889), whence he intended to proceed to Jola, returning to the station in Bali-land by way of Bakundi, Gashka, and Bagnio.

An Expedition to the Upper Amazons.—An expedition has been despatched by the Peruvian Government to the Javary river, on the borders of Peru and Bolivia. The primary object of the expedition is a military one, being the chastisement of the Indians for the murder of white traders, but as not less than five scientific men accompany the party, some important results with regard to the topography and ethnography of the region may be expected. Among the savants is M. Richard Payer, who on returning to South America after a hurried visit to Europe was invited to join the expedition.

Obituary.

Mr. John Ball, F.R.S.†—By the death of Mr. John Ball, F.R.S., the Society has lost a distinguished Fellow, and its council an oft-tried and trusted member. John, the eldest of four children, was born in Dublin in 1818 (August 20), the son of the Right Honourable Nicholas Ball, at one time M.P. for Clonmel, and Attorney-General for Ireland, and latterly Judge of the Irish Court of Common Pleas. From an age so early that he must be credited with remarkable precocity, he developed a passion for scientific reading, observation, and experiment, in which he was

* 'Proceedings R. G. S.,' 1888, p. 648.

† By Sir Joseph D. Hooker, .kc.s.l.

encouraged by his parents. When five years old he had read with delight Mrs. Marcet's 'Conversations on Natural Philosophy,' and Joyce's 'Scientific Dialogues,' and was the happy possessor of some philosophical apparatus. He then lived in a street which led out to roads which he has described as of excessive dullness, and in which his daily walks were taken; but even in them he succeeded in finding sources of interest, in the broken stones used for wall-mending, in which he discovered pyrites and other minerals, together with a few wild flowers, which he studied with the aid of a child's book on botany, and his great delight was a bit of ground on which rubbish was shot, out of which he pictured mountain ranges, and, mapping these at home, called some the Rocky Mountains, others the Alps.

When seven years old he saw mountains for the first time, and afterwards in Belfast, where the view from Cave hill over the Loch and its surrounding shores left an ineffaceable impression. At that age he made a map of the stars, and largely increased his stock of philosophical apparatus; his reading was, however, hardly germane to his pursuits, for his delight was in Don Quixote! In 1825, in his seventh year, his father took him to Switzerland, and in a journal which he kept he in the following words recorded the sensations he experienced on first seeing the Alps:—"We reached the top of the Col de la Faucilli just before sunset. The sky was almost cloudless. We all got out. I managed to get a little apart from the others, and remained fixed for almost half-an-hour. The light gradually stole upwards from the lake over the nearer mountains, and then over the Savoy Alps, and finally the peak of Mont Blanc alone remained illumined. One little cloud only hung just over the peak. As the peak also became dim, the cloud remained like a glory over its head. For long years that scene recurred constantly to my mind, whether asleep or awake, and perhaps nothing has had so great an influence on my entire life."

In the following year, when at Ems, and eight years old, his father presented him with a mountain barometer, and his chief occupation was measuring, or trying to measure, the heights of the hills around. But he also collected minerals, shells, and fossils, and endeavoured to learn something of them from books.

Up to the age of thirteen, young Ball was left very much to himself in so far as education is concerned. He had a tutor for classics for a short time, but his appetite was for physical science and natural history, which, as he has himself described, amounted to voracity. This kept him not only out of mischief, but also a stranger to boyish sports. Amongst other scientific feats, he had at the age of eleven written 'Elements of Chemistry,' had made tolerable geological sections, and endeavoured to establish the identity of the galvanic pile and solar spectrum!

At thirteen, Ball was sent for three years to the Roman Catholic College of St. Mary's, Oscott (now Stonyhurst), where his chief acquirements were classics and a smattering of mathematics, his amusement being chemistry, which he says was pursued under every discouragement.

In 1835 the British Association met at Dublin, and Ball became a juvenile member and indefatigable attendant, only regretting that he could not be present at all six sections at once. At its close he was placed by his father in charge of Mr. (now Professor) Babington and R. M. Lingwood, Esq., for a tour in the west of Ireland, which extended to Galway and Connemara. Mr. Babington informs the writer that "he was very much of a wild Irishman, and did all sorts of odd things, much to the amusement of us who had seen nothing of Ireland and Irishmen," and adds, "he was as nice a companion then as he ever was." This was probably Ball's introduction to serious observation and study. An account of the excursion is given in the 'Magazine of Natural History,' vol. ix. p. 119, which includes several passages on the geology of the district, the latter written by Ball himself.

I have not hesitated to give at so great a length the history of Ball's childhood and youth, because I know no better instance of "the child the father of the man"; because it is an example of the fallacy of the oft-repeated dogma, that one so brought up, with such proclivities, and so segregated from youthful companions, must needs develop into a prig; and because it reveals the sources of his many successes, no less than of his few failures, in his career as a scientific investigator. When questioned in after life (by Mr. F. Galton) as to the effect on himself of such a course of self-instruction, he answered that what he most felt was the want of intelligent teaching of classics and physical science, and consequently of accuracy and completeness of knowledge.

From Oscott Mr. Ball went to Christ College, Cambridge, where mathematics, and especially its analytic branches, occupied most of his hours of study; not, however, with the zeal and energy that he would have given to them had he been able thereby to obtain even the ordinary degree, for from this, as well as from a scholarship or a fellowship, his creed debarred him. He, however, in 1839, came out as twenty-seventh Wrangler in the mathematical tripos, having previously, in 1838, contributed a paper to the Mathematical Section of the British Association of that year, which attracted the attention and favourable notice of Sir William Hamilton. Of the science lectures three divided his attention, Henslow's botanical, Sedgwick's geological, and Airy's optics. Of these the former carried the day, swayed as the pupil was by the geniality of the Professor, the interest of his botanical excursions, and a certain similarity in their minds, accomplishments, and pursuits, and perhaps above all by his intimacy with the Henslow family, amongst whom the "wild Irishman" was a prime favourite as vocalist, pianist, and chess player. At Cambridge, too, he renewed his friendship with Professor Babington, and became a member of the Ray Society for the Promotion of the Study of Natural Science, which was established by that botanist as an endeavour to replace the sociable evening meetings that Professor Henslow had for eight years previously held at his house on every Friday during term, and which his change of residence to Suffolk put an end to. For four years after leaving Cambridge Mr. Ball travelled in various parts of Europe, including a visit to Sicily, on the botany of which then little-known island he contributed a valuable paper to the 'Annals of Natural History.'

In 1845 he was called to the Irish Bar, but he never practised, and again visited the Alps and made a series of observations in the glaciers near Zermatt, the results of which, he says, so nearly coincided with those obtained by Professor James Forbes that he did not publish them.

Mr. Ball's official life commenced in 1846, by his appointment as an Assistant Poor Law Commissioner. This was at the commencement of the Irish Potato Famine, and the severe work entailed was such that in the following year he was obliged to resign from ill health and go abroad. After two years of rest he again took office in the same Department of Government, this time as Second Commissioner, a post which he held for two years, when he stood for Carlow and was elected. It was during this period that he formed his life-long friendship with the late Mr. W. E. Forster, to whose memory he touchingly alludes in the 'Alpine Club Journal.' As stated in the *Times* obituary notice, he made some mark in the House of Commons, supported a somewhat advanced land programme, opposed all interference with convents, and supported Mr. Gladstone's proposal (1853) to extend the income-tax to Ireland. In 1855 Lord Palmerston offered him the Parliamentary Under-Secretaryship for the Colonies; and it was during his two years' term of office as such that he not only effected much in the interest of science, but so far gained the confidence of men in the highest official positions for his single-minded love of science and judicious consideration of its claims upon Govern-

ment, that his opinion was sought and acted upon on many future occasions. Amongst other examples of his enlightened views was the organisation of the Palliser Expedition for discovering the best route across the Rocky Mountains of British America, for intercommunication between Canada and the Pacific. At his request, Sir W. Hooker and the writer of this notice accompanied him to the then Secretary of the Treasury, to urge the importance of such a reconnaissance, and the writer well remembers the interest with which the Secretary (the late Mr. Wilson) listened to Mr. Ball's exposition of the advantages that would accrue from it, and after promising it his full consideration, added words to this effect, "Well, if all applicants to the Treasury would give their reasons for coming with the knowledge, completeness, and lucidity that you have, we should have little difficulty in considering what to grant and what to refuse." It need not be said that the Expedition,* which started in 1857, was accompanied by a scientific staff, of whom Dr. (now Sir James) Hector (Director of the Geological and Meteorological Surveys, and of the Colonial Museum, Auckland, New Zealand) was naturalist and geologist, and as botanist the late E. Bourgeau, the most skilled botanical collector in Europe and the East.

Another matter which he powerfully aided was Sir W. Hooker's efforts towards inducing the Colonial Government to undertake the publication of inexpensive floras of all our Colonies. Of these several had appeared, and others were in preparation, under the auspices of the individual Governments which voted the supplies, but upon no definite system, nor under such encouragement as the official sanction of the Home Government might afford. An admirable scheme was drawn up under Mr. Ball's supervision, and sanctioned by the Government, but it was left to the Director of Kew to induce the several Colonial Governors and their Parliaments to give it effect, each on its own resources.

After two years' tenure of office, on the expiry of the Ministry in 1858, Mr. Ball contested the city of Limerick, but was defeated. Again quoting from the *Times* notice, "a cloud was then rising in the horizon which gravely disturbed the Catholic constituencies, though the rest of the world knew little of it as yet. This was the Italian question. The Irish priests foresaw the coming struggle, and demanded that their candidates should take sides with the Papacy and the Duchies against Piedmont and the Revolution. This, John Ball, though a good Catholic, refused to do, and he was therefore opposed by the Irish priests, and, after a hard struggle, was defeated." The struggle may well be called hard; he barely escaped with his life from the excited city. The writer happened to meet him in Dublin, on his way back from the scene, and accompanied him to London. His appearance was evidence of what he had gone through, and many years afterwards he told him his purse was still open for the support of relatives of those of his party who had been injured in the strife. Yet neither then nor afterwards did one word of bitterness, disappointment, or repining escape his lips.

Of his Parliamentary career, thus rudely and utterly broken, a well-informed friend writes:—"This took place at a time when the effects of the Reform Bill of 1830 were still not unfrequently discussed, and the hard fate of John Ball and of two others was repeatedly adduced on those occasions in evidence that the Reform Bill had not been an unmixed benefit, but had deprived the country of valuable services which would certainly have been secured under the bygone institution of pocket boroughs. Though excluded from Parliament, his political friendships coloured his life, and enabled him to serve the cause of science in many indirect ways. It may be

* Of the four passes first surveyed by this expedition, the "Kicking Horse" is that now crossed by the Canadian Pacific Railway.

of interest to put upon record that almost, if not the very last official act of Cavour, performed just before his sudden and fatal attack of illness, was at the instance of Ball—to sign the new Code of Regulations for the Chamounix Guides, in which he had been much interested.”

From this time, then in his fortieth year, onwards, his life was devoted to scientific pursuits, travelling always with a scientific object, collecting indefatigably, and often contributing to scientific or Alp-exploring periodicals. He spent many of his summers in London and Ireland, his winters generally abroad, chiefly in Northern Italy, where (at Bassano) he came into estates through his first wife, Eliza Parolini, daughter of a distinguished naturalist and Oriental traveller, Count Alberto Parolini. His compilation of the ‘Alpine Guide’ during several succeeding years occupied almost his whole time, and had he done nothing else, or nothing more scientific, this work alone would establish his claim to an excellent position as a botanist and geological observer. Mr. Freshfield has kindly drawn up a full and discriminative account of it, which is appended to this notice.

In 1871, the writer was (with Mr. G. Maw) on the point of starting for Morocco, for the purpose of investigating the flora of the Greater Atlas, when Mr. Ball, who had just returned from the Continent and had accidentally heard of it, volunteered his companionship. It needs not to say that it was eagerly accepted, for surely no living man was so competent to aid in carrying out the objects of such an enterprise as he was, whether as a traveller, an Alpine expert, or a botanist with a consummate knowledge of that section of the European flora with which the Moroccan has so many features in common. During the progress of the journey, Mr. Ball’s labours were unintermittent; and to his loyalty and geniality, his endurance under trials of temper, discomfort, and dirt, and his patience under the opposition of officials and the obstacles of nature, its success was greatly due. As a collector he was unrivalled; nothing in the shape of a plant escaped his keen eye, aided as it was by a familiarity with so large a proportion of the species. It is quite certain that no plant of importance was unrecognised over the routes followed, and that but for his aid the botanical collection would have fallen far short of its approximate completeness. However hard his day’s work had been, he never retired to his little Alpine sleeping tent till past midnight, being occupied in my tent with putting his day’s collection in papers from the hour of returning to camp. Even more remarkable than his collecting powers was his memory of the plants themselves: he affirmed that he remembered for months and years the date and place of gathering every specimen, and consequently he attached no tickets to them till full leisure arrived for doing so. It was the same with places; he kept none but a very imperfect diary, and all of the narrative of the journey which was not taken from the leaves of my journal was supplied by Ball’s retentive and unerring memory.

On the return from Morocco he occupied himself at intervals during several years in studying the materials which were brought home for describing its flora. These he worked up with consummate care, and published them in the ‘Journal of the Linnean Society’; and though considerable collections from that empire have since been received in England, very little indeed has thereby been added to Ball’s ‘Spicilegium Floræ Maroccanæ,’ and nothing to disturb the affinities and differences between the vegetations of North-western Africa, Europe, and the Canaries, which it was one of the main objects of the expedition to determine.

But it was during his voyage to South America, in 1882, that Ball best showed his powers as an observer and naturalist, and the result of that voyage, ‘Notes of a Naturalist in South America,’ published in 1887, have by high authorities been pronounced to be deserving of a corner of the same shelf with the works of Humboldt, Darwin, Bates, and Wallace. Of this book, the writer, reviewing it in

'Nature,' has said :—"The contents are a rich collection of facts and thoughts, chiefly botanical, meteorological, and geographical, the results of a five months' voyage, extending over 18,400 miles of ocean, and embracing 100° of latitude, during which the author passed only seventy days on land; and they are laid before the reader in a style which is as attractive as instructive."

At the outset of the voyage a pleasing instance of the influence which Ball exercised over those around him occurred, and has been recorded by Mr. Morris, now Assistant Director of the Royal Gardens, Kew. While on the voyage out his ship touched at Barbadoes, where he went ashore, accompanied by a party of young men who never before had taken much notice of plant life. On this occasion, however, sharing the enthusiasm of Mr. Ball, they became ardent collectors of everything likely to be of use to him. In spite of the tropical heat, they did not return to the ship until it was about to sail, and they came back laden with specimens of all kinds, proud to share in the pursuits of a man whose charm of manner was irresistible, and who made friends wherever he went.

Mr. Ball's more important contributions to science are geographical, physical, and botanical. To the first belong the Guides to the Alps; the Morocco Journal, and its accompanying map; a paper on "The Geography of the Chain of the Great Atlas," published in the British Association Reports; many papers in the journals of the Alpine Club, and in 'Peaks, Passes, and Glaciers;' and above all the geographical and physical features of the coast line and Andes of Western America, from Panama to the Straits of Magellan, and of Uruguay and South Brazil. He was the first to recognise in the geography of Chili that almost continuous range of high land which, commencing in latitude 40° S., runs at first parallel to the rapidly-lowering main Andean range, and is continued far beyond the latter to the entrance of the Straits of Magellan, now sinking under the ocean as at the Gulf of Penas, &c., and again emerging in the island of Chiloe, the Chonos Archipelago, Cape Tres Montes, and Wellington Island.

Of Ball's contributions to meteorology the first is a paper "On the Aurora of April 24, 1840," published in the Proceedings of the Royal Irish Academy. This was followed by one that marks an epoch in the development of meteorological science, entitled, "On Rendering the Electric Telegraph Subservient to Meteorological Research," read before the British Association in 1848, at which early period he advocated, with sound and cogent reasoning, the utilisation of the electric telegraph for meteorological purposes connected with storm warnings. This suggestion, Mr. Galton informs me, was not carried into effect until 1861, after a correspondence between M. Leverrier and Sir George Airy (then Astronomer Royal), in the previous year. Other meteorological papers are "On the Determination of Height by means of the Barometer," and "On Thermometric Observations in the Alps," both published in the Reports of the British Association. Under this head came his meteorological observations in South America, especially those on the rainless zone of Peru, on the climate of the Cordillera, of Central Chili, of the Straits of Magellan, and of the whole southern hemisphere, as to which latter he gives data to prove that "it is not colder than the northern, and that all arguments based upon an opposite assumption must be set aside." Two long and important appendices conclude the 'Notes of a Naturalist.' They are "On the Fall of Temperature in Ascending to Heights above the Sea Level," and "Remarks on Mr. Croll's Theory of Secular Changes of the Earth's Climate."

Another remarkable discussion in the same work relates to the early geological history of South Brazil, as to which he suggests that the area of probably 200,000 square miles in *Argentaria** now covered with an unknown depth of detritus, has

* A name he proposed for the territories of the Argentine Republic.

been so covered by the disintegration of one of the greatest mountain regions of the earth, which occupied Brazil, and "whose summits may probably have exceeded in height any now existing in the world."

On glacial science he published, in 1848, a "Notice of the Former Existence of small Glaciers in the County of Kerry" (*Geolog. Soc. Jour.*, 1848). Two papers "On the Structure of Glaciers," and "On the Cause of the Descent of Glaciers," and two "On the Formation of Alpine Valleys and Alpine Lakes" (all in the '*Philosophical Magazine*').

Ball's contributions to botany may be classed under the two heads of Critical and Theoretical, critical in the sense of scrupulous accuracy, both as to the characters ascribed to the plants described and the language used in their description, and in discussions upon their distribution, affinities, &c. In respect of "style," if that word may be applied to botanical literature, his was excellent, and a striking contrast to the looseness of method and diction too prominent in Taxonomic Science. He wrote fluently in Latin, English, French, German, or Italian. He had some knowledge of Spanish. As a botanist he will be best known by his '*Spicilegium Floræ Maroccanæ*,' which will ever be classical, both for its own merits and from being the Virgin Flora of that country. On his Topographical History of the Alps, as contained in the volumes of the '*Alpine Guides*,' it is not necessary to dwell, their conscientious accuracy and utility to botanists and amateurs are so well known and appreciated; whilst the work itself is excellently described by Mr. Freshfield in a note appended to this notice of his life. Ball's theoretical contributions to botany are two: one "On the Origin of the Flora of the European Alps," read before the Society.* In this he argued for the high antiquity of the Alpine Flora, and for the earliest types of flowering plants having been confined to high mountains (thus accounting for their absence in a fossil state), due to the proportion of carbonic acid gas in the lower regions of the earth being too great to support a phenogamic vegetation. He further held that existing modes of transport are insufficient to account for the present distribution of plants. His other theory relates to the South American Flora, and is given in his '*Naturalist's Journal*.' In this he assumes that the majority of the peculiar types of the whole South American flora, except possibly a few that originated in the Andean chain, had their primitive homes on that hypothetical ancient mountain range which he had placed in Brazil, and to great heights on which they would, under his theory, be restricted through the operation of the same cause that restricted the European early types to the highest Alps.

After his return from South America, Mr. Ball worked assiduously, during the summer months especially, in the Kew Herbarium, latterly on his South American collections, described in the '*Journal of the Linnean Society*.' At the same time he rendered valuable aid and advice in the preparation of the great nomenclature of all known flowering plants that is being prepared at Kew under the terms of a bequest of the late Mr. Darwin, and in respect of which his loss is severely felt.

Mr. Ball had independent means, and his many years' service to science in so many ways were gratuitous and disinterested. His position in society was a rare one, counting as he did amongst his warmest friends so many of the *élite* of the literary, artistic, scientific, and political world in England and on the Continent. He was as fond of society as society was of him, and he confided to a friend that to this must be laid the blame of his not having done greater scientific work. But society had no charm for him except for its real worth, for he was one of the most modest of men, without an atom of vanity, conceit, or self-esteem; to efface himself and to exalt others was his nature, and what is perhaps rare in any man of strong

* '*Proceedings R. G. S.*' 1879, p. 564.

affections and warm sympathies, he was unable to harbour an ungenerous thought of another.

For the last few years of his life Mr. Ball suffered much from an affection of the throat, which obliged him to spend his winters abroad, one of the last in the Canary Islands, and the previous one in Algeria and Tunis. In the summer of last year he visited the Alps, and was taken ill in the Engadine, from whence he was with difficulty transported to Geneva for advice, and thence to England. Almost immediately after his arrival he underwent an operation that might have afforded relief, but not a cure, and he survived it only a few hours, dying in his house, 10, Southwell Gardens, South Kensington, at midnight of October 21st.

Mr. Ball married twice, in 1856 and 1869. His first wife, by whom he had two sons who survive him, has been already named; his second was Miss Julia O'Beirne, daughter of the late F. O'Beirne, Esq. of Jamestown, County Leitrim. He was elected into this society in 1860, and was a fellow of the Royal, Linnean, and Antiquarian Societies of London; of the Royal Irish Academy, and later in life was elected an Honorary Fellow of his college (Christ's) at Cambridge—an honour the more welcome from his religion having, as stated above, been, half a century before, an insuperable obstacle to his taking a degree. His extensive Herbarium and Botanical Library were left by bequest to the writer of this notice, the Director of the Royal Gardens, Kew, for the time being, and the President of the Royal Society of London, to be dealt with as they should think fit, with the sole object of promoting the knowledge of natural science.

MR. J. BALL AND THE 'ALPINE GUIDE.'*—Mr. Ball's name will, perhaps, go down to posterity as "the author of the 'Alpine Guide.'" That was undoubtedly the most important literary product of a life of very varied activity—scientific, political, social. It may not be that which shows to most advantage the scientific qualities of Mr. Ball's mind, or the value of his scientific work as a traveller, an observer, and more especially as a botanist, but for the public it stands first among his writings, and on the whole deservedly so.

The writing of a guide-book may seem a small title to popular fame. But to all who have studied or used Mr. Ball's great work—I use the epithet advisedly—its authorship will carry sufficient honour. In the history of guide-books, 'The Alpine Guide' stands where Dr. Johnson's Dictionary—the comparison might be followed up in several points—stands among dictionaries.

We have all sorts of so-called 'Guides' now-a-days. Mr. Ball's 'Alpine Guide' was written for the man of modern education, who thinks nothing Alpine alien to him. It has suffered undeservedly in popularity from an impression that it was primarily a mountaineer's guide—a guide, that is, confined to the region above the snow-level.

Its conception was both comprehensive and scientific. Mr. Ball, unappalled at the magnitude of a task most men would have shrunk from, and which no one but himself could have carried so rapidly and successfully to completion, determined to deal with the Alpine chain as a whole from the Col di Tenda to the Semmering. He first subdivided his subject into three volumes, which were issued successively in 1863, 1864, and 1868. A preface, dealing with the Alps and Alpine travel generally, was prefixed to the work, and also published separately. The lesser subdivisions, based mainly, but not absolutely, on physical considerations, were made with great skill, and have proved practically convenient. The first point of distinc-

* By Douglas W. Freshfield, Sec. R.G.S.

tion that strikes a reader fresh from other handbooks is that the writer's object is not to push his followers along certain beaten tracks, but to put them in a position to choose freely for themselves between every known route in a district, to indicate the unknown to the adventurous, and at the same time to give clear advice as to what is best worth notice to those who need it. Throughout the work the main geological and botanical features of each district in succession are insisted on, and the botanist and geologist find observations in detail at every fitting opportunity. Thus the last volume closes with these words :—" While the ranges on either side are formed of stratified rocks, the floor of the valley or trough is formed of granite or crystalline schists with veins of syenite. This disposition would be of common occurrence if the valleys of the Alps were universally formed by erosive action, but its rarity should inspire caution in those who select one among the multitudinous agencies that have operated upon the earth's crust, as alone capable of explaining the complicated phenomena of great mountain regions."

But such scientific passages are episodal. The main purposes, topographical and practical, of the book are kept constantly in sight, and it is written throughout in a clear vigorous style which maintains its freshness to the end, and makes the descriptive passages pleasant reading, while they are relieved from time to time by shrewd observations, flashes of humour, or tersely told personal adventures, as in the descriptions of the ascents of the Terglou and the Pelmo. If there is any fault to be pointed out in the literary portion of the work, it is that Mr. Ball did not apply the same rigorous rule of condensation to others that he did to himself. He was too generous to his contributors, who must often have sorely tried his own keen topographical talent. The personal narratives of great ascents have added, and will add still more in the future, to the interest of the early editions of his work to many home readers, but for use abroad they might be advantageously curtailed. It is for the Alpine Club to maintain its reputation, and honour the memory of its first President, by resuscitating the 'Alpine Guide.' The control of the work could hardly be in better hands than those of Mr. Coolidge, whose very instructive and entertaining volume on 'Swiss Travel and Swiss Guide-books,' together with his 'Handbook to Dauphiné,' sufficiently prove him to be possessed of every qualification for the task.

How much absolutely novel information, topographical and general, was contained in the first editions of the 'Alpine Guide,' how much actual discovery has been made in the Alps since, and to a great extent in consequence of their publication, is known only to those in the secrets of Alpine literature. Twenty-five years ago Dauphiné was still protected by filth and privation, the Graian and Lombard Alps were unexplored, the so-called Kataster survey of the Austrian Alps was full of errors of every description. Mr. Ball could, in 1863, find only one general map of the Alps worth notice, and that "contained many serious errors." The suggestions in Mr. Ball's volumes were often fruitful. Thus the following passage instigated the production of at least one supplementary volume :—"To ordinary tourists the Lombard Alps form a *terra incognita*, and scientific travellers, who are usually the first to explore new districts, have scarcely touched many of the most interesting valleys." Many of his juniors never failed to remember that to him they owed their most delightful holidays, and the success of their first adventures in travel. His book was always in their pockets and on their lips. He, in turn was never better pleased than when, as in 1864, a party of undergraduates, led by the 'Alpine Guide,' crossed country from Thonon to Trent, over peaks, then maiden, and through valleys where Englishmen were still unknown, except in the form venerated by villagers as the "illustrissimo Ballo!"

Many of the relationships thus formed ripened at home into personal friendships.

Mr. Ball had a singular power of attracting and retaining the affectionate regard of his associates. To the expression of such sentiment, our stiff northern tongue and ways do not lend themselves easily. But the heartfelt phrase that has been heard on all sides since his death, "Dear old Ball," is, perhaps, as expressive as any other could be of the warmth of feeling with which he was universally regarded by his Alpine friends.

Mr. Ball joined the Alpine Club within a few weeks of its foundation. He was at once appointed its first President (1858-60) and the editor of its earliest publication, the first series of 'Peaks, Passes, and Glaciers,' to which he contributed three papers. It was the mass of material which during his years of presidency he found at his disposal for a new handbook that gave the final impulse to the writing of the 'Alpine Guide.' Besides his English associates, he had assistance from several distinguished foreign friends, among whom may be named Quintino Sella, Count P. de St. Robert, von Sonklar, Moisisovics.

Before 1863 Mr. Ball had "crossed the main chain forty-eight times by thirty-two different passes, besides traversing nearly one hundred of the lateral passes;" but his principal Alpine feats were the passage of the Schwarz Thor, near Zermatt, in 1845, when he had to lead his incapable guide through the séracs (a description of this expedition appeared in the first series of 'Peaks, Passes, and Glaciers'); his ascents of the Terglou and Brenta Alta, made with his friend, Mr. W. E. Foster; and the first ascent of the Pelmo, the noble "tower of observance" that looks down on Titian's birthplace, and which Titian more than once drew.

In company with Mr. W. Mathews and Mr. F. F. Tuckett, Mr. Ball had, in 1865, the order of SS. Maurice and Lazarus conferred on him by the King of Italy, in consideration of his geographical and scientific explorations of the Italian Alps. His name has been given to one of the peaks of Primiero; and his portrait appears in Mr. E. Whymper's 'Scrambles in the Alps' amongst a group of the early members of the Alpine Club.

I may add a story Mr. Ball told me on the last time I saw him, which shows him in a new and unsuspected character as a military strategist. Garibaldi in 1866 was breaking the heads of his eager young followers in vain attempts on the Austrian fort of Val Ampola, near Lago di Ledro, which commands one of the approaches to the Trentino, when Mr. Ball furnished the Italian Staff with a plan of campaign which was acted upon with immediate success, and for which he received a second decoration. Mr. Ball was, in fact, almost as much Italian as English in his sympathies, though the very reverse of the character proverbially assigned to the "Inglese Italianato."

Colonel Sir Henry Yule, K.C.S.I., C.B., LL.D., R.E.*—By the death of Sir Henry Yule a heavy loss has been sustained by the Royal Geographical Society, by all who are interested in the study and progress of geographical science, and by a very wide circle of personal friends. With large stores of knowledge and great power of using it, with zeal unabated and mind active, as they were almost to the last, it might have been hoped that he was yet to do much useful work of the kinds for which he was so admirably fitted. But for a great length of time his body had been enfeebled by tedious illness, and slowly but steadily his strength continued to decline, till the active mind was left without the physical power to do what it would, even with the help of others. He died on the 30th December, 1889, in the 70th year of his age.

He was educated at the High School of Edinburgh. At the time he joined it

* By General Robert Maclagan, R.E.

his father, Major Yule, had lately moved from Inveresk, six miles off, where Henry was born, and had taken up his abode in Regent Terrace, on the face of the Calton Hill, close to the school. This was Henry Yule's home till he went to India. Here he learned to love the wide scenes of sea and land spread out around that hill—a love he never lost, at home or far away. And long years after, with beautiful Sicilian hills before him and a lovely sea, he writes (in the closing lines of the preface to the second edition of his most noted book) words of fond recollection of the bleak Fife hills and the grey Firth of Forth.

In February 1837, he went to the East India Company's Military College at Addiscombe, and left in December of the following year, at the head of the outgoing term, and was appointed to the engineer service. He went through the usual further course of professional instruction at Chatham, under Colonel (afterwards Sir Charles) Pasley. Of much interest, and not uninteresting to the young officers, though they were not on the spot, was an occupation of Colonel Pasley's at this time, which involved frequent absences from Chatham, directing the operations for blowing up the wreck of the *Royal George* at Spithead, and recovering her guns and stores. During his Chatham course Lieutenant Yule formed many firm friendships with brother officers both of the Imperial and of the Indian services, not then, as now, one corps.

On starting for India he was put in charge of magnetic and meteorological instruments for a temporary observatory at Aden, where he made a short stay for the purpose of handing them over, and he reached Calcutta in the end of 1840. His employments in India made a geographical beginning. Nominally attached to the corps of sappers and miners, as most young officers of engineers are on their first arrival, he was sent on special duty to the Kasia Hills, in eastern Bengal, and wrote an account of the country and people, which was published in the 'Journal of the Bengal Asiatic Society.' He was then employed for a number of years on the irrigation canals of north-west India. A journey of something over twelve hundred miles took him to his new headquarters at the large military station of Karnál, 75 miles north of Delhi. Here he was under the orders of Captain (afterwards General Sir William) Baker, his very dear and constant friend from that time forward. The work which Captain Baker superintended was that called the Delhi Canal, one of the old Mohammedan works, which had fallen into disuse and disrepair, and which the British Government, when it came to occupy that part of the country, restored and rectified. The usual quiet course of the canal engineer's occupation was disturbed for a short time by the refusal of the little native State of Kaithal (adjoining the Karnál district) to acknowledge its lapse to Britain in defect of heirs. This required a little military demonstration, in which Lieutenant Yule took part. It was a small business, and soon settled. It brought Yule into contact for a time with Major Lawrence, better known afterwards as Sir Henry, who was placed in charge of the civil administration of the new British district, his brother John (afterwards Lord Lawrence), being the chief civil officer of the Pánipat district, which included Karnál.

Another matter of much importance with which Yule was concerned was the enquiry ordered by the Government of India into the connection between canal irrigation and the very extensive prevalence of fever in canal-watered districts. Yule was a member of the committee appointed for this purpose, composed of one medical officer and two canal engineers. Their report, though not conclusive, has, along with later enquiries, been considered to show generally that not canal irrigation itself, but its abuse and excess, together with defective drainage, are chargeable with the extensive sickness. But one very important result followed. The sickness was excessive among both European and native troops, in the large station of Karnál,

once remarkably healthy. On this ground, but not without political and military considerations also, the Governor-General, Lord Ellenborough, resolved to abolish the cantonment of Karnál, and move the troops forward to a position a little nearer the then frontier on the Sutlej, the canal engineers likewise moving to the neighbourhood of the head works on the Jumna. The place chosen for the new large military station was Ambala, 50 miles north of Karnál. And to plan and build it another officer was appointed whose earlier training had been on these old native irrigation canals—Captain Robert Napier—the much honoured, much lamented, Field-marshal Lord Napier of Magdála, who has just passed away from among us, ten days after he had walked behind the coffin of his old friend, Henry Yule.

The Sutlej campaign of 1845–6 called away engineer officers from their civil duties, and Captain Baker and Lieut. Yule among them. In 1846, when the campaign was over, Lieut. Yule succeeded Lieut. Strachey as executive engineer of the northern division of the Ganges Canal, the division which being nearest the hills and crossed by intermittent torrents of great breadth, and great volume when in flood, includes the most important and interesting engineering works. After the second Sikh War of 1848–49, when Lieut. Yule was in the field again, he took furlough to England and went to stay in Edinburgh. There he became an instructor in fortification at the Scottish Naval and Military Academy, and brought out a handbook for the use of his pupils and young officers. The first edition was a collection of plates, with explanations. The second (which did not call itself a second, being really a new work) was enlivened with many notes and references to military history, and with sketch-portraits of distinguished military commanders and engineers.

On return to India in 1852 he was sent to report on the passes in the hills between Arakan and Burma. Extracts from his 'Reports on the Aracan Frontier' were published in the first number of the Professional Papers on Indian Engineering, at Roorkee, in 1863. This examination of the passes was just before the second Burmese War, the result of which was the annexation of Pegu. Some time after the conclusion of the war, the King of Ava sent a mission to the Governor-General. Lord Dalhousie returned the friendly visit of the Burmese ambassadors by sending to Ava the special mission under Colonel (afterwards Sir Arthur) Phayre, and he appointed Captain Yule to be the envoy's secretary and the chronicler of the mission. The account of the 'Mission to the Court of Ava' is the first of his important geographical and historical volumes. It is a flowing narrative, with copious notes and illustrations. It was written amid constant official business after he had returned to his post of Assistant-Secretary to the Government of India in the Public Works Department (to which he had been appointed under his old friend Colonel Baker on coming back from the Arakan passes), and it was finished in 1858, at Allahabad, where he had, during the exciting days of the Mutiny, been employed on various defensive works and other duties.* The design for the enclosure wall of *The Well* at Cawnpore, a memorial of one of the saddest events of that sad mutiny time, was prepared by Colonel Yule during a short visit in 1859 to his former station of Roorkee, the headquarters of the Ganges Canal. A few weeks of leave were employed in a visit to Java, and he gave the results of his observations in the form of a lecture, which he delivered in Calcutta just before his retirement and final departure from India in 1862. For a long time the state of his wife's health had prevented her being with him in India, and he had hope that by the influence of his warm friend, the retiring Viceroy, Lord Canning, he would obtain official

* In January 1857, he communicated to our Society a valuable paper "On the Geography of Burma and its tributary States, in illustration of a new map of those regions," which was published, with map, in the 'Journal R.G.S.,' vol. xxvii. p. 54.

employment at home. By Lord Canning's death this prospect was closed, though his services were recognised by his being made Companion of the Bath, in the civil division, in 1868. He proceeded at once to occupy himself with his literary work in the field of geography and history, and went to live in Italy, for the sake of access to some of the great Italian libraries, as well as on his wife's account. After staying for a shorter or longer time at various places on these accounts, they went in 1864 to Palermo, a place which offered special advantages in both ways. During their long stay at that place he was a diligent reader at the libraries, and his pen was busy. He also superintended the erection of the English church, and designed some parts of the sculptured decoration. And there, at Palermo, Mrs. Yule died, in the Giardino Inglese, which had for a length of time been their place of abode. They had become well and widely known, and the local newspapers published sympathetic notices of her death.

It was while he was living in Italy and Sicily, with occasional short visits to England, that he completed the volumes which prepared the way for the 'Book of Ser Marco Polo.' The first was his translation from the Latin of the 'Wonders of the East,' by Friar Jordanus, a traveller of the fourteenth century (Hakluyt Society, 1863); then the collection of translations and extracts of the narratives of other travellers, both before and after Jordanus—Friar Odoric of Friuli, John of Monte Corvino (Archbishop of Pekin), Ibn Batuta, Benedict Goez, Rashid-ud-din, and others. This collection, with numerous notes involving great research, and a preliminary essay on the intercourse of China in the middle ages with the countries to the west, was published in 1866 by the Hakluyt Society, in two volumes, under the title 'Cathay, and the way thither.'

Similar research, and much of it over the same ground, was bestowed on the work with which his name is most closely connected, his new translation of the travels of Marco Polo, with exhaustive notes and dissertations. Of M. Pauthier's 'Marco Polo' (Paris, 1865), Colonel Yule wrote, in the essay prefixed to his 'Cathay,' that it "leaves far behind everything previously attempted." It may now be said of Yule's 'Book of Ser Marco Polo, the Venetian,' that it stands at the head of all. The book came out in 1871, and a second edition, containing the results of further study and enquiry, in 1875.

One thing specially to be noted, in this and his other works, is the value he attached to a good index. In one of his letters addressed to the 'Royal Engineers' Journal,' he wrote, "Nothing causes such waste of time and temper as the absence of an index, or, worse still, a bad index." So much did he feel the want of a continuation of the general index to the Journal of our Society, that he voluntarily undertook the heavy task of compiling the index to the third ten volumes, which was completed and published in 1867. Every one who has had occasion to use his books must be grateful for the pains he bestowed on this very important part of all such works.

In 1871, Colonel Yule was President of the Geographical Section of the British Association, which met that year at Edinburgh.

In 1872 the Founder's Medal was awarded to him by the Council for the three chief works above named, 'Ava,' 'Cathay,' and 'Marco Polo.'

In 1875 he was appointed a member of the Council of the Secretary of State for India. His chief geographical writings, after 'Marco Polo,' are the essay prefixed to the new edition of Wood's 'Journey to the source of the river Oxus,' published in 1873, a memoir entitled "Papers connected with the Upper Oxus Regions," contributed to the 'Journal R.G.S.' vol. xlii., and the geographical introduction to the second and condensed edition of Captain Gill's 'The River of Golden Sand,' with memoir of the lamented young traveller, published in 1883.

In this year the University of Edinburgh, on the occasion of its tercentenary

celebration, conferred upon him, along with other men of eminence in literature, science, and art, the honorary degree of LL.D.

A number of short papers were contributed by Colonel Yule, at various times, to the 'Journal of the Royal Asiatic Society,' the 'Journal of the Asiatic Society of Bengal,' 'Ocean Highways,' the 'Proceedings of the Royal Geographical Society,' and other publications. He likewise printed several short memoirs of brother officers of the Engineer corps, originally issued in the 'Royal Engineers' Journal.' His love of his corps, and of his brother officers and other friends was very strong. He had a very large circle of personal friends in this and other countries, many of them people with whom he had been in correspondence with reference to matters in which both he and they were interested, from whom he obtained help, and to whom he gave it. But many of his most intimate friends were attached to him by no community of interests and pursuits. He loved them for what he found loveable in their life and character, and very truly was he loved by them.

His geographical contributions to the latest edition of the 'Encyclopædia Britannica' range over a large area of Asiatic ground, from Cambaluc, "royal city of the Great Khan," westward and southward to Lhasa, Gilgit, Kafiristan, Hindu Kush, Ghazni, Afghanistan, Ormus, Gaur, the Maldivé Islands, Cambodia, Achin, and the Andamans; and his biographical notices (which are also geographical) from Hwen Tsang, the Chinese pilgrim of the seventh century, to the medieval travellers, Rubruquis, Marco Polo, Friar Odoric, John de Mandeville, Ibn Batuta, and one memoir that comes into our own century—Major James Rennell of the Bengal Engineers, Surveyor-General of India.

Colonel Yule had travelled, and all he had seen was well turned to account, but it is not as a traveller that he has gained a reputation. He was gifted with a rare geographical faculty and an equally excellent critical faculty: he possessed great wealth of knowledge, and a remarkable memory. With these resources he was able to take a correct measure of the work of other travellers, to discern the real results and value of what they had done, the exact meaning of what they had seen, the true bearing of what they had related. By well-directed research he was able to solve geographical problems of distant lands and distant times. In all his work he aimed at accuracy and completeness, and no labour was spared to attain these ends. The evidence of all competent witnesses, living or dead, was sought, and he knew where to look. To Colonel Yule might not unfitly be applied the words used by Bernier with respect to an eminent student-geographer of his time, M. Thevenot, whom he calls "cet illustre Curieux, qui nous donne tous les jours plus de découvertes sans sortir de son cabinet, que nous n'en avons appris de ceux qui ont fait le tour du monde." Colonel Yule sets forth distinctly the conclusions he has come to after careful study and enquiry. And his readers are not left to take these conclusions on his word: the sources of his information and grounds on which he bases his judgment are laid out with equal fulness and clearness.

His later works are less directly geographical than those already named, though there is a good deal of geography in them. The 'Glossary of Anglo-Indian Words' was published in 1886. Mr. Burnell, of the Madras Civil Service, was associated with him when the work was started, but little had been done before the death of that accomplished scholar; and practically the book is Colonel Yule's, though it bears also the name of Arthur Burnell, who contributed so much of value, as Yule says, in preparatory collection of books and notes of material to be used. There is no way of knowing the kind of book this glossary is, and the quantity of curious and apt illustration that has been dug out for it from all sorts of places, but by looking into the book itself. It is certain that one look will not satisfy. About almost any Anglo-Indian word of which an Anglo-Indian wishes to know the history and mean-

ing, he will generally, on turning it up in this book, find a good deal more than he could have expected. And others besides Anglo-Indians will be sure to find something to read, in any part of the book, without having anything particular to look for.

'The Diary of William Hedges' is the title of his latest work. It was issued in 1889 by the Hakluyt Society, of which he had for many years been the President. The diary itself occupies only a small proportion of the three volumes. Some contemporaries of William Hedges (afterwards Sir William) and events of their time form the subject of much pleasing discourse on the early days of the English in Bengal, with a good deal about Madras, all full of interesting notes and remarks, after his manner.

No systematic work was carried through after the completion of these volumes, but he continued, as strength permitted, to make notes, to write enquiries, to jot down quotations, and record references, which he might perhaps some day be able to make use of. Early in 1889 the state of his health had obliged him to resign his seat at the council table of the Secretary of State. On his retirement he became Sir Henry, an honour he thought right now to accept, though declined before. Two days before his death a telegram from Paris announced his election to be a Corresponding Member of the Académie des Inscriptions et Belles Lettres. His reply has already been published in the papers:—"Reddo gratias, illustrissimi domini, ob honores tanto nimios quanto immeritos. Mihi robora deficiunt, vita collabitur, accipiatis voluntatem pro facto. Cum corde pleno et gratissimo morturus vos, illustrissimi domini, saluto."

† **Colonel Sir Edward B. Sladen.**—This distinguished officer, whose death took place on the 4th of January, was known in the geographical world as the leader of the expedition from Bhamo, on the Irawadi, into South-western China, in 1868; undertaken chiefly with the object of ascertaining if a practicable trade route could be established between the British port of Rangoon, and the south-western provinces of China. At that time Colonel (then Major) Sladen occupied the post of Political Agent at the Court of Mandalay. The expedition was accompanied by Dr. J. Anderson as naturalist, and Captain Williams as surveyor, and resulted in valuable additions to our knowledge of the geography and natural products of the region. Colonel Sladen read a paper at our Evening Meeting of June 26th, 1861, on the subject of his journey, in the discussion on which Sir Arthur Phayre, Sir John Bowring, Colonel Yule, Mr. T. T. Cooper, and other authorities on Indo-China, took part. His paper, illustrated by a map of the region explored, was published in vol. xli. of the R. G. S. Journal. A general narrative of the expedition was subsequently (in 1876), published by Dr. J. Anderson, under the title of 'Mandalay to Momein.' Colonel Sladen was the son of Mr. Ramsay Sladen, of Madras, and was born in that city in 1830. He entered the Madras Staff corps in 1849, served in the Burmese war of 1852-53, and conducted two successful expeditions against rebel hill tribes in the Yunzali district of Martaban in 1856-57, where he was dangerously wounded. With his regiment, the 1st Madras Fusiliers, he served in the suppression of the Indian Mutiny from February 1858, and was present at the capture of Lucknow and took part in other important engagements during the war. In the years from 1876 to 1885 he occupied the post of Commissioner of Arakan, and in 1886 accompanied the force sent against King Thebaw as chief civil and political officer. He was knighted in 1886, and retired to England in the following year.

Admiral Sir B. J. Sullivan, K.C.B.*—We have to announce the death, on January 1st, at Bournemouth, of Admiral Sir Bartholomew James Sullivan. He was

* By Mr. H. N. Sullivan.

the eldest son of Admiral Thomas B. Sullivan, c.b., grandson of Admiral Bartholomew James. Born in 1810, he entered the Royal Naval College in 1823, and having passed his examination in 1829, obtained his first commission the following year. He then served, from 1831 until the close of 1836, in the *Beagle* surveying vessel, as second lieutenant to the late Admiral Fitzroy, and was one of the two survivors who were able to be present at the funeral of Charles Darwin, who had served as naturalist on board that vessel on the South American expedition. He was on the 30th November, 1837, appointed to the command of the *Pincher* schooner at Chatham; and from April 1838 until 1839 was again employed in surveying in South America in command of the *Arrow*. He attained the rank of commander in 1841; served in that capacity in the *Philomel* surveying vessel on the south-east coast of America and the Falkland Islands from the 2nd April, 1842, until paid off on his return to England in 1846, subsequently having his name borne as a supernumerary captain for surveying service on the books of the *Victory* flagship at Portsmouth. His promotion to post-rank, which was effected in 1846 by a commission dated back to 1845, was made a reward for the conduct he had displayed in the command of the southern division of ships engaged in the battle of the Paraná, where the combined British and French squadrons, after a hard day's fighting, destroyed four heavy batteries belonging to General Rosas, at Punta Obligado, as well as a schooner-of-war mounting six guns, and twenty-four vessels which were chained across the river. He commanded the small landing force of seamen and marines, and himself spiked six guns in a battery under a heavy musketry fire. "I should be unmindful," wrote Captain Charles Hotham, the senior British officer present on the occasion, in his official report to the Commander-in-Chief, "of the ability and continued zeal of Commander B. J. Sullivan did I not bring him particularly to your notice; by his exertions we were furnished with a chart, which enabled us to complete our arrangements for the attack." He was senior surveying officer to the Baltic Fleet in 1854-5, in command of the *Lightning*, and afterwards of the *Merlin*. He planned and was present at the attacks on both Bomarsund and Sveaborg, which were most successfully carried out. He was a strong advocate for training officers of the general service as nautical surveyors. He was naval officer to the Board of Trade from 1856 to 1865, and was frequently called by the Admiralty to act on committees for various objects, such as Harbours of Refuge, Fisheries, &c. The estimation in which he was held by his brother officers may be shown by the recent remark of a distinguished naval officer, who had served under him and knew him well, "As a sailor, a surveyor, or a strategist, he had no rival." He was a "younger brother of the Trinity House," and a Conservator of the river Thames. In 1848, after drawing up a scheme for the enrolment of dockyard workmen as army volunteers, he was placed at the head of the movement as Colonel-in-Chief on the Staff, receiving afterwards the thanks of the Government for the efficiency to which he had raised the corps. He became Rear-Admiral on the reserved list in 1863, Vice-Admiral 1870, Admiral 1877. He was made a c.b. in 1854, k.c.b. in 1869. He married in 1837 Sophia, daughter of the late Vice-Admiral Young, who survives him. Of eight children five are living; his eldest son being Commander J. Y. F. Sullivan, r.n. His second son Thomas died at Monte Video as Lieutenant of H.M.S. *Pert*. He had been a Fellow of our Society since the year 1857.

REPORT OF THE EVENING MEETINGS, SESSION 1889-90.

Fourth Meeting, 20th January, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.C.S.I., &c., President, in the Chair.

PRESENTATION.—*G. F. L. Giles, Esq.*

ELECTIONS.—*Lieut.-General Sir Archibald Alison, Bart., G.C.B.; Percy Alleyne, Esq.; George Paton Balfour, Esq.; J. B. Cameron, Esq.; Walter Clutterbuck, Esq.; Rev. W. A. B. Coolidge; E. Crawshaw, Esq.; George Cumes, Esq.; Hermann Eschwege, Esq.; Henry Gurney, Esq.; Charles Hoare, Esq.; Right Hon. Sir Henry James, G.C., M.P.; Charles Watson Martin, Esq.; James Boyd Miller, Esq.; Philip A. Myburgh, Esq., G.C.; William Newall, Esq.; Count Stas' Ostrorög; Capt. John Roper Parkington; H. D. Pilcher, Esq.; Adolph Riekmann, Esq.; Joseph Ruston, Esq.; Eli Lemon Sheldon, Esq.; Delphin E. Thebaud, Esq.; Thomas Oldfield, Esq.; Edmund Tipson, Esq.; Ambrose Berkeley Wall, Esq., B.N.*

The papers read were:—

1. "Mr. J. R. W. Pigott's Journey to the Upper Tana in 1889." By E. G. Ravenstein, Esq.

2. "The Mouths of the Zambezi." By Daniel J. Rankin, Esq.

Both papers, with the resulting discussion and maps, will be published in the next number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Berlin.—December 7th, 1889: BARON VON RICHTHOFEN in the Chair.—The German "**Plankton Expedition.**"—Professor Krümmel, of Kiel, spoke upon the general geographical and oceanographical results of the German "Plankton" Expedition of last summer. The objects of the expedition were essentially biological, being concerned with the exploration of regions which had not yet been studied by the savants of the *Challenger* and *Gazelle* Expeditions. The special subject of investigation was the organic world of the plankton, which is so rich in forms and of such importance for the support of the animal life of the high seas. Under the name "plankton" Professor Hensen includes everything which, both in animals and plants, is involuntarily carried along by the waves and currents of the ocean. The expedition owed its origin to a munificent donation by the German Emperor, and received the support of the Academy of Sciences of Berlin. The following gentlemen took part in it:—Professor Hensen as leader, Professor Brandt and Dr. Dahl as zoologists, Dr. Schütt as botanist, and Professor Krümmel as geophysicist. For the purpose of studying the smallest marine organisms, the marine bacilli, the expedition included Professor Fischer of Kiel as doctor, and Herr Eschke as artist. (The latter exhibited in the hall of meeting a collection of excellent marine pictures and landscapes in water-colours and oils.) The expedition was provided with a Sigsbee's plummet machine, which, however, in consequence of its not being constructed by the American makers in accordance with the directions given, failed to be of any use during two-thirds of the voyage. The deep-sea thermometers in Magnaghi's frames acted well; this was also the case with a refractometer recently constructed by Professor Abbe, of Jena, and used for the first time, which was used as a substitute for the aræometer, for determining, with the assistance of the diffraction exponents, the quantity of salt at times when the vessel was rolling heavily.

Little dependence could be placed upon Sigsbee's apparatus for drawing up water from the greater depths for testing purposes; the instruments were too small, and often not watertight. The colour of the sea was for the first time systematically tested and accurately compared with a simple colour-scale contrived by Professor Forel, of Geneva. The voyage was commenced on the 15th July, on board the steamer *National* (609 tons register), which had been altered and adapted for the purposes of the expedition. After passing through the Pentland Firth, the ship's course was directed to Cape Farewell, and the work of the expedition commenced. The plankton was fished for at depths of 100 and 200 fathoms. Under $58^{\circ} 57' N.$ lat. and $8^{\circ} 35' W.$ long. the soundings showed 832 fathoms, and under $60^{\circ} 12' N.$ lat. and $22^{\circ} 56' W.$ long. 1315 fathoms. On the 26th July the expedition found itself among the East Greenland drift ice; at 100 fathoms depth the temperature was 44° (Fabr.), and at the surface, with a salinity of 3.2 per cent., 37.5° . On the 28th July the vessel arrived in the Labrador current with its dense fog, and five days later, the expedition, on entering the Gulf Stream, experienced a complete transition from winter to summer within twenty-four hours. On the 6th August the ship lay in the sheltered harbour of St. George's, in the Bermudas, where the party stayed four days. In a sixteen days' run from here the passage was made to the Cape Verd Islands through the Sargasso Sea and the North African current. The Sargasso Sea was found to be surprisingly poor in animal life, but the great transparency of its waters is truly remarkable. Midway between the Azores, Cape Verd Islands, and the Bermudas, a large white canvas disc could be seen, even at a depth of 37 fathoms. Soundings under $31^{\circ} 29' N.$ lat., $59^{\circ} 0' W.$ long. showed 2869 fathoms, and under $28^{\circ} 56' N.$ lat. and $34^{\circ} 58' W.$ long., 3098 fathoms. From S. Jago the ship's course was turned southwards, and on the 7th September the equator was passed; the temperature of the water fell considerably from 79° (Fabr.) to 74° , so that just here the freshest and most pleasant weather was experienced. On the 10th the island of Ascension was reached. The acting governor, Mr. H. Napier, gave a most admirable reception to the expedition; the hygiene station here was visited. On the 23rd of September the vessel arrived in the mouth of the Tocantins. Halfway between Pará and the light-ship at the mouth the percentage of salt in the tidal stream amounted to 1.2, at ebb-tide to 0.4. It was in the programme of the expedition to make a voyage through the Breves Straits along the Amazons to Almeirim, in order to study the plankton in a great tropical river. Some necessary but lengthy repairs to the steamer, and the fact that the latter unfortunately got stuck fast upon a sandbank for three days, necessitated the abandonment of this part of the programme from want of time; the homeward voyage was therefore commenced. On the 11th October, under $6^{\circ} N.$ $43^{\circ} W.$, the Guinea current was once again met with in a very westerly position; high temperature (82° Fabr.) and small salt composition were noticed as characterising it. The vessel called at Ponta Delgado, on San Miguel, on the 24th October, and 14 days later steamed into the harbour of Kiel, after an absence of 115 days and a voyage of 15,600 nautical miles. —Professor Brandt then spoke upon the zoological results of the plankton expedition, with special reference to the biological investigations. Professor Hensen in the first place attempted to solve the problem, what and how many living substances the ocean produces. For this purpose the so-called plankton net was used, which consists of three parts, viz. a funnel-shaped top-piece made of impervious cloth with an upper opening of about a square foot, the net proper, composed of "miller's gauze" (No. 20), a silk texture with equal square meshes of only 0.0019 inches width, and the bucket attached below, the sides of which also consist of this gauze. A plankton net of this description is lowered to a given depth (100 to 200 fathoms) and by drawing it up a column of water, the height and base of which are accurately known,

is filtered through. One such draught in the Baltic Sea, for example, yielded, from a depth of 11 fathoms, and from a filtered volume of water of 2·358 cubic yards, a mass of $\frac{1}{2}$ cubic inch (8 cubic centimetres) of organic matter. This catch comprised not less than 5,700,000 large and small organisms, among which were about 5,000,000 peridinaceæ, 630,000 diatomaceæ, and 80,000 copepodæ. The collective production of the Baltic Sea in organic substances can be only partially compared to the gross produce of a similarly large surface, as it is composed of both food consumers (animals) and food producers (the original food). To the latter belong all beings, containing chlorophyll, which, like plants of the earth, are themselves capable of forming the organic substances necessary for the building up of the body. To this class the diatomaceæ and peridinaceæ especially belong, also the filamentous and unicellular algæ. In one cubic metre of Baltic Sea water 45,000,000 diatomaceæ were counted; in fact they are so plentiful in the Baltic that every drop of the water contains several diatomaceæ. Of the commonest species of peridinaceæ in the Baltic (*Ceratium tripos*) 13,000,000 are found in a cubic metre of water. A million peridinaceæ contain 0·46 grains (0·03 grammes) of organic matter. It has been ascertained that the copepodæ, and even certain fish like sardines, live principally upon such peridinaceæ. The copepodæ, of which about 80,000 live in one cubic metre of water, are in their turn of the greatest importance as the food of many economic fish, for example, the herring. In the western part of the Baltic, about 100 billions of these minute crustaceans would be found at an average depth of 11 fathoms over an area of one square mile. During the course of the expedition the plankton net was cast 140 times; the result shows that the ocean is very much poorer in plankton than the North Sea and the Baltic. Only in the northerly and colder regions was there such a mass of organisms as that found on the coasts of Northern Europe. This fact is the more remarkable, inasmuch as a greater abundance of living substances might have been expected to be produced under the influence of the powerful rays of the tropical sun than under the less powerful sunlight of the north. The Sargasso Sea in particular proved to be poor in organic life. Accurate data upon this point may be expected when the materials collected by the expedition have been worked up. The importance of the ocean currents both as media for and limitations to the spread of the plankton organisms, will be accurately studied upon the basis of the materials collected. The quantity of diatomaceæ in the waters of the north and also in the cold currents, as in the arm of the Gulf Stream which flows northward, is important. In the Florida current and the Sargasso Sea, the diatomaceæ tend to disappear, while the filamentous algæ (phycochromaceæ) become more plentiful, being present in greatest numbers in the Guinea current. The expedition made 33 vertical throws with the "closed net" at a depth of 1900 fathoms. By means of this net, a given column of water at a given depth can be fished through for organisms; the net is let down closed, and then unwound and drawn through from 50 to 100 fathoms of water, it then closes again and is drawn up. The result of the throws with this net goes to show that the number of organisms living in the great depths is very much less than in the upper strata which are penetrated by the light. Not only the quantity diminishes but also the number of animal species. Only certain radiolaris (phæodaris) and copepodæ were found swimming and living in depths of 1900 fathoms. In the lesser depths of from 1000 to 500 fathoms, the saggittæ and isolated siphonophoræ, salpæ, medusæ and young fish appear in addition. How vesicular marine algæ (*Halosphaera viridis*), can live in large numbers at depths of from 500 to 1100 fathoms, seems at present incomprehensible. According to former investigations, especially those of the *Challenger* expedition, all plant life ceases below 200 fathoms. Surface fishing with nets drawn horizontally through the water was made 110 times. On sixty-eight of these occasions the simple "Kätscher"

was used for the very simple reason, but one which appears not to have been taken advantage of by similar expeditions, that a freely floating ship tends to lie broadside to the wind. In this way the marine inhabitants in large numbers gradually accumulate upon the lee side of the vessel and are easily caught.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

EUROPE.

Abercromby, [Hon.] John.—A Trip through the Eastern Caucasus, with a chapter on the Languages of the Country. London, Stanford, 1889: 8vo., pp. xvi. and 376, maps and illustrations. Price 14s.

The entire Caucasian region has now been brought within the reach of the better order of vacation tourists, and we may look forward to numerous volumes dealing with the country from the different points of view which interest their authors. Mr. Abercromby's tastes led him in the "Mountain of Languages" to study the languages rather than the mountains, and he has added to his narrative a technical chapter on the structure and affinities of seven of the tongues of the Eastern Caucasus—the Ude, Kürin, Hürkan, Kasikumuk, Avar, Chechen, and Tush. He concludes that the primitive inhabitants of Daghestan came from Persia and entered the mountains from the south-east, and were Albanians.

The author gives a good many details as to the peculiar and primitive customs of other mountain tribes, the Chevsurs and Pshava, but he does not seem aware that the subject had been treated with some fulness by Dr. Radde in his 'Die Chewsuren und ihr Land,' 1878, or that throughout his tour he was continually treading in Dr. Radde's footsteps. (*Vide* 'Petermann's Mitteilungen,' 1887, No. 89, "Aus den Daghestanischen Hochalpen.") Nor does he refer to M. Chantre's splendid volumes on Caucasian ethnology and antiquities (in the R. G. S. Library), or to Professor Kovalevsky's works. He spells Ossetia throughout with a single *s*, on the ground that it is so spelt in Russian. But is not the *s* used in that language the heavy *s* properly represented by double *s* in European languages? At any rate all the Russian and European writers we have consulted, when they are not writing in Russian, spell "Ossetia." And we would ask Mr. Abercromby if he ever heard a Caucasian speak of an O-set? We have heard the word pronounced many hundred times, but never otherwise than Osset. We have also looked in vain for any information on an interesting and hitherto obscure topic, the "Mountain Jews" of the Caucasus, many of whom are found in the *Acouls* of Daghestan. An interesting work on this subject has been lately published at Moscow, by M. Anisimoff, himself by birth a "Mountain Jew," the gist of which has appeared in a translation by Professor Hahn, of Tiflis, in a series of articles in the 'Allgemeine Zeitung' for 1889 (Nos. 268-71).

When we turn to the topographical portion of Mr. Abercromby's volume we find a clear but somewhat slight and bare record of a tour from Tiflis viâ Nucha and across the main chain by a frequented pass to Achi, where are hot baths, and thence over the skirts of the range to Gunib. The author travelled on, for the most part along a well-known Russian road, to the northern steppe east of Vladikavkaz, returning to Tiflis by the valleys of the Argun and eastern Aragva, a route new to English travellers. He did not, it will be seen, approach closely to the volcanic heights of Basardjusi or the granite rocks of Schebulos, and the scenery he met with appears to have been on the whole not very interesting or picturesque. Daghestan is bare of trees, the mountains are composed of friable rocks, which do not as a rule assume noble forms, and the

most remarkable landscapes are consequently found in the deep gorges. Travel is tolerably easy for those who adhere to horse-paths, and the country is intersected with such tracks. Moreover, from military reasons the Russians have done more in the way of road-making than on the other side of the Caucasus. The most attractive as well as the least hackneyed part of the tour seems to have been the last, and it is to be regretted more time was not given to this district. Mr. Abercromby acknowledges the cordial assistance he received everywhere in his journey from the Russian officials.

Mr. Abercromby subsequently visited Derbend and explored the great wall. Of this we had previously very imperfect accounts. M. A. Dumas, in his unvarnished but extremely graphic and entertaining 'Impressions du Caucase' quoted a Russian report. Mr. Ussher, in his 'London to Persepolis,' gave General Loris Melikoff's account of the wall. Mr. Abercromby was the first Englishman to examine in detail this very curious structure, which extends into the mountains for 25 miles, and appears to be built of stone throughout and strengthened by many forts. It is believed to have been erected by Chosroes I. in the middle of the sixth century. The author also visited Kubachi, a mountain community celebrated for its artificers, who are popularly believed to have come originally from the land of the Franks, a tradition for which there seems to be very small foundation. The village produces jewellery, metal-work, cloth, and pottery of a Persian character.

The map that accompanies the volume is very superior to the route-maps ordinarily inserted in books of travel, and gives a clear idea not only of the author's route, but of the general configuration of the Eastern Caucasus, the highest crests of which lie roughly at right angles to the watershed, and are far more formidable as barriers than the grassy ridge that forms the northern boundary of Kakhetia, the Lombardy of the Caucasus. The volume is also illustrated by a map of the Wall of Derbend, an ethnographic map, and some fair illustrations.—[D. W. F.]

Köppen, Fr. Th.—Geographische Verbreitung der Holzpflanzen des Europäischen Russlands; being the fifth volume of the third series of the Beiträge zur Kenntniss des russischen Reiches und der angrenzenden Länder Asiens, edited for the Imperial Academy of Sciences by L. v. Schrenk and C. J. Maximowicz. St. Petersburg, 1888: pp. 668.

In the preface the author tells us that in 1880, upon the completion of his great work on the noxious insects of Russia, he began collecting materials for his present undertaking. In 1884 he published in Russian a work on the geographical distribution of conifers in European Russia and the Caucasus; and he has followed this up by the present volume forming the first part of a general treatise on all kinds of woody plants growing wild within the same limits. But while the conifers only numbered 20 genera, he has here to deal with 450. Independently, too, of the magnitude of the field of enquiry there were difficulties arising from nice botanical points about which even specialists are doubtful, e. g. as to distinctions between certain species of *Rubus*, *Rosa*, and *Salix*.

The fact of Russian literature being poor in this subject, the only treatises of the kind, by Trautvetter and Bode, being out of date, and only dealing with the more important ligneous plants, is a good reason for the production of this book, particularly if viewed in connection with the great changes that have taken place in Russia during the last thirty years, chiefly owing to the rapid development of steamboat communication on the Volga and its tributaries, and the expansion of the railroad system—changes that have largely affected her forests. The author gives a list of authorities for the native names of plants which he has given. In the present volume 325 species are discussed, the rest and a supplement will appear in part ii., which will also contain an alphabetical index, besides maps showing the distribution of many kinds of woody plants. In the preparation of the work much help was received by M. Maximowicz.—[E. D. M.]

ASIA.

Hallett, Holt S. DM. Inst. C. E.]—A Thousand Miles on an Elephant in the Shan States. William Blackwood and Sons, Edinburgh and London, 1890: 8vo., pp. xxxii. and 484, appendix, maps, illustrations, and index. Price 21s. [Presented by the Author.]

This long expected work is now before us, and most of its readers will at once guess from the title-page that it deals largely with the question of the railway with which the author's name is so inseparably connected. Mr. Hallett has worked so long and energetically at the Burma-Siam-China railway, first in explorations and surveys of the ground over which he proposes to take the line, and secondly by his lectures and writings at home to bring it before the public notice, and has made the subject of railway communication between Burma, Siam, China, and Assam so peculiarly his own, that anything he has to say about it is certain to command attention and respect. The present publication, embodying as it does a great part of the author's measurements and observations, and his latest views on the question, will prove of valuable assistance to all those who are anxious to satisfy themselves as to the practicability of the proposed lines, and as to their probable success as a commercial undertaking. Apart from the railway question, however, there is much that will attract the general reader, and as a brightly written book of travel it well deserves perusal. The journeys described lay almost entirely through the Shan States; and as the Shans are one of the most interesting of Eastern peoples, all who wish to learn about their country, cities, religion, superstitions, rites, customs, and mode of living, will do well to study what the author has to say about them.

Mr. Hallett's various journeys were long and harassing, involving the most laborious and unceasing work on his part in the way of observations for direction and distance traversed. It is surprising how he could possibly have kept his attention so continuously on the strain in order to take and note down the enormous mass of facts that are given, not only of the route followed, but also of the physical features of the country traversed, the width and depth of the rivers, the soil and geological formation, the trees, shrubs, and other vegetation, the fauna of the region, and the meteorology from day to day.

Starting on the 21st of January from Shoaگون on the Salween, the author proceeded eastwards by cart a distance of 13 miles, to Hlineboay; from which place, having procured elephants for the journey, he started for Zimmé, a distance of 236½ miles. At Lanma-Gyee, 24 miles from Hlineboay, he turned westward for an excursion down the valley of the Yembine river to its junction with the Salween; where he notes that, in the gorge to the south, the latter could be bridged by a span of 400 or 500 feet. Returning to Lanma-Gyee, he continued his journey up the valley of the Yembine, and over the waterparting between it and the Thoungyeen; crossed the latter, and the Meh Laik; and followed the valley of the Meh Nium to Maingloongyee. From this latter place he struck eastwards across the plateau separating the Meh Nium from the Meh Ping to Maung Haut on the latter river, passing some ruby-mines on the way. At Maung Haut the author left his elephant, and finished the journey to Zimmé by boat, up the Meh Ping. After resting at Zimmé he proceeded to Kiang Hai, and on to Kiang Hsen on the Meh Kong. This was his farthest northing; and thence he retraced his steps to Kiang Hai—this 41 miles having been enjoyed as a complete rest from all labour in taking observations. After leaving Kiang Hai, the author crossed the waterparting between the Meh Low and the Meh Ing, passing some hot springs, and following the proposed line of railway between Kiang Hai and Lakon; from which latter place he struck westwards across country by Lapoon back to Zimmé, his march being hastened by the fact of his travelling companion having been attacked by small-pox. His next journey was undertaken alone in a N.E. direction for 57 miles, to Ban Mai, on the Meh Wung. After his return to Zimmé he started again north to Ban Meh Hang via Mnaug Fang, a distance of 93 miles, returning to Zimmé by

another route a little to the eastward. On the 31st of May the author bade adieu to his kind missionary friends at Zimmé, and started by boat down the Meh Ping, past Raheng into the Meh Nam, and so on to Bangkok.

AFRICA.

Gibbs, E. J.—England and South Africa. London, Longmans & Co., 1889: 8vo., pp. xi. and 151. Price 5s. [Presented by the Publishers.]

Consists of a series of chapters dealing with our political relations with South Africa, principally in modern times.

Harris, Walter B.—The Land of an African Sultan. Travels in Morocco. London, Low & Co., 1889: crown 8vo., pp. xii. and 338. Price 10s. 6d. [Presented by the Publishers.]

The journeys here recorded were made in 1887, 1888, and 1889. The author has very little new to tell, the country to a great extent having been traversed by Mr. H. E. M. Stutfield in 1883, and described in his volume, entitled 'El Maghreb,' published in 1886. Some interesting and out-of-the-way places were, however, visited, including the Berber city of Shehouan, which, according to the author, has been only once before seen by a Christian. The volume is divided into four parts—Part I. is descriptive of a journey through Northern Morocco from Tangier by Larache to Mequinez and Fez, and back viâ Wazan. Part II. contains an account of a journey with H.B.M. special mission to the Court of the Sultan at Morocco City. This was accomplished by steamer as far as Mazagan, where the party struck inland to the city of Morocco, returning by way of Mogador and the coast to Tangier. Part III. describes a visit to Wazan and a ride to Sheshouan. Part IV. deals with the Moors. A map is given of the author's routes in Morocco, besides a number of illustrations.

Sudan Almanac, 1889.—Compiled at the Intelligence Division, War Office. London, Harrison and Sons: 12mo., pp. 14. [Presented by the Director of Military Intelligence, Intelligence Division, War Office.]

Willoughby, [Capt.] Sir John C. [Bart.]—East Africa and its Big Game. With Postscript by Sir Robert G. Harvey, Bart. London, Longmans & Co., 1889: 8vo., pp. xi. and 312. Price 21s. [Presented by the Publishers.]

This is an account of a sporting trip from Zanzibar to the borders of Masai Land, undertaken by the author in company with Sir R. G. Harvey and others, in 1886–87. The plan of the expedition on leaving the mainland was to proceed at once to the forest of Taveta, near the base of Mount Kilima-njaro, where it was proposed to establish a permanent headquarters camp, and from thence make a series of shooting trips into the surrounding country. Although mainly devoted to sport, the volume contains some useful notes on the country traversed, as also on the various native tribes encountered. It also includes an account of the party's ascent of Kilima-njaro to a height of about 16,000 feet. A list of the Fauna of the region will be found in the Appendix, as also an English Swaheli Vocabulary. A map is given of the routes of the expedition, coloured to represent the various game districts; there are also a number of illustrations, many of which are taken from photographs.

AMERICA.

[America.]—Narrative and Critical History of America, edited by Justin Winsor. Vol. viii. London, Low & Co., 1889: imp. 8vo., pp. viii. and 604. Price 30s.

With the present volume this important work is completed. It deals with the later history of British, Spanish, and Portuguese America. Chapter I. contains a History of the Hudson Bay Company, by Mr. George E. Ellis; Chapter II. deals with Arotic Explorations in the eighteenth and nineteenth
No. II.—Fms. 1890.]

centuries, by Mr. Charles C. Smith; a short account of the work accomplished by each expedition is given; the History of Canada from 1763 to 1867 is next treated of in Chapter III., by Mr. George Bryce, with an editorial note on Newfoundland; Chapter IV. is devoted to Spanish North America, by Mr. Justin Winsor, who gives a condensed account of the history of the Spanish countries in North America from the close of the eighteenth to the middle of the nineteenth century, with bibliographical notes on the West Indies and the Spanish Main; Chapter V. deals with the Colonial History of South America, and the Wars of Independence, by Mr. Clements R. Markham, with an editorial note on the Bibliography of Brazil, and a dissertation on the Historical Chorography of South America, by the editor. The volume concludes with an appendix, in which the editor discusses the manuscript sources of, and printed authorities on, United States history; a Chronological Conspectus of American History, by the editor, and a general index. There are the usual critical and editorial notes, besides a profusion of illustrations, including fac-similes of old maps, portraits, and autographs. As a collection of information on America the work is of great value; the copious critical notes on authorities, and the detailed bibliographies render the work of the greatest service to the student.

GENERAL.

Zapiski (Memoirs) of the Imperial Russian Geographical Society. General Geography, vol. xi. Edited by J. V. Mushketof. St. Petersburg, 1888.

Contents.—Sketch of a journey from Tien-tsin to Ching-kiang, by P. T. Unterberger, with a map; notes of travel from Cheng-tu-fu to Chaya in 1792, translated by P. Popof. The route followed by the Chinese author of this narrative is that known as the southern route, by which China carries on her official relations with Tibet; it is the route taken by Messrs. Huc and Gabet on their return from Lhása. It was by this way, too, that the Emperor Kien-lung sent his expeditions against the mountain tribes, and Cooper, the author of 'Travels of a Pioneer in Commerce,' followed it as far as Batang. The interest now attaching to the countries lying to the westward of China lends interest to the narrative. The next article is on a map of Dzungaria, drawn by a Swede of the name of Renat, during his captivity among the Kalmuks, from 1716 to 1733. Finally, there is a full report of Adrianof's journey to the Altai and beyond the Sayan, undertaken for the Russian Geographical Society in 1831, with four plates of illustrations. The author, who accompanied Potanin in one of his expeditions in north-western Mongolia in 1879-81, turned his attention chiefly to the native races of Siberia and their religions, besides collecting plants, insects, and ethnological specimens.

Zapiski (Memoirs) of the Society for the Study of the Amur region. Vol. i. Vladivostok, 1888.

This is the first issue of a new publication by a new Society. There has hitherto been no officially recognised body for collecting materials on the region known as the "Amur Country." The Society dating its existence from the 11th April, 1888, intends to supply this want. Their memoirs will contain (1) Reports and communications at general meetings, (2) notices and monographs on separate subjects, (3) extracts from historical documents relating to the country, (4) bibliographical and scientific information, (5) protocols and reports of the committee, (6) other information on work done by members of the Society, and a programme of scientific explorations. The present number contains (1) an article on the coal-fields of Peter the Great Bay, (2) an excursion to the islands of Tiulen (Seal) and Sakhalien (Sagalien) in 1887, with a map, and traces of antiquities in the valleys of the Lefu, Daubi-ho, and Ula-ho. —[E. D. M.]

[The 'Challenger' Voyage.]—Report on the Scientific Results of the Voyage of H.M.S. *Challenger* during the years 1873-76, &c. Physics and Chemistry—Vol. II. London, Eyre & Spottiswoode, 1889: 4to., pp. xvi. 76, 78, 263, 18,

ii. and 180, maps, plates, and woodcuts. Price 52s. 6d. [Presented by the Lords Commissioners of Her Majesty's Treasury.]

This volume contains Parts IV., V., VI., and VII. of the Physical and Chemical series of Reports on the Scientific Results of the *Challenger* Expedition. Part IV. deals with the Physical Properties of Water, by Prof. P. G. Tait; Part V. is devoted to Atmospheric Circulation, by Dr. Alexander Buchan; in Part VI. Staff-Commander E. W. Creak discusses the Magnetic Results; Part VII. deals with the Petrology of Oceanic Islands, by Prof. A. Renard. The publication of Mr. Buchan's memoir has been long expected by those interested in climate. Mr. Buchan has collected his materials from all quarters, and has not contented himself with the *Challenger* data alone. He has recalculated the whole of the isotherms and the isobars of the globe, and charted them carefully on a series of about 40 maps. His memoir and the accompanying tables, combined with the maps, will render these results of many years' work the standard authority on a subject of great importance in physical geography for a long time to come.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

ORDNANCE SURVEY MAPS.

Publications issued during the month of December 1889.

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ENGLAND AND WALES: New Series. No. 336 (in outline); 1s.

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(*Stanford, Agent.*)

AFRICA.

Stanley's Explorations in Africa.—A New Map, showing all Stanley's Explorations in the Dark Continent from 1868 to 1889. With a complete *Résumé* of the Great Explorer's Travels and Discoveries, by E. (G. Ravenstein, F.R.G.S. Scale 1:9,577,600 or 131·2 geographical miles to an inch. George Philip & Son, London and Liverpool. Price 1s.

As indicated by the title, this map has been published to show all Mr. Stanley's explorations in Africa. These are clearly laid down, each expe-

dition being indicated by a distinctive colour, and dated on the map. In addition to this, the map will also be useful to those interested in the partition of Africa, as it exhibits the present limits of spheres of influence, and the extent of the possessions of European Powers east of the third degree of west longitude, and between lat. 22° N. and 11° S. On the back of the map will be found a short account, by E. G. Ravenstein, F.R.G.S., of Mr. Stanley's African Explorations from 1867 to the close of 1889.

Zoutpansberg.—The First Published Geological Map of —; showing its Great Gold Belts, and defining parts of the Gold Country hitherto unknown. Compiled from original notes and observations recently made during a protracted exploration tour through unexplored tracts of the Northern Transvaal Territory, by Charles Maidment, Geological Specialist. Scale 1:290,000 or 13·6 geographical miles to an inch. Argus Co. (Ltd.).

This map contains a large amount of information that will be useful to those who are interested in developing the mineral resources of this region. It is geologically coloured, and has reference notes, by the aid of which the meanings of the different shades of colour, and of the symbols employed, are explained.

ATLASES.

Attika.—Karten von —. Auf Veranlassung des kaiserlich deutschen archäologischen Instituts und mit Unterstützung des königlich preussischen Ministeriums der geistlichen, Unterrichts- und medicinal-Angelegenheiten. Aufgenommen durch Offiziere und Beamte des k. preussischen Generalstabes. Mit erläuterndem Text herausgegeben von E. Curtius und J. A. Kaupert. Heft V. drei Blätter, 1:25,000. Bl. XVI. Laurion, aufgenommen und gezeichnet von v. Bernhadi. Bl. XVII. Olympos, aufgenommen und gezeichnet von v. Zieten I. Bl. XVIII. Drakonera, aufgenommen und gezeichnet von Erchenburg. Heft VI. Bl. XIX. Marathon, 1:25,000. Nebst erläuterungen zu Heft III-VI von Arthur Milchhofer. Berlin, 1887-89, Dietrich Reimer. Price, Part V. 8s., Part VI. 7s. (*Dulau*.)

This valuable atlas cannot fail to be of great assistance to those engaged in the study of ancient Grecian history and its monuments. The maps have been published with the sanction of the German Imperial Archaeological Institute, from surveys executed by officers of the Royal Prussian Staff. They are drawn on a large scale, and reflect credit on all concerned in their production. The physical features of the country are represented in a manner that leaves nothing to be desired, while the sites of ancient ruins, monuments, and tombs, being shown in red, are easily identified. Each issue is furnished with explanatory letterpress, illustrated by woodcuts, and containing an exhaustive description of ancient and modern Athens and environs, the Piræus, and other places of historical interest. As the present issue completes this atlas, it will not be out of place here to mention its contents in the order in which it has been published:—Heft I. mit Textband: I. Athen mit Umgebung. Ia. Alt-Athen mit seinen nachweislichen Denkmälern, Plätzen und Verkehrsstrassen. II. Die Halbinsel Peiraieus. IIa. Die Halbinsel Peiraieus nach Erbauung der Hippodamischen Stadtanlage und der Befestigungsmauren. Heft II. mit Textband: III. Athen-Peiraieus. IV. Athen-Hymettos. V. Kephisia. VI. Pyrgos. Heft III.: VII. Spata. VIII. Vari. IX. Raphina. X. Perati. XI. Porto Raphti. Heft IV.: XII. Pentelikon. XIII. Markopulo. XIV. Sunion (West). XV. Sunion (Ost). Heft V.: XVI. Laurion. XVII. Olympos. XVIII. Drakonera. Heft VI. mit Text zu Heft 3-6: XIX. Marathon.

When previously noticing the parts of this atlas, at the time of their publication, attention has been called to the very superior manner in which the maps have been produced, it will therefore only be necessary, on the present occasion, to say that this issue is quite equal to any that have preceded it, and that, taken as a whole, the atlas is a very fine example of the excellence attainable in cartographic art.

Commercial Geography. Atlas of —, illustrating the general facts of Physical, Political, Economic, and Statistical Geography, on which international commerce depends. By John George Bartholomew, F.R.G.S. With Introductory Notes by Hugh Robert Mill, D.Sc., F.R.S.E., Lecturer on Physiography and Commercial Geography in the Heriot-Watt College, Edinburgh. Cambridge, at the University Press. London, C. J. Clay & Sons, 1889. Price 3s.

This atlas, which contains twenty-seven well-executed maps, has been compiled with the view of facilitating the study of commercial geography, and, consequently, prominence is given to those physical conditions of the earth which directly affect commerce, or the distribution of commodities. In the construction of the general maps two projections are used, viz. Mercator's and Gall's, and though each of these has errors inseparable from it, they are nevertheless well suited to the purpose for which they are used. The first eight maps are devoted to heights, depths, surface features, ocean currents, and meteorology; the next four treat of natural productions; maps 11 and 12 exhibit the density of population, diseases peculiar to countries, races of men, and prevailing religions; these are followed by isochronic distance, and postal maps of the world. No. 15 is a Mercator's Chart of the World, showing approximately the regions open to and available for commercial enterprise. No. 16 is an interesting map of the British Empire, showing the degree of self-government. No. 17 is a commercial map of Europe, on the conical projection, orographically coloured. In this case the attempt has been made to show too much on one map, the consequence being that the result is not satisfactory, for until closely inspected it has the appearance of being an orographic map and nothing more, and it would be far better if the localities where each product is found had been indicated by a decided shade of colour on an otherwise uncoloured map. For the purpose of instruction no map should, where it can be avoided, be devoted to two subjects.

Maps 18 and 19 show all the principal means of communication in the British Isles and Central Europe. The eight small maps which follow show the physical geography, conditions of the land, products, density and distribution of the population of the British Isles. Nos. 22, 23, 24, 26, and 27 are commercial maps of Asia, Africa, North and South America, and Australia. These are similar in design to No. 17, and the remarks made on that map are applicable to them all. The introductory notes, by Dr. H. R. Mill, are very clearly written, and if carefully read, will much facilitate the use of the maps.

Hachette et Cie.—Atlas de Géographie Moderne, édité par Hachette et Cie. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, diagrammes, etc. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Libraire Hachette et Cie, 1890. 8° Livraison. Price 10*d.* (*Dulau.*)

No. 1 contains four projections of the sphere, two polar and two meridional. The notes by M. F. Schrader, which accompany this map, are worthy of commendation. Sheet 53 contains maps of southern and eastern Australia, Tasmania, Fiji Islands, and New Zealand. The notes on these maps are illustrated by several well-drawn diagrams, and contain statistical information with regard to climate, population, industry, commerce, &c. No. 57 is a map of the United States and Mexico. M. Henri Roland, by whom the explanatory text which accompanies this map is written, gives no less than seven diagrams to illustrate the physical geography, meteorology, and hydrology, in addition to which the superficial areas of the several States are given in square kilometres. In a note on the cover of the present issue, the publishers announce their intention to complete this atlas during the year 1890.

Johnston, W. & A. K.—The Modern Series of Cheap Atlases. Sixpenny Atlas. W. & A. K. Johnston, Edinburgh and London.

This is a remarkably cheap little atlas, containing forty-six sheets of maps, some of which are orographically coloured.

Nordenskiöld, A. E.—Facsimile-Atlas to the Early History of Cartography, with Reproductions of the Most Important Maps printed in the 14th and 15th centuries. Translated from the Swedish original by Johan Adolph Ekelöf, Roy. Swed. Navy, and Clements R. Markham, C.B., F.R.S. Stockholm, 1889. 127. (*Dulau.*)

In the preface to this important atlas, Baron Nordenskiöld states that he has been induced to publish a systematic collection of the most important maps printed during the early period of cartography, to enable every student of historical geography to examine and consult in his own library, correct copies of the most important geographical documents printed during the fifteenth and sixteenth centuries; and in order to make the atlas accessible to students not versed in the Swedish language, the letterpress of the present edition has been published in English. The reproduction of manuscript maps does not form any part of the author's plan; for these the student is referred to the well-known atlases of Jomard, Santarem, Fischer, and others, and it has even been found necessary to exclude some large printed maps, such as the large map of Scandinavia by Olaus Magnus, the terrestrial globe in gores, by Mercator, Sebastian Cabot's planisphere, and some others, as the reduction in scale that would be necessary in order to produce them in this atlas, would have greatly detracted from their value.

The table of contents, at the commencement of the letterpress, independent of its utility as an aid for reference to the atlas, is a valuable work, in which information is given as to where the original, from which each facsimile has been taken, is to be found. When the original is in the Royal Library at Stockholm, this is indicated by the letters K.B., and those in the collection of the author by the letter N.

The atlas contains 51 large maps, which, with the exception of No. LI., are reproduced in full size. In addition to these, there are 84 smaller maps and figures in the text, which for the most part are reductions from originals. The letterpress is divided into the following sections:—I. The Geographical Atlas of Ptolemy. II. Editions of Ptolemy's Geography. III. Pseudo-editions of Ptolemy. Ptolemy's errors and merits. IV. Ancient, not Ptolemaic, Maps. V. Extension of Ptolemy's Oikumene towards the north and north-west. VI. The first Maps of the New World, and of the newly-discovered parts of Africa and Asia. VII. Terrestrial Globes from the fifteenth and first part of the sixteenth centuries. VIII. Map Projections. IX. The end of the early period of Cartography. X. The transition to, and the beginning of, the modern period—Jacopo Gastaldi, Philip Africanus, Abraham Ortelius, Gerard Mercator. This arrangement of subjects is most convenient for the student, commencing, as it does, with the Geographical Atlas of Ptolemy, and ending with the decided change from the Ptolemaic system which took place towards the close of the sixteenth century.

In Section I. Baron Nordenskiöld calls attention to the fact that the present method of orientation in maps was introduced by Ptolemy, and that his method of denoting boundaries between land and sea, mountains, rivers, and towns, has, with slight modifications, been followed by cartographers to the present day. The catalogue of editions of Ptolemy's Geography contains a short account of each of the fifty-six editions published between the years 1472 and 1883. A few of these have never been noticed before, but, on the other hand, twenty-six works, which, in the author's opinion, have been erroneously enumerated among the editions of Ptolemy's Geography, have been excluded. A list and description of these will be found under the title of Pseudo-Editions. The author's remarks on the errors and peculiarities of Ptolemy's Geography are highly interesting. He points out the most conspicuous of these, their cause and effect. Among the principal appears to be the manner in which the editors attempted to fit discoveries to Ptolemy's geography, preferring to adhere to old errors rather than disturb their accepted system. Instances of this will be found in the map of Britannia, contained in the 1472 edition of Ptolemy, in which Scotland is shown as an eastern extension of the north of England, thus placing the east coast of Scotland at right angles to the east coast of England;

and by referring to the different maps given in the atlas it will be seen how this error was persevered in through many editions, long after it was known to exist. One story of the manner in which this error occurred is that maps of England, Ireland, and Scotland were sent to the author, each map being separate, and that as Ireland was known to be to the west of England it was placed in an approximately correct position; but though Scotland was understood to be a portion of Great Britain, it was not known in which direction it extended, and for some reason was placed in the position before referred to. On p. 11 of the letterpress, a copy of a map from the 1513 edition of Ptolemy is given, on which Scotland is shown in its correct position, as far as orientation is concerned. In connection with this portion of the letterpress, the author remarks that though, in his critical catalogue, he has reduced the number of editions by rejecting twenty-six which he considers to be spurious, there yet remain no less than fifty-six authentic editions of Ptolemy's Geography, most of which are provided with maps. Thirty-three of these were issued before 1570, twenty-six of which contain, altogether, about 700 old Ptolemaic maps, and about 400 "tabulæ novæ," and he points to the fact that it is by comparing this number with the few maps unconnected with Ptolemy's Geography which were published before 1570, that we shall be able to form a correct idea of the great influence that the Alexandrian geographer, after fourteen hundred years, still exercised upon the history of geography and civilisation. A list of the maps without any direct connection with the editions of Ptolemy, and which were printed before 1520, will be found in Section IV.

The subjects to which the different sections are devoted, have been mentioned in a previous part of the notice, and these will sufficiently point to the scope of Baron Nordenskiöld's work; it will therefore be sufficient to say that the whole is dealt with in a masterly manner, and that for completeness and clearness of style, the author's notes surpass anything of the kind that has been published in this country.

The production of the fac-simile maps is remarkably good, and leaves nothing to be desired, the small lettering and outlines being for all practical purposes as clear as in the originals, while the selection that has been made of maps to represent the progress of cartography during the period which the atlas embraces, is extremely happy. The large maps commence with a reproduction of the whole of the 1490 edition of Ptolemy's Atlas, and ends with "Descriptionis Ptolemaicæ Augmentum," G. Cornelius Wytfliet, 1597. In the opening sentence of the preface Baron Nordenskiöld asserts "that the history of geography during the era of great geographical discoveries cannot be fully intelligible without a comparative study of the maps which were accessible, and on which the explorers based their schemes for new enterprises." The truth of this assertion is so palpable that no one is likely to contradict it, and the thanks of all geographical students are due to the distinguished author for providing them with the means of pursuing studies which the publication of his valuable atlas has done so much to facilitate.

Saint-Martin, Vivien de.—Atlas Universel de Géographie Moderne, Ancienne et du Moyen Age, construit d'après les sources originales et les documents les plus récents, cartes, voyages, mémoires, travaux géodésiques, etc. Avec un Texte Analytique par M. Vivien de Saint-Martin et Fr. Schrader. Paris, Hachette et Cie., 1889. 9^e Livraison, contenant France, 1 : 1,000,000, feuille Ouest. Puissance du Canada, 1 : 10,000,000. Australie, 1 : 10,000,000. Price 5s. (*Dulau.*)

The first map in this issue is one of the west of France, forming part of the six sheet map of that country, which, when completed, will be, without doubt, the best map of France that has ever been published in an atlas. The next is a map of North America, which, though necessarily small in scale, is very clearly drawn, and has been carefully compiled. The same remarks also apply to the map of Australia which follows.

Stieler's Hand-Atlas.—Neue Lieferungs-Ausgabe von —. 95 Karten in Kupferdruck und Handkolorit, herausgegeben von Prof. Dr. Herm. Berghaus,

Carl Vogel und Herm. Habenicht. Erscheint in 32 Lieferungen (jede mit 3 Karten, die letzte mit 2 Karten und Titel). Achtzehnte (18) Lieferung. Nr. 52, Balkan-Halbinsel, Blatt 2. 1:1,500,000 von C. Vogel. Nr. 71, Afrika, Blatt 6. 1:10,000,000 von R. Lüddecke. Nr. 82, West-Indien. Blatt 4. 1:7,500,000 von A. Petermann. Gotha, Justus Perthes. Price 1s. 6d. (*Dulau*.)

Sheet No. 52 includes the south-east portion of the Balkan Peninsula; the heights of mountains and the depths of the sea are given in metres, the latter being indicated by a series of contours, commencing at twenty metres and ending at one thousand. Sheet No. 71 contains maps of South-east Africa and Madagascar, Abyssinia, the country in the neighbourhood of Cape Town, and the island of Zanzibar and the neighbouring continent; these two latter being drawn on an enlarged scale. Sheet No. 82 includes all the West India islands, the southern part of Florida, Central America, the Isthmus of Panama, and the northern portions of Colombia and Venezuela. Inset maps, drawn on an enlarged scale, are given of Jamaica, Puerto Rico, the country round Havana, Guadeloupe, Dominica, Martinique and St. Lucia. These maps, like all those belonging to this atlas, are beautiful specimens of cartography.

ILLUSTRATIONS AND PHOTOGRAPHS.

Hölzel, Eduard.—Hölzel's Geographische Charakter-Bilder für Schule und Haus. Herausgegeben unter pädagogischer und wissenschaftlicher Leitung von V. v. Haardt, V. Prausek, A. Ritter Kerner v. Marilaun, Dr. Friedr. Simony, Dr. Fr. Toula, Dr. K. Zehden, und Mitwirkung vieler anderer namhafter Fachmänner. Nr. 28, Steilküste in Irland. (Pleaskin Head am Giant's Causeway; Riesendamm in der Grafenschaft Antrim.)—Nr. 29, Die Puszta Hortobagy bei Debreczin.—Nr. 30, Der Grand Cañon des Colorado.—Nr. 31, Halemaumau-Lavasee des Kilauea-Kraters auf Hawaii.—Nr. 32, Ansicht des Kintschindschinga mit den Vorketten des Himalaya, von Dardschiling aufgenommen. Ed. Hölzel's Verlag in Wien.

— J. Langl's Bilder zur Geschichte. Nr. 22 a, b. (Doppelblatt). Forum Romanum. Neue Ausgabe. Ed. Hölzel's Verlag in Wien. (*Dulau*.)

There can be no doubt as to the value of pictures as aids in teaching geography, provided they faithfully represent the peculiar features of the country or scene they are intended to illustrate, and are free from those exaggerations which artists are frequently tempted to introduce for the purpose of heightening the pictorial effect. These requirements appear to have been borne in mind by the artist in the pictures under consideration. The subjects are well chosen, and exhibit contrasts between the grand mountain scenery of the Himalayas and the dreary monotony of the steppes, the difference in the geological formations of the Giant's Causeway, on the sea-coast of Ireland, and the Grand Cañon of Colorado, in the interior of the American continent. The picture of the crater of Kilauea would hardly convey a correct idea of the original to a student's mind; and that of the Forum Romanum, which belongs to another series, though well executed, is not a geographical subject.

Yucatan.—Six enlarged Photographs of the Ruins of Uxmal, Yucatan, taken by Mr. W. D. James, 1889, and presented by him to the Royal Geographical Society.

These are a set of very fair enlargements from photographs taken by Mr. W. D. James, and presented by that gentleman to the Society.

It may not be out of place to mention here that it would greatly add to the value of the collection which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.



120 124

MANCHURIA

Bodumee

Khol F.

Shara-muren R.

Mukden

SHUNG-KING

Cheng

LEAO-TUNG-G.

KOREA BAY

GULF OF CHI-LI

YELLOW SEA

K A L (Lia)

Chukhu

Shan

Seoul

Shanghai

116 120

32 36 40 44

Scale: 1:100,000

Statute Mile

Scale

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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

*Mr. J. R. W. Pigott's Journey to the Upper Tana, 1889.**

(Read by Mr. E. G. Ravenstein at the Evening Meeting, Jan. 20, 1890.)

Map, p. 192.

ON the 23rd of January I received instructions to proceed, with as little delay as possible, to Golbanti, from thence up the north bank of the river Tana to Masa, and, if possible, to the north of Mount Kenia.

Having settled my affairs in the Rabai district, I came down to Mombasa, and was engaged in preparing and packing goods, &c., till the 11th of February, when I started.

The caravan consisted of Mahomed bin Homar, five headmen, an interpreter, two servants, and about 180 porters and askari (soldiers). I was told that Galla guides would be provided by the Liwali (governor) of Malindi.

I arrived at Malindi at midday on the 18th of February. The road by which I came led for the greater part of the way through dense scrub, from 10 to 15 feet high, which excludes any breeze there may be, and when the sun gets up the heat is very great. The road, moreover, for about half the distance, is either covered with loose sand, about four inches in depth, or with rough coral. I make the distance about 78 miles. I travelled from eight to 10 miles on six days, and 12 and 13 on the others. These short marches were necessitated on account of the water, which is only obtainable at certain places, besides which the crossing of creeks caused great delay. The road lies along the coast and passes through many villages, at each of which some of the porters deserted, so that when I reached my destination my party was considerably reduced, and of those remaining some were sick and unable to proceed. This is a great drawback to this route. There is an alternative route through Giriya, but I think it would have proved impracticable owing to the scarcity of water. Even in a comparatively good season but little water is to be had, and much of what there is is brackish and apt to cause dysentery.

* Communicated by the Imperial British East Africa Company.

The Liwali called on me the day I arrived. A deputation of Galla came to me while he was here, some from the north, near Golbanti, and others from the south, their respective tribes having been at war. Things have now been amicably settled. They then told me that I should be welcome in their country wherever I went. They expressed themselves anxious to combine with the Wakamba against the Somali, who, they say, are a very bad lot, and not to be trusted.

I remained at Malindi three days to rest, and got a few extra things, and on the 21st was just starting when I received a message from the Liwali asking me to wait, as Suliman bin Abdalla, of Mambroi, was at the Sabaki river with 200 armed men, to prevent me crossing. The matter was peaceably settled, but it delayed my departure another day, until the 22nd.

We went as far as Mambroi that day. Mambroi lies on the coast, about two miles from the mouth of the Sabaki river. There does not appear to be much trade there, and there is little promise of an increase, as the approach from the sea is very far from good. As we arrived, two dhows, which were leaving, struck on a reef within 150 yards of each other.

After leaving Mambroi we passed through Gongoni and Marereni, the latter a small place, inhabited by people who get their living by gathering orchilla weed (*mareri*), after which the place is named. There is a garrison of twelve or fifteen soldiers here.

The country between Mambroi and Golbanti is flat, with grassy plains and swamps, both salt and fresh. In places we had to walk through water for miles at a stretch. It abounds in game of all sorts, especially antelopes and zebras. I lost a good many men on the road, as at nearly every village two or three disappeared, taking their wives with them.

On the 26th of February we reached Golbanti,* better known as Borabini. It is situated on the south [west] bank of the river Tana, and consists of a substantial Mission House, specially built for defensive purposes, and twenty or thirty "bee-hive" huts. At this time of the year it seems to be a very healthy and pleasant place, although surrounded by swamps. The population consists of Galla and a few Wapokomo, together about 100 souls, who seem to be very poor, as owing to the frequent raids of the Somal from the one side and the Masai on the other, they are unable to keep cattle. They do not cultivate grain except on a small scale, not raising enough for their own wants. There is plenty of water and good grass, and the country in the neighbourhood is capable of supporting a large number of cattle. A good deal of rice is grown by the Wapokomo further down the river. The river is at present very low, which makes the navigation upwards difficult.

* Golbanti is incorrectly placed on my latest map of part of Eastern Africa. It lies about two hours' row below Ngao, on the western bank of the Tana.—E. G. R.

During my stay at Golbanti I was hospitably entertained by Mr. W. G. Howe, of the United Free Churches Methodist Mission, which has also stations at Jomvu and Ribe, near Mombasa.

I waited at Golbanti till the 1st of March, for guides and interpreters from the Osi (Káo), and when, at length, two arrived, I found that neither of them had been up the river, and as they could speak nothing but Kiswahili, I sent them back. I managed to get a Pokomo man to be my interpreter, who knew the Swahili and Galla languages fairly well. Two Galla undertook to act as guides for the first five or six days. From Golbanti to near Ripa (Masa) we travelled along the south [west] side of the river, getting guides from village to village. As the inhabitants live almost entirely on the river, there are no roads except between the villages and shambas. Near the river the country is either forest or grass, growing to a height of nine feet. Away from the river are vast grassy plains, with clumps and belts of mimosa scrub. At the time we passed there was hardly a blade of grass to be seen. The whole country, being very dry, was out up by the game, of which there must be a great quantity, though we saw little. There are villages at frequent intervals on both banks of the river. The people are, as a rule, Wapokomo and Galla. There are also one or two villages of runaway slaves.

On the 17th of March we crossed to the north side of the river, about two miles below Ripa, the residence of Kyai, the chief of the Masa district. Ripa lies on the south bank of the river, but the Masa district includes both sides.

At Ripa I made enquiries about Mr. Denhardt's visit, and everyone, including the chief, an old man of about sixty-five or seventy, denied any knowledge of his having been there, and said that I was the first European they had seen. Under these circumstances I thought it right to make a treaty with them, and gave them the Company's flag.*

After leaving Ripa we had considerable difficulty in getting food, and much delay was caused in trying to buy. All through the Wasania district there is no food obtainable except now and then a few pumpkins. This district extends from Kidori to Korokoro. The inhabitants are hunters.

Korokoro or Oto Bororuwa, reached on the 30th March, is a swamp or lake, in and around which are numerous small villages. The inhabitants are Galla—who consider themselves the lords of the soil—and Wapokomo. As there is a good supply of food here, and a good deal of ivory, I decided to establish a depôt, leaving a headman with fifteen men in charge. I had a second reason for doing this, viz. that I might be able to leave some goods, so as to enable me to carry more food.

I paid the Galla chiefs one hundred cloths for the site, on the under-

* Of Mr. Denhardt's visit to Masa, in November, 1876, there can be no doubt.—E. G. B.

standing that should it prove unsuitable the Company should have the right to select another spot without further payment. In settling this and buying food I was delayed ten days, the Galla, whatever they got; always wanting more, and putting off the final settlement until "tomorrow."

We got away on the 9th of April, and came to Bokore. From there we went to Baza,* a Wapokomo village, where I hoped the porters would get enough food to take them four days on the road; but in this I was disappointed, as the natives either could not or would not sell. Baza is situated on an island in the river.

Here the country becomes much more hilly, and quartz-reefs crop up at frequent intervals. There is also a good deal of gneiss and sandstone.

On the 16th of April, at 7 a.m., I sighted Mount Kenia, bearing W. $\frac{1}{2}$ N. It was visible only for about five minutes. On the 17th we crossed the bed of a river, about 60 yards wide, but with only a small quantity of water in it. The water was clear, and slightly salt. On the 18th we had only four days' food left, and I made up my mind that if by noon next day we saw no signs of human beings we must return. On the next day, thinking we were going wrong, I struck in towards what I thought to be the Tana, but found that it was a much smaller river flowing from the north. As the character of the country ahead of us was to all appearance the same as that in which we were, viz. hilly, with some mimosa scrub, I resolved, much against my will, to return. On our way back we followed the course of the river which we had struck, and found that it joined the Tana about seven miles below. About a quarter of a mile from the confluence the banks are rocky, and rise to a height of 40 or 50 feet. As I do not think this river is known, I should wish it called after the Company's first Administrator-in-chief, Mr. Mackenzie, the main river being the Mumoni.†

I made most careful inquiries all the way from Golbanti to Ripa as to whether there was any stream flowing into the Tana from the north, but was everywhere told that there was not. Beyond Ripa I can speak from my own observations. The first stream is that mentioned as having been crossed on the 17th of April. I was also informed that there were no villages away from the river to the north, except one near Ripa, the Galla inhabitants of which live by hunting. Otherwise the country is entirely uninhabited.

The people as far up as Korokoro all complained of the Somali. The people higher up seem more afraid of the Wakamba. They say that the country beyond Baza was formerly inhabited, but that the people were driven away by the Wakamba. I saw no signs of its having been in-

* This is probably identical with Denhardt's Hameye, the furthest Wapokomo village up the river.—E. G. R.

† The Mackenzie river is perhaps identical with the Kilolumo or with the Guaso Nakut of Count Teleki.—E. G. R.

habited except in one place, where there were some old cattle "bomas." A few miles further on, on the bank of the river, there were a great many cairns, either graves, or memorials set up by hunters.

The Tana is navigable as far as Baza, but as it is full of "snags," and has a very strong current, it would require most careful navigation. There is plenty of fuel on the banks for steamers. Beyond Baza the river becomes rocky, and in places there are rapids.

The people all along the river are most friendly and peaceable, and seem glad to have Europeans among them. They appear to be great cowards, and a couple of Somali in the neighbourhood is enough to keep them all within their stockades. The villages are all on the banks of the river, and are, as a rule, surrounded on three sides by a stockade, the only entrance being from the river. They are afraid to keep fowls, lest the crowing of the cocks should betray them to the Somali. There are no big chiefs on the Tana, the territories at best consisting of two or three villages.

On Tuesday, the 7th of May, we crossed the Tana from Bokore into Ukamba. We had to go some distance up a loop of the river, down which a strong current was running, and although six large canoes were employed we did not get the last load over for several hours.

We then set out in a westerly direction across comparatively open country till the 9th, when we again camped on the Tana. Leaving this we passed through some hilly country covered with dense scrub, and got no water that day. At daybreak the next day we set forward, and at 10 o'clock reached a place where we hoped to get water, but only got about a pint per man. We went on again, travelling till about half-past eight in the evening. The next morning we set out again as soon as it was light enough, and marched till half-past nine, when I halted to let the stragglers come up. I was sitting at a little distance from the porters when my attention was attracted to what they were doing, and I found that all of them had untied their loads and were about going to look for water. I remonstrated in vain, and found myself left with my headmen, Askari, and about 15 porters. A good many came back in the course of the day, and I got together a force of about 100 men, all told. In the meantime some of the men found a small supply of water about three miles from the camp, so the next day, after we had cooked and eaten our food, we started, and after a time met some Wakamba hunters, one of whom consented to guide us to the nearest villages. We got water the next day about four in the afternoon, and on the 16th reached Ngomani. Here we heard that our deserters, about forty-five in number, had left the day before for the coast, having sold one of their number for food. As they had nothing with which to buy food I presume they had to continue selling each other. Before reaching Ngomani, we passed a great many deserted villages and shambas, the inhabitants of which had been driven away by the Masai.

Ngomani is a large rock surrounded by numerous villages with their shambas, but as so many shambas had only recently been abandoned, food was somewhat scarce. We remained here till Monday to rest, as many of the porters were knocked up after their fast.

On the 21st we went on to Rhy, where we heard food was more plentiful, but this did not prove to be the case, so we went on, and after passing through some well-watered and thickly-populated country we reached the river Athie (Sabaki) on the 29th, which we crossed with some difficulty, some native hunters, who came on hearing our guns, showing us the way. With the exception of some five or six miles of scrub near the river, the country is thickly populated all the way to the Company's old station at Nzoi, which we reached on the 1st of June.

On my arrival at Nzoi I sent up word to Dr. Mackinnon, at Machako's, asking him to come down and take over my spare goods and porters.

He arrived on the 7th. On the following day Mr. Bateman came in with a caravan from Mombasa, and on Monday (10th) I left. I followed the Mombasa caravan route as far as Mbuli, in Kikumbuliu, and from there struck across to the Sabaki river, which I followed till I reached a village called Makongoni.

There is a fairly good path on the south side of the river all the way, but as the country is uninhabited, no food is obtainable. Leaving Makongoni, I struck across to Mombasa, by way of Feratoyo, Mwyba, and Ribe. Makongoni is inhabited by Galla and Wasania, and the villages between that place and Mombasa by runaway slaves and Wa-Giriyama.

A few miles from where we first struck the Sabaki, the road from Mumoni, in Ukamba, to Buchuma, on the Vói, crosses and follows it as far as the junction of the Tzavo.

I would direct your attention to the necessity of preventing, if possible, the inter-tribal wars which are constantly going on. While they continue, the territory and the Company can never be really prosperous. The people on the lower Tana, between Masa and the coast, are kept in a continual state of alarm by the Masai and Somali. The Galla, from this and other causes, have become almost extinct, and the Wapokomo do not cultivate more than enough to cover their actual wants. The people on the upper river are in fear of the Somali and Wakamba. The guides from the Kituyu (Kitui) district would not venture near the Sabaki, as their people were at war with the people beyond it. And when I got to Ulu the people at one place asked me to use my influence with the people at the other end of the district to prevent them from fighting.

While this state of things continues the country cannot prosper. I do not pretend to say how it can be stopped, but, from what I have heard of the Somali and Masai, I should think that force will be required before they consent to settle down quietly.

After the paper,

Mr. E. G. RAVENSTEIN said that the Imperial British East Africa Company deserved the thanks of the Society for allowing reports like that by Mr. Pigott to be placed before them. That gentleman had considerably extended our knowledge of the Tana, which the brothers Denhardt had been the first to ascend and to survey as far as Masa. Mr. Pigott had gone far beyond this locality. He had reached not only the furthest inhabited village on the river, but had travelled for ten days beyond, until Mount Kenia rose in front of him. He was thus the first European who saw the eastern face of that giant mountain. Mr. Pigott's experience appeared to confirm the view that this mountain was nearer the coast than was generally supposed. From the upper Tana Mr. Pigott took a south-westerly course, until he reached Kitui, and other districts, familiar to students of African geography in connection with the exploits of the venerable Dr. Krapf, Hildebrandt, Thomson, and others. What struck him most in connection with Mr. Pigott's paper was the sparseness of population of this part of Africa. Even along the Tana, which was a miniature Nile flowing through a vast pastoral region, the number of inhabitants was small, and they lived in constant dread of marauding Galla, Somali, and Wakamba. Large districts had been abandoned, and day after day Mr. Pigott travelled through regions, which, although naturally productive, supported not a single inhabitant. Caravans, under these circumstances, were compelled to carry many days' supply of provisions with them, and a failure in this respect might prove disastrous. No doubt, when security of life and property had once been established, agricultural settlements would spring up along all the caravan routes, and travelling would thus be facilitated, and trade become more profitable. Mr. Pigott's expedition was followed by one led by Mr. Smith, a short account of which has already been published. Dr. Carl Peters, the leader of the German "Emin Pasha Relief Expedition," followed almost in the footsteps of Mr. Smith. Having been denied a passage through the German and British "spheres of influence," that gentleman very cleverly evaded the blockade, and landed on June 18th at Shimbe, on Manda Bay. At Vito he organised his caravan, consisting of 25 Somali soldiers, and 107 porters, with 16 camels, eight asses, a horse, and four dogs. On July 26th he started for the Tana. All appeared to have gone well as far as Masa, but during the march from that place to Oda Boruruwa the expedition nearly came to grief, as the distance was found to be far greater than he expected. As Dr. Peters had thought fit to make him responsible for this "hair-breadth escape" from a disaster, and described one of his (Mr. Ravenstein's) maps, which he carried with him, as having been constructed with "a reckless want of care," they would, he felt sure, allow one of their oldest members to say a few words in self-defence. The map to which Dr. Peters referred was evidently the one published by the Society in July 1882. Upon that map the Tana was laid down in accordance with Denhardt's provisional map, and the distance from Masa to Oda Boruruwa amounted to 32 miles, and not to 15 as alleged by Dr. Peters. The definite results of Denhardt's explorations were only published in 1884. The "reckless want of care" was all on Dr. Peters's side, who had entered an unknown region in a famine-stricken country without an adequate supply of provisions, as was the custom of all African explorers, and who had failed to provide himself, before starting, with the latest maps of the countries he was about to explore. This was all the more reprehensible as he must have met Mr. Denhardt at Lamu. The reception which Dr. Peters met with at Oda Boruruwa appeared to have been friendly. A treaty was signed, the flags from the two English stations were brought to Dr. Peters and burnt, and a station, named "von der Heydt House," was built. Dr. Peter's injudicious interference with the slaves of the Galla, twelve of whom he enlisted among his porters,

unfortunately led to a collision. The Galla "Sultan" was shot dead, the Gallas fled from their villages, their stores were appropriated, and war was thus carried into a hitherto peaceful district. This happened on October 6th. The last letter received from Dr. Peters is dated October 8th. On November 13th Captain Rust was within a couple of days' journey of Dr. Peters's station. A Somali, whom he sent overland not having returned by the 13th, Captain Rust left for the lower river. This, as far as he was aware, was the latest available trustworthy information, and it certainly afforded no evidence of a disaster; for long before the arrival of Captain Rust's messenger, Dr. Peters might have departed for Kitui, as he had intended to.*

Mr. P. L. SCLATER, F.R.S., exhibited two specimens of the heads and horns of a new antelope obtained by Mr. H. C. V. Hunter, F.Z.S., when on a shooting expedition along the north bank of the Tana river. Mr. Sclater had named this species *Damalis hunteri*, after its discoverer.

Mr. DIGBY PIGOTT said that private letters he had received from his brother showed how extremely easy it was for a man to get into difficulties in that district. When his brother reached a little north of Malundi he was met by a chief, who came with 200 men with guns, and said if he went any further he would be killed. At the end of two or three days, however, he succeeded in getting on very well with the chief. A little further up the same sort of thing occurred. He was taken possession of, and told that he must produce rain or take the consequences. He pointed to his own exhausted provision store as a proof that he possessed no miraculous powers, and recommended the natives to take their cattle down to some fertile districts that were quite uninhabited. In either case a very little impatience or want of tact might not improbably have led to bloodshed.

The Chinde River and Zambezi Delta.

By DANIEL J. RANKIN, M.R.A.S., Ex-Acting Consul at Mozambique.

(Read at the Evening Meeting, Jan. 20th, 1890.)

Map, p. 192.

ON July 28th of last year I landed at Quillimane. Sir Donald Currie had very kindly given me a note of introduction to his agent, Mr. J. D. Schippers, who is also agent-in-chief of the Oost Afrikanische Cie., a well-known Dutch firm on the Zambezi and East Coast. Mr. Schippers received me with the greatest kindness, and for his hospitality and the many times he ungrudgingly put himself to inconvenience to further my plans, I owe their success and a very great debt of gratitude to him.

Of Quillimane I need say little. Its mud, its fever, and its mosquitoes have been the theme of every visitor. Its delicious oranges, its mango groves, and its delightful avenues have been described to satiety.

The Obras Publicas have been busy the last year draining the swamp on which the town is built. A wall has been erected along the river-front of the town and tastefully laid out; but I fear it will only prove

* It appears from trustworthy information since received that Dr. Peters has turned up in Ukamba, where the British Company has several stations.

temporary, and that a few rains will resolve it into the normal state of mud and swamp that reigns in this part of the world. It is strange the authorities have not attempted to erect a wharf here, nor even supplied mooring buoys, either of which would prove a great and needed boon for commerce in this port.

The lower reaches of the Quaqua are not unpicturesque, though one must indeed be an enthusiastic lover of tropical Africa to detect their beauties. From Quillimane to the sea, the vicinity of the river is a flat, sodden swamp, covered with diminutive mangroves. Here and there is a poor shelterless hut, built of straggling rushes and broken palm leaves. In front of this wretched abode is often a group of natives gazing at the passing steamer; the mother with a dirty handkerchief around her waist surrounded by her little naked children, the father mending his paddle or fishing-line in the background; a family whose only home is the dreary swamp, and companions the hermit crabs and screaming curlew.

Above Quillimane the river becomes shallower. The tidal influence extends as far as Mogurumbo. Some considerable distance beyond Mogurumbo the river divides into two small insignificant channels, the Mutu and Barabanda. The surrounding country is a low-lying plain, merely a swamp during the wet season. The water from the Achigunda and Shimwara hills on the north flows over it, a portion being drained off by these channels; the remainder is evaporated by the sun or absorbed by the sodden ground. Whatever it has been in former times the Quillimane river cannot now be strictly termed an outlet of the Zambezi, as its waters are the drainage of the Shimwara and Achigunda hills and the Bororo highlands.

The use of this waterway for navigation is fraught with many serious difficulties. At Quillimane there is a very strong tide running, and sometimes a choppy sea; while there is nothing but a primitive stone causeway to discharge the lighters upon. Then a slow journey to Lokoloko in lighters and transhipment into dug-outs.

These primitive craft are constantly suffering disasters from hippopotami and unskilful management. Theft, too, forms no inconsiderable item in the loss of goods and produce carried by them. From Mopea every bale must be divided into a number of loads of 50 or 60 lbs. weight for land portorage.

During the wet season these six miles overland are made through a veritable quagmire of mud and reeds. The only wonder is that any perishable goods or produce should have survived the guantlet of so many perils, and at least 60 per cent. suffer damage or loss.

Above Maruro, on the left bank of the Zambezi, the country becomes hilly and broken. From this, until the sea is reached, the country assumes all the characteristics of the alluvial deposit of a large river, with no elevation over 100 feet.

The importance to the commerce of the vast tract of country com-

prised by the Zambezi basin of cheap and rapid means of communication with civilised markets can, I think, be scarcely over-estimated.

Quillimane, as a port for trade with the interior, is manifestly altogether inefficient. Surrounded as it is by swamps, railways under present conditions are impracticable; while the water communication is unsuited to successful navigation even up to the point where it loses itself in a swamp.

It is all important to consider, when speaking of the prospects of trade in this part of Central Africa, the stifling and deadening effect resulting from the exclusive use of this port for communication with the interior markets, and it may be taken in itself as a strong argument of the indifference of the Portuguese to their real interests, in that they have not, with the brilliant exception of their ex-governor-general Captain Castilho, directed their attention to the great advantages offered by the use of the Zambezi and its outlets. Fresh fields for commercial development are, at the present day, eagerly sought for, and it appears mere short-sightedness to suppose that this rich country will long be kept shut to the civilised world.

The Kongoni mouth of the Zambezi is, although quite navigable for small vessels of about 12 to 14 feet draught, unsuited for even the present exigencies of trade. Coast steamers, except of very light draught, cannot enter. The nature of the mouth also is against its use for the proper development of trade. For two or three miles from the sea this part of the delta consists of nothing but the most hopeless kind of mangrove swamp, for the most part inundated every high tide. It is covered to a great depth with soft alluvial and vegetable debris. Moreover, the island of Inhamissengo is being rapidly submerged. The agent's house of the Oost Afrikanische Cie., when I visited it in 1883, was several hundred yards inland; on my second visit last year it was under the sea. The channels connecting it with the main-stream have many obstacles to navigation; the bars of both the Madredane and Mosella are only crossed with difficulty by the lightest craft.

The Madredane channel is about three miles in length, very narrow, and so choked, at times, with reeds and aquatic vegetation, that a passage has not unfrequently to be hewn through before progress is possible.

Of the Mosella little is known. The *James Stevenson* paddle boat of the African Lakes Company has traversed it only once or twice. It is a fairly broad channel, but at its confluence with the main stream it has a bad bar.

Two miles below the Madredane, and some 13 miles from the sea, is the port custom house. The settlement was named by Captain Castilho, Conceição, he having transferred the custom house here from Inhamissengo island, where it was formerly established. For a year previously the Oost Afrikanische Cie. had an agent here.

For the convenience and encouragement of shipping—about three or four vessels enter during the year—Captain Castilho has erected a very serviceable and superior wharf, alongside which vessels can moor in $2\frac{1}{2}$ fathoms, low water. There is also a telegraph, communicating with the bar; a telephone, however, would, from a practical point of view, have answered infinitely better.

The residents are chiefly Goanese customs officials, the agents of the Oost Afrikanische Cie. being the only Europeans. A few natives have begun to settle near the whites. The African Lakes Company have occasionally one or more of their agents down to repair their steamers.

At Conceição the stream is split up by a number of islets and mud banks, making navigation both intricate and difficult. Hence to the sea the country is rarely more than a huge mangrove swamp, exhaling poisonous and miasmatic vapours that have already proved fatal to very many white visitors.

The Melambe, East Luabo, Catherina, and Maria mouths, are, as far as is known, apparently closed to navigation, the sea breaking upon their bars at all tides and conditions of weather.

Seeing then the difficulties attending the navigation of the Quillimane and Kongoni ports, I will ask your kind notice of the one remaining channel, the Chinde river, the advantages of which I have been the first to bring before the public.

The bar had on it during last rainy season, some three fathoms, low water, with a good, broad channel, 500 yards in width. The *Stork* reports during last dry season, seven feet low-water springs, with easy access and a broad channel. This latter we may confidently take as the minimum, for it represents the depth during an exceptionally dry season. This gives 20 to 23 feet high-water, so that it compares favourably with the bar at Natal and indeed with two-thirds of the river-bars in the world.

With this depth no vessel of a similar class to those now trading on the coast will experience any difficulty in entering.

The channel is well defined. It is close to the shore, on which are distinctive natural land-marks. This is of some considerable advantage on a low-lying coast-line like the delta, where it is hard to distinguish one part from another until close in shore.

Inside of Foot Point* is a good anchorage, sheltered from all winds. This offers the most suitable site for the transhipment of goods and produce.

By using this entrance a sea-going vessel can tranship at once to and

* This point being without a local name I have taken the liberty of naming it after one who gave up his life in seeking to benefit Africa, and whom I shall never cease to remember as one of my earliest and best friends, Captain F. C. Foot, R.N., late H.B.M.'s Consul at Nyassa.

from the craft plying on the Zambezi, while vessels of four or five hundred tons burthen can proceed immediately from the sea to the main stream of the Zambezi itself.

When compared with the difficulties that have hitherto attended the Zambezi trade, this new route to the interior offers every possibility for the extensive development of the resources of this vast tract of country. It will indeed place trade in this part on an entirely different and superior basis, and should the navigation at the same time be made free, and unfettered by the artificial restrictions and burthens now imposed upon it, it is difficult to predict a possible limit to its growth and importance in a few years.

Foot Point is low and sandy, and free from the fetid mud and mangroves that make the Kongoni mouth so prejudicial to the health of Europeans. Indeed, it may safely be said that this will prove the most healthy site for residence in the whole of the delta.

Both monsoon winds blow directly from the sea. There is thus infinitely less fear of the deleterious effects of malaria than at Quillimane, where every breeze that blows is poisoned by the miles of swamps it has travelled over.

From the mouth to the main-stream of the Zambezi is, in a straight line, about ten miles. The channel, however, winds considerably, but has nowhere less than two fathoms in the dry season, and is of sufficient breadth to admit of its navigation by vessels of about 500 tons burthen. The banks are low, and covered with mangroves near the sea, and jungle grass higher up.

Three miles from the sea the Inhamacatius and Maria branch off and join the Zambezi, some four and eight miles above its confluence with the Chinde. Their channels are, however, I am informed, unsuitable for the navigation of larger craft than small lighters and boats.

Seven miles from the mouth, on the Chinde river, is Sumbo, the residence of Senhor Augusto C. Paiva d'Andrade, a relative of Lieut-Col. Joaquim C. Paiva d'Andrade, who is well known in connection with the Zambezi basin.

The former gentleman treated me with the greatest kindness during my exploration of the Chinde outlet. He furnished me with a lighter on two occasions, and did all in his power to assist me. He is doing valuable work in experimenting in agriculture, and a visit to his tastefully laid-out estate demonstrates without doubt the valuable and prolific resources of this alluvial region. In his garden are to be seen rows upon rows of grape vines, mango, casheu, orange, lemon, guava, and many other fruit trees. The rubber tree, mulberry, sago, indigo, sugar cane, palm trees, oil seeds, tomatoes, coffee, and many other plants of commercial value are to be found scattered over his well cared-for estate, showing that there are many parts of this region well worthy the attention of the agriculturist.

At the confluence of the Zambezi is a large and flourishing village named Chinde, from which the channel takes its name. The main stream is here about a mile in width, with from three to five fathoms during the dry season. From the Inhamacatiua river, the stream is strewn with islands, and increases in width. There is always a good channel with from two to four fathoms till Maruro is reached. Here, during the dry season, lighter draught craft will continue the navigation to the upper waters of the Zambezi and Shiré, for Lake Nyassa. During the rainy season the craft used for the lower river will sometimes be able to run the whole distance, but it is better to tranship at some point in the vicinity of Maruro, which is less than a day's steam from the Shiré confluence.

For the lower navigation, steam vessels of two or three hundred tons burthen are suitable. For the upper, paddle boats not exceeding 50 feet in length or 12 to 18 inches in draught are necessary.

The banks and channels of the main-stream are continually undergoing change of direction, under the influence of the immense volume of water that rushes down in places at a rate of five or more miles an hour.

The greater part of the delta is made up of gently rolling grass-country. The depressions during the rainy season are covered with water. These if systematically drained, would furnish excellent and extensive fields for rice and sugar cultivation.

Towards the sea-board the altitude gradually decreases until a belt of country, more especially on the right bank of the main stream, some 10 miles and more in width, is submerged by high tides and floods.

These inundated districts consist of a light-coloured ooze, impregnated with vegetable matter. They are densely covered with mangroves that hedge in the channels with thick unbroken walls of vegetation, bordered at low water by banks of vegetable slime and mud. Away from the water the country is covered with rank grass and stunted bush.

The delta is not at all thickly populated, nor are the majority of the people, I believe, indigenous, but have been drafted from time to time into this region from the interior as slaves. The language as well as the features of the present inhabitants support this view. The pure Mahindo dialect, which was evidently the original language, is being fast lost through intermixture. The route that has been used is the one known as the Matapwiri, from the fact that it passes through this village at the northern extremity of Mount Milanji. I had the honour of describing this route before the Society in 1885, and it is along it that very many of the parents of the inhabitants of this delta have been drafted.

Their social condition is perhaps inferior to that of the Nyassa tribes. At all events, they have lost most, if not all, of their former industries, such as cotton-weaving and iron manufacture. Their

attitude of abject servility towards the whites, and more especially the half-castes, is very noticeable, and to an Englishman it often excites feelings akin to indignation.

The delta has few attractions to the lover of the picturesque. There is certainly a primeval look about the dense untrodden labyrinths of mangroves. But the gaunt, slime-bedaubed roots of the mangrove are not beautiful. Nor is it pleasant to breathe in the fetid miasma that, oozing from the slime, may carry the death-germ.

For the sportsman there are abundance of water buck and wild pig on the larger islands, while many herds of buffalo have their home on the right bank above Conceição. The rivers, too, teem with crocodiles and hippopotami.

These latter have many victims. Scarcely a week passes but some one is seen bewailing the loss of a relative devoured by a crocodile or crushed to death by a hippopotamus.

Two or three people will sit in a canoe so that the crank craft is almost gunwales under. Travelling thus, with stolid indifference to the ever-present peril, often there is a quick ripple, a shriek, a splash, and one passenger less, and the grim tragedy is repeated week after week.

Then, too, it is very dangerous to get amongst a herd of hippopotami, especially on a dark night, when it is so difficult to avoid them. Without the slightest provocation or warning an inoffensive water-party will be tossed starwards and emptied into the black river. I have seen a canoe crunched like matchwood and flung with its occupants high in the air by one of these brutes. While I was near Conceição four stalwart brothers went out one dark moonless night to paddle up-stream. Before they were aware, they were amongst a crowd of black monsters looming in the darkness of the river. A vicious bite crushed their bark, and not one of the brothers escaped.

To give some idea of the experiences a traveller or explorer goes through in this land of swamps, I will, with your permission, endeavour to describe one day in my life out there.

It was the wet season in the beginning of this year, about six o'clock in the evening. The atmosphere had turned suddenly chilly, as it generally does on the eve of a storm. Ugly black clouds, flecked with white, scudded across the sky. Flocks of black geese passed overhead to their favourite haunts on the sandbanks of the Zambezi. Multitudes of tiny birds sought shelter beneath reeds and bush. Not a breath of wind ruffled the quick-flowing current, or bent the most slender of the grasses.

I was in a crank dug-out, cramped up with my chin on my knees. Four blacks were ploughing up the river with their paddles in front, and my boy Alfan sat behind me steering with a broad-bladed paddle. The rank reeds on either side of the narrow channel rose up out of the mud some eight or more feet. Often a sharp bend would bring us near

a huge crocodile lazily sleeping in a bed he had wallowed out for himself in the reeds. On again, past a dead tree half undermined by the current, its lifeless roots in the air and its leafless branches covered with long-necked white-plumed birds.

We were all hungry, tired, and dispirited. I was cramped with so long sitting in the narrow craft, where the slightest change of position imperilled the safety of the whole concern. None of us was certain how far the next village might be, and we hoped that every bend—the river seemed all bends and curves—would reveal to us the welcome sight of a group of brown huts nestled in a grove of broad-leafed banana trees.

This was but one of many occasions that I had to pass the night, or part of it, in a pestilential swamp, wet, hungry, and shelterless. It soon began to rain. The first big drops fell one by one, then the inky cloud overhead suddenly released its flood of water in a torrent over the swamp and river. The night became intensely black, so that I could neither see the paddlers nor the banks. The men made the canoe fast to a clump of reeds which sheltered us slightly from the violent wind. The din of the frogs and crickets, that had been piercing a moment before, was now drowned by the hissing and seething of the rain on the water.

The flashes of lightning showed clearly the crouching forms of my crew. Shielding their shoulders with their hands from the cutting rain, teeth chattering, and their dirty loin cloths soddened and clinging to their limbs, completed their pose of utter misery. Thus we waited for two miserable hours until the fury of the storm had passed. By this time the canoe had become partly filled with water, and we had perforce to sit in a cold, comfortless pool of water, that swished backwards and forwards under the impetus of the paddles when once we were under weigh again.

The rain came down more gently, and soon ceased altogether. The bright stars glanced out between the soudding clouds. The banks became visible as a black wall against the sky, bespangled with fire-flies. Frogs croaked and tinkled lustily, and the crickets chirped with renewed vigour.

My crew started a canoe song, consisting of modulated grunts ending in a noisy chorus. We made good headway, and in a short time were glad to see, on a slight elevation in the banks covered with a few trees, a canoe fastened and a little red fire flickering. Solid ground promised us a dinner, and we were not long in running alongside the other canoe. The men jumped out into the mud and hauled me well up, so that by grasping an overhanging tree root, I was able to jump on the bank.

As I stood over the fire, my men soon made to boil our meal of fowl and rice. The moon, now near the full, burst out from the bank of

storm clouds disappearing in the west. A mimosa tree overhanging the river, swaying gently in the night breeze, scattered its load of rain-drops on the water below. Here and there in the swampy wilderness rose up from the rushes a lightning-blasted tree, its gaunt, blackened arms covered with great white birds.

The occupants of the other canoe were a strong, brawny negro, his wife, and three little children. The woman and children were sitting by the glowing embers of the fire, warming their naked bodies and eating the cold remnants of a bowl of rice with some fish they had warmed in the ashes. The man was busily carrying his household utensils and effects down to the canoe ready for departure.

The wife and children embarked, the father then untied the grass painter from the tree-stump, waded down through the sticky mud, and with a push and jump, sent the party out in mid-stream. Sitting in the stern, a few lusty digs of his paddle took the whole family out of sight.

Continuing our journey, the stream began to widen, and the banks to present more the appearance of solid ground covered with stunted trees and bushes. Half an hour racing down with the tide, which had turned in our favour, brought us suddenly out on the main stream of the Zambezi. In the moonlight it was like a great lake, the opposite bank being indistinctly seen as a black line dividing the starry sky and dark water.

Our course lay across the wide river. The men put their whole strength into their work, and churned the water into foam alongside with every dip of their paddles. Crossing the Zambezi at night in a small canoe is perilous and greatly dreaded by the natives. Many lives are sacrificed every year in attempting it, owing to the hippopotami and crocodiles.

Fortunately for us we were not molested. After a time the opposite banks grew more distinct, and the strains of tom-toms reached us over the water. A few minutes brought us opposite to a large village where we were to stay the night and next day. A number of canoes laden with oil-seeds, mostly for the Dutch house at Conceição, were made fast to the banks. A messenger was sent to announce the arrival of a white man, and soon the chief made his appearance. A hut was immediately offered me, and I had a good night's rest.

Life in this world of swamp and solitude has few charms for a European, and for the native it is too often but a weary struggle with hopeless wretchedness and ever-present death.

Captain WHARTON, R.N. (Hydrographer to the Admiralty) said that the majority of rivers in Africa had bad mouths, and there was always a difficulty in making use of them as highways into the interior. If the Zambezi were navigable it would afford a good highway into a region which was at the present time particularly interesting. But it had particularly bad mouths. It was liable to heavy floods every rainy season; the river rose some 15 or 20 feet, islands were swept away,

new channels were formed, and when the floods subsided everything was changed. At those times the mouths also underwent change; bars were swept away in places, but when the east wind came again the sand was once more packed up, and the entrance was comparatively shallow. All the mouths had been examined at different times, though they had not been closely watched. At one time one mouth was deeper than the others, and three or four years afterwards the circumstances were changed. Hitherto, so far as he knew, no mouth had been described as having so much water on it as Mr. Rankin had stated. That mouth had been known to the Portuguese for many years, but no particular attention had been called to it. There was 18 feet of water there when Mr. Rankin passed, but when the *Stork* examined the river in June last there was only seven feet. Even seven feet was more than the Kongoni had, which was only two feet at present. But whatever happened to the mouths the goods must be transhipped, because in the upper reaches of the Zambezi in the dry season there was only two or three feet of water. Specially designed steamers must be used, drawing not more than one foot six inches, and when trade required it there would be no difficulty in making suitable arrangements as in other similar rivers, but the chief difficulty would be the bars, and he wished to warn against the assumption that the present depth on the Chinde bar would be maintained.

The Rev. HORACE WALLER said that Mr. Thornton, who travelled with Baron Von der Decken, used always to speak of Mount Kenya as Mount Kenia. He wished to congratulate Mr. Rankin on having established the fact that at the present time there was a good entrance to the Zambezi, but the river was continually shifting. Sir Anthony Hoskins, at present in command of the Mediterranean fleet, many years ago navigated the East Luabo river for a considerable distance, and he was most sanguine that it led into the Zambezi. The Portuguese seemed to know nothing of those rivers. Mr. Rankin had done very good service in pointing out that the Quillimane estuary was not the recipient of any Zambezi water at all. The reason why the Portuguese, down to a very recent date, had been contented with the port of Quillimane was that the merchandise came there on two legs—slaves carried ivory. He remembered when he went across to Maruro, Bishop Mackenzie had died, and his sister, who had come to Africa to join him in his work, brought a donkey with her. He (Mr. Waller) was at that time in a very low state from fever, and found the donkey useful. One night he rode inland, and three or four natives coming in the opposite direction, not knowing what sort of animal it was, took refuge in a tree. They had never seen a person riding before. Above Maruro the Zambezi is a very wide river, but that must not deceive them into thinking that it was very navigable. From May to November the river might be compared to a great sandy desert, with a few streams running here and there. It would never be of much use for large vessels. The telegraph cable laid down from the Zambezi coast was broken several times, and he had heard that there was a great chasm at the bottom of the ocean. Approaching the coast the water generally shoaled about a fathom a mile, and the rollers were among the most terrible in the world. The sea broke at seven fathoms. He had seen a vessel riding four miles outside the Kongoni bar have to get up steam for fear of dragging anchors. He believed there were more mosquitoes to the cubic inch of atmosphere there than in any other part of the universe. Nature had put them there as warning-boards that visitors had better go inland or out to sea. In such a case mosquitoes and malaria seem to form a kind of joint-stock company to destroy European life.

Captain V. L. CAMERON, R.N., said that the map of the mouths of the Zambezi reminded him of the mouths of the Mississippi. Twenty-eight years ago the Ponchartrain Canal was something like the entrance at Quillimane, while the south-west pass of the Mississippi mouth was the chief entrance, but some of the

ships that took the Federals up had to be lightened and towed across the bar. By means of training-walls, however, the main waters of the river had been drawn into one channel, and now the south-west channel was open for ocean steamers, which could go straight up to New Orleans. When the mouth of the Zambezi was properly attended to it also might become a navigable river. The mass of water that came down in the rainy season would always keep some mouth open. Mark Twain had described the flat-bottomed steamers with stern-wheels on the Mississippi, and with similar steamers it might be possible to ascend the Shiré as far as the Murchison Rapids at any time of the year, and the main river as far as the Kebrabasa rapids. The great point was to find a convenient port where the ocean-going boat could transfer her cargo to the river steamer. He believed the mosquitoes on the Mississippi were even worse than those on the Zambezi. Neither mosquitoes nor sand-bars ought to be allowed to stop enterprise on such a highway as the Zambezi. It was a great mistake that the people on the Nyassa ever went by Quillimane, because they instantly dropped into the hands of the Portuguese as regards custom-house dues. If they had kept to Lord Clarendon's declaration they could have unshipped their goods and sent them across one of the bars of the Zambezi and have kept clear of all interference.

A Recent Journey in Eastern Mashona Land.

By F. C. SELOUS.

Map, p. 192.

MR. SELOUS has sent us his sketch survey, from which the accompanying map is drawn, of the portion of Mashona Land traversed by him in his journey of last year. The following letter is in further explanation of the topography of the region:—

CAPE TOWN, 9th Dec., 1889.

I have just returned here from a journey to Eastern Mashona Land, which I reached from Tete, on the Zambezi. With two companions, Mr. Burnett and Mr. Thomas, the latter an experienced miner, I reached Quillimane on July 16th last, where it took three days to get our things through the custom house. From Quillimane we went by boat up the Quaqua river as far as Lokoloko, and from there walked over to Vicenti, on the Zambezi, where the African Lakes Company have a station. From Vicenti a fourteen days' journey by boat took us to Tete. Here we engaged porters and started for Mashona Land, and as all the country between Tete and the head of the Mazoe is most incorrectly laid down on the most recently published maps, the sketch-map which I send you may be of some interest.

After leaving Tete, and until we had attained an elevation of about 3500 feet above sea-level, we found the whole country very dry, barren, and scarce of water; for although we crossed numerous river-beds, most of them were quite dry, and in the others we only obtained a little water by digging holes in the sand. Speaking generally, this part of the country is very broken and hilly, though thickly covered with forest, and, owing to the scarcity of water, very sparsely inhabited. Between Tete and Inyatsutsu we followed nearly the same route as that

taken by Mr. W. Montagu Kerr in 1884, but we afterwards struck to the south and crossed the Luia, a river which is almost equal to the Mazoe in size and importance. The natives say that this river, the Luia, is richer in alluvial gold than the Mazoe. Inyatsutsu is close to the northern extremity of the Vunga Hills, and is, I believe, the same spot as that marked Vunge on Mr. Ravenstein's map, where Dr. Livingstone passed in 1853 on his journey from Zumbo to Tete.* From Inyatsutsu I could see Mount Bungwi quite plainly, and took a compass bearing to it. The Marengi or Umrengi (the Molinji doubtless of Mr. Ravenstein's map) is a miserable little dry river, and is a tributary of the Daiki. It (the Marengi) rises, as I have marked it, in the Vunga range of hills. The course of the Daiki, and also of the Mudzi, I have laid down according to information I received from a black trader, an intelligent man speaking Portuguese.† He seemed intimately acquainted with the country. I am sure that I am correct in marking the Kangudzi as a tributary of the Mutangwa, which in its turn is a tributary of the Luia. Some hunters from Daingi, who were intimately acquainted with the country, gave me much information, which I checked on our return journey from information received from the people living near the junction of the Luia and Mazoe, who pointed out to me whereabouts the Mutangwa joined the Luia.

After reaching Mount Inyota, on which is situated the town of the Makorikori chief Maperondera (who was visited in 1884 by Mr. Montagu Kerr), Mr. Burnett and myself went down to the Mazoe, and followed it right up to its source, which is not very far from Mount Hampden and very far indeed from where it is marked on the latest maps. From there we went to Mount Hampden, as I wished to join my routes from the east and the west, and thence down the Umrodzi river, back again to Inyota. I have now discovered that the hills which were pointed out to me in 1885 and 1887 as Wata's Hills, and to which I took compass bearings from Mount Hampden, are in reality the range of hills through which the Mazoe runs about ten miles north of its source. I have now been to the real Wata's Hill and taken many compass bearings on to it from different points. What has been pointed out to me as the source of the Mazoe proves to be really the Tataguru. The real source of the Mazoe is as I have marked it on the present map. It rises in a swamp, not on the high plateau, but at the head of a valley, two or three hundred feet below the level of the high country. This year I got information about a place, or rather a chief, called Sakatuku (this must be the Sakatoko of Herr Mauch) who, the natives say, lives on the head-waters of the river Rua, a tributary of the Manyame. I crossed the Rua on my journey to the Sabi in 1883. The river Inyagui they say rises near

* Mr. Turner, the compiler of our map, thinks this identification, and that of the Molinji with the Marenga, very doubtful; he cannot make their positions coincide.—[Ed.]

† These rivers were crossed in part by Capello and Ivens, and are inserted at those parts in accordance with the map of their journey.—[Ed.]

Mangwendi's town, not far from the source of the Rua. I heard of this river as a large tributary of the Mazoe in 1883, and marked it down in my little sketch-map. Now you will see that Mr. Burnett and myself crossed the Inyagui (pronounced In-ya-goo-ee) at its junction with the Mazoe, where it is a fine stream fifty or sixty yards broad, flowing very swiftly amongst great boulders of rock. At the place where the two rivers join, the Inyagui is quite as large as the Mazoe, and brings down quite as much water. A little below the junction of the two rivers the Mazoe becomes a fine river, full of large deep pools several hundred yards in length by 150 in breadth. In one of these we shot a hippopotamus bull—about the last of his race in the Mazoe, I think.

We rejoined our companion, Mr. Thomas the miner (who with our interpreter had followed our old route back, in order to examine some old gold-workings), at Chibonga's kraal, and from there we travelled together to Rusambo's town. From Rusambo's we again struck down to the Mazoe, which we found had opened out into an immense sand river, with a bed about 300 yards wide, down which there ran only a very small channel of water from four to six yards broad, and from six inches to a foot in depth. As dense bush grew on each bank of the river, we now had to walk for three days down the bed of the Mazoe, in deep soft sand, dreadfully fatiguing to walk through, and under a terrible sun. You will imagine that it was pretty warm work. Before reaching the Ruenya we passed the mouth of the Luia, which had become an enormously broad sand river with no surface water at all.

I never saw so much lion spoor in my life as in the bed of the Mazoe near the mouth of the Luia. Mr. Burnett saw five, all large full-grown animals, in the open bed of the river, and got a long shot at them. They had just killed a monkey, and were lying round it. I just missed seeing them, as I had gone into the bush to look for a bushbuck. However, this is not geography.

Just at the junction of the Ruenya and Mazoe rivers, the bed of the former is about 150 yards broad, that of the latter about 300. But whereas the Ruenya, even at the time of year when I saw it, which was towards the end of the dry season, brings down a fine stream of water about 60 yards wide and several feet in depth, rushing like an alpine torrent amongst masses of rock, in the Mazoe there is only a very meagre stream of water, a few yards in breadth and a few inches in depth. Just at the junction of the two rivers there is a small fall in the Ruenya, and below this fall the whole river is narrowed into a deep channel only a few yards in breadth, which it has cut for itself through a mass of solid rock, and through which the water rushes at a terrific speed. The place reminded me of Kariba Gorge on the upper Zambezi, though, of course, everything is here on a smaller scale. The Ruenya soon opens out again into a channel about 60 to 80 yards broad, always running very swiftly through terraces of rock. We followed the Ruenya down to its junction

with the Zambezi, and then walked along the bank of the latter river up to Tete.

The map I send you, you must take for what it is worth. It is better than nothing; that is all I can say for it, and I do not know exactly how you will square it on to the published maps, as I make the distance from Tete to Mount Hampden greater than it ought to be. It may seem presumptuous to say so, but in my own mind I feel sure that I have underrated, not overrated, the distance. I believe that it will ultimately be found out that the Hanyane (or Manyami) river, Lo Magondi's town, Mount Wedza, and the whole of eastern Mashona Land, ought to be placed further to the west. My own sketch-maps of Mashona Land have all been based upon the supposition that the positions of Lo Magondi's town and Mount Wedza were correct. Every step of my route this year I have timed most carefully by the watch. You must remember that I am a very fast walker when the path is good, but under the most favourable conditions I have never allowed more than three geographical miles to the hour of actual walking, and usually from two to two-and-a-half in rough country or where the footpath is winding. From Busambo's to Maziwa's I have made 33 geographical miles. This bit we did twice, and both times I made it 14½ hours' actual walking at a very fast pace. The whole journey in fact has been very carefully timed. Now, from the mouth of the Buehya to Tete is made to be about 20 geographical miles on the best published maps. Mr. Burnett and myself walking fast did it in ten minutes under six hours. However, time will show, and when we have the railway up to Mashona Land I suppose we shall know all about it.

One note more. A Kafir carrying letters from my camp on the Manyami gets to Emhlangen in the Matabele country on the eighth day; but starting from the same place to Tete, a Kafir (or even relays of Kafirs) could not do it under twelve days, namely: two days to Inyota; four from Inyota to Busambo's, and six from there to Tete. Yet according to the published maps, from the Manyami to Tete is only about 40 geographical miles further than from the Manyami to Emhlangen. By placing Wedza a little more to the west, and making the Manyami run more north and south, as according to my compass bearings it really does, I could get my different sketch-maps to agree very well together. Between the Zambezi and Inyatsutsu, I could not get many compass bearings, as the country was very hilly, and always thickly wooded, without there being any conspicuous landmarks; but from Inyatsutsu to the source of the Mazoe, I took a great many compass bearings with the prismatic compass lent me by the Royal Geographical Society. In making the map, I have reckoned the error of the compass to be about 20 degrees.

I have named two conspicuous hills, Mounts Darwin and Thackeray. I have done this because the Portuguese claim the country, which they

know nothing about (as their maps prove), and where the natives say no Portuguese has ever travelled. We claim the country too under the Queen's charter, and we mean to have it, and as an Englishman travelling in an unexplored country, I think I have the right to call any conspicuous mountain by the name of a distinguished Englishman. Such names on the map, at any rate, will show that Englishmen have been there.

As to my altitudes, I suppose they are not worth much. I had my aneroid set in Cape Town at the Observatory. At Tete, which, in the Portuguese official report is said to be 148 metres, or about 530 feet above sea-level, I found that my aneroid, when the weather was fair, stood at about 550 feet early every morning, going up to over 700 feet in the heat of the day, and when rainy weather came on going down to about 300 feet. Thus all my altitudes are taken by the lowest reading in the twenty-four hours. We left Rusambo's on September 1st, and the aneroid then marked 2900 feet. Returning on September 10th it marked exactly the same three days running early in the morning. After this the weather got much hotter, and upon returning to Rusambo's from the Mashona country in October the aneroid read 300 feet higher. I have therefore deducted 300 feet from all my readings west of Rusambo's. Altogether you will think my aneroid readings are not worth much. Perhaps not, but I think it will ultimately be discovered that much of the Mashona plateau is nearly, if not quite, 5000 feet above sea-level.*

A Journey through the country lying between the Shire and Loangwa Rivers.

By ALFRED SHARPE.†

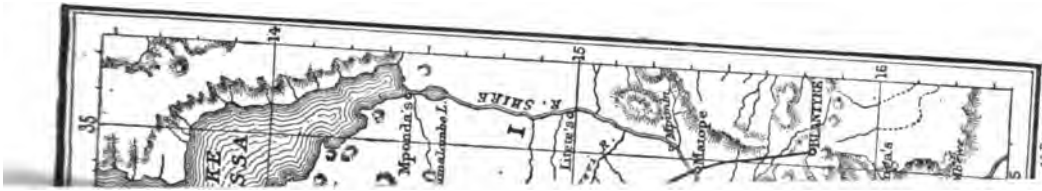
I LEFT Blantyre in the Shire Highlands, on August 22nd, 1889, with a caravan of seventy-four men, intending to travel through the country lying between the Shire and Loangwa rivers (the latter running into the Zambezi at Zumbo).

Crossing the Shire at Matope, a short march of eight miles brought us to the village of Seweza, where we bought a food supply to last us five or six days. Travelling due west from Seweza, we crossed the Lisungwe river, a fine little stream rising in the Kirk Mountains, and flowing into the Shire at Chirala, and commenced the steep ascent from the Shire valley, reaching the watershed between the Shire and Revubwe rivers on the 28th August.

The Kirk Mountains are not a range as they appear to be when

* Mr. Turner has adopted the position of Tete given by Dr. Livingstone and Messrs. Capello and Ivens, and for Mount Hampden he takes that given by Mr. Selous in the map of his journey of 1883 ('Proceedings R.G.S.,' May 1888), correcting the intermediate positions by the compass bearings supplied by him.—[Ed.]

† Communicated by Otley Perry, Esq., F.R.G.S.



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looked at from the east, but merely the abrupt descent to the Shire valley from the highlands lying west. They are a continuation of the wall which, starting in the Konde country at the north end of Lake Nyassa, runs down the whole of its shores, and forms the western edge of the trough in which the lake lies. Following the watershed for a day, and then travelling north-west, I crossed the track of Mr. Montagu Kerr at the village of Deuka in the Angoni country.

The ascent to the watershed is through very pleasant country, well wooded, and with plenty of water; but when the top is reached trees disappear, and the gentle slopes on the western side are bare grass. While in the woodlands I saw elephants, and after entering the bare moor-like country, was seldom out of sight of game.

The inhabitants of this southern portion of Angoni-land, though calling themselves Angoni, are in reality Achewa who have given in their submission to the Angoni and are allowed to live in peace. All the larger villages have headmen from Chikuse's living in them. Chikuse is the king of the Angoni living south of the lower end of Lake Nyassa. His own kraal is situated two days' journey south of the south-west corner of the lake.

On August 31st, during the night, I was deserted by thirty-seven of my carriers, which compelled me to leave half of my loads in an Angoni village, and to take the chance of my recovering them on my return.

The Revubwe (or Revugwe as in Perthes' map) was crossed on September 2nd, a little below where the Chère joins it. It is a stream of considerable size, having occasional deep, rocky pools, which afford a home to a few hippopotami. It takes its rise in the mountains lying north of Chikuse's kraal, and flows into the Zambezi near Tete. Even in the driest season it always has a good volume of water, and in the rains must even here—far up its course—be a large stream. Its bed is full of rocks, worn in many places with deep holes or "pots." The width where I crossed was about 20 yards.

Seventeen miles north-west from where I left the Revubwe another stream was crossed, of about the same size and character, the Lifidzi. The sources of the latter are among the mountains west of Chikuse's, which on the northern side of their watershed supply the head waters of the Lintippe river (flowing to Lake Nyassa).

The Diampwe river, marked in the map accompanying Livingstone's last journals, cannot rise so far south-east as there shown.

After crossing the Lifidzi, a few more so-called Angoni villages were passed, and then commenced the uninhabited belt which invariably surrounds Angoni country. Wherever these people have settled they have driven back the original inhabitants. They have a regular war season, commencing about August (when the crops have all been collected, and the burning of the grass throughout the country has rendered travelling easy), and ending in November, when their gardens have to be hoed and

planted. During this period of three to four months they travel in bands throughout the surrounding countries, harrying the weaker tribes and *collecting slaves*. Owing to this, there is always found an uninhabited stretch of two or three days' journey on leaving any part of Angoni land. They always live in the high-lying country, and are rich in cattle, while tribes living near the Angoni never possess any.

My route after leaving Kumchenka, the last Angoni village, five miles west of the Lifidzi river, was nearly due west.

For four days we travelled through pleasantly wooded and well watered country, having an undulating "ground floor," out of which rise large granite peaks and domes in every direction. All this country drains south-west to the Pomvi river which runs south and south-east throughout the Makanga country, and joins the Revubwe river.

I find in Perthes' maps a river called the Aroangwa Posse, the authority for which is, I think, Portuguese. The Pomvi river where I crossed it occupies a position near where the Posse is laid down, and I therefore conclude that it is the same river. It is, however, shown (in Perthes' maps) as flowing to the Liuyi river, which is incorrect. I made careful inquiries and ascertained beyond doubt that the Pomvi flows through the Makanga country to the Revubwe river.

I crossed the Pomvi on September 8th, a good sized stream frequented by hippopotamus. From here the country gently rises, with only occasional peaks, for ten miles to the west, where the "ground level" abruptly falls some 400 or 500 feet, and the character of the country entirely changes.

Here are first met the independent Achewa tribes, who at this their eastern limit are under a chief named Palankungu. Their houses are built high up in almost inaccessible places on the rocky peaks wherever water is within reach. They only descend to the valleys for the cultivation of their gardens, and live in constant dread of the Angoni warriors. They also plant a grain called *mapira* on the mountain sides wherever crevices in the rocks afford a holding to a few handfuls of earth. When they descend to their gardens it is only in large parties; some of the men keep watch, while the others and the women do the work.

After leaving Palankungu we met with great scarcity of water. The country is broken and covered with small fragments of quartz and stones; the heat great, and not a green leaf to be seen.

On leaving Palankungu, I had great difficulty in retaining the remnant of my carriers. They were all Nyassa and Shire men, who are unaccustomed to making journeys of any length, and are quite useless after a few days' travel away from their homes. For three nights I had to watch all night to prevent desertion, and even during the day I had to keep a sharp look out; for though they fear the thought of running home through country inhabited by other tribes, yet their fear of the amount of work to come if they stop is far greater.

On September 12th I crossed the Ngwangwa river flowing south, and crossed it again twice on the 13th, as it takes a bend to the north and back again to the south-west. It was here a rocky stream with plenty of excellent clear water, having a bed about 15 yards wide. Like other rivers throughout this country it is evidently subject, during the rains, to heavy floods. Its general course, I was told, is nearly south until it joins the Liuyi river some 40 miles south.

From here each day brought us into hotter and drier country. The only green things were on the banks of the few streams met with. There was a famine throughout the country, and after leaving Palankungu we were unable to buy any food whatever. Fortunately, game of all kinds abounds on the banks of the Ngwangwa, and of the rivers we passed further on; and I was able to keep all supplied with meat.

On September 14th we reached the Liuyi river which was here running only a little south of west. It is the Leuia crossed by Livingstone. At the point where we reached it, we were, as nearly as I could judge, some 25 miles, as the crow flies, south-west from where Livingstone reached it. It is here (on the upper part of its course) a rocky stream rather larger than the Pomvi or Ngwangwa, and has occasional deep pools frequented by hippopotamus. (I subsequently crossed it much lower on its course, where its character was changed to a wide sandy river flowing through plains.)

At this point I found it impossible to get my men any further, and decided to leave most of them and nearly all my remaining loads at the town of a chief named Kanguru, a day south-west; and then to push on with a few men lightly loaded. I shot a hippopotamus in the Liuyi river, which gave all a good supply of meat for some days to come.

From the point where I first struck the river I went, without crossing it, 15 miles south-west to Kanguru's. He lives, like all the Achewa, high up on a rocky mountain, and is one of their biggest chiefs.

I left here most of my men and loads, and, starting again on September 18th, with a small party, travelled due west 14 miles to Tembwe, without reaching the Liuyi river again. Tembwe is a small chief who has his village on the extreme summit of a mountain some 1200 feet above the level of the surrounding country. I did not climb up to his village but camped on the side of the mountain near the rocky hole from which the people obtain their water. From here I overlooked, to the west, a great stretch of apparently dead level country, with only one or two hills rising out of it at considerable distances from one another. The Liuyi river was visible as a thin green line coming from the north-east, making a great bend round to the south, and disappearing to the south-east. I had from time to time enquired as to the whereabouts of Mano which is marked in Perthes' maps, as a town on the Liuyi; but I here found that Mano is the name of the whole of the country lying west

of the Liuyi river, and reaching, according to information given me, almost to the Loangwa river to the west.

The Mano country, I was told, was bounded on the south by the Senga country; on the west, by the country of Tinde, a chief on the Loangwa river; and on the east by the Liuyi river.

The Liuyi, where I again struck it on September 19th, is from 25 to 30 miles west of the dotted lines given, in Perthes' maps, as its supposed course. It is here a large stream; but, at this time of the year, has only a narrow line of water trickling down its sandy bed. The actual sand-bed of the river is from 25 to 40 yards wide, between low banks; beyond these, the high banks (forming in flood time the limits of the water) are in some places 80 to 100 yards apart.

Leaving the Liuyi river before daylight on September 20th, we had a terrible march west, some 40 miles to a river called the Kapochi. It is very difficult to get any information as to the country even one day away, and I was not aware how far we had to go before reaching water again. I reached the Kapochi myself at sunset, having been the whole day without water. My men dropped in, some during the night, and some not until noon the next day, much exhausted by thirst and the great heat. I have experienced no heat so great in Africa as in this Mano country. There is no dew.

The Kapochi river which is not marked in any maps, so far as I am aware, is about the same size as the Liuyi, but has no running water in it at this season. Water is, however, easily got by digging down a foot into the sand. Stopping a day on the river, and travelling a few miles down its course, I found large deep pools, with many crocodiles and hippopotami, and plenty of fish.

Another waterless stretch of ten miles brought us to a high rocky mountain, inhabited by Achewa, the retreat of a chief named Undi. He claims Kanguru and Palankungu to the east as subject to him, and says his country extends to the west almost to the banks of the Loangwa river.

Water collects in one or two places among the rocks high up in the mountain, and affords a supply throughout the dry season.

Endeavouring to get on west from Undi's, I learnt that at this time of year there was no water for three long days' journey ahead, and I could get no men as guides. The famine was even worse here than in the country we had left behind. Near Undi's we passed several skeletons, and were told that many had died from hunger. I offered gifts of guns and powder to any who would accompany us to the west for three days, and this, I knew, would tempt them if it were possible, but I could get no one. I had therefore to give up for this year (1889) my journey further west.

Undi is constantly visited by Arab caravans from Nyassa, as he collects considerable quantities of ivory. He formerly lived in the

country to the north-east of his present abode, but finding himself too near the Angoni, moved back a few years ago.

Leaving Undi's on September 24th, I started on my return journey, and reached the Shire Highlands again in 26 days. On returning, I shortened the journey somewhat* by cutting off two corners on my old route. Along the banks of the Liuyi, Ngwangwa, and Kapochi rivers there are immense quantities of game. My men lived entirely on meat for three weeks, as we were unable to buy any food. Rhinoceros are very plentiful west of the Liuyi river, and on all three rivers I shot elephants.

I was unable to ascertain accurately whether the Kapochi runs to the Liuyi, or straight south to the Zambezi. Of those I asked some said one thing, some the other. I am inclined to think, however, that it runs to the Zambezi and is identical with the Pajosi, marked as entering that river some 30 to 40 miles above where the Liuyi enters it.

Livingstone, in the "Last Journals," mentions several places described to him as lying south-west of his route from Nyassa to the upper Loangwa, e. g. Zomba's, Zalanyama mountains, Isamangombe mountains, Chindunda mountains,† &c. I passed through the positions given to some of these, but could not hear of them. Names change quickly in Africa, places being, as a rule, called after the reigning chief. When he dies there is a new name, and the old one is quickly forgotten.

Livingstone also speaks of gold. Of this I could hear nothing. It may have been found formerly, but at the present time nothing is known of it by the natives, nor did I find any traces, though I made a careful search.

Undi is doubtless the chief spoken of to Livingstone as Undi M'senga (Undi in Senga), living to the south-west of his route. His (Undi's) name is known afar; I heard of him before leaving the Revubwe valley. The Achewa must formerly been a very large tribe. They are the original inhabitants of nearly the whole of the country contained (roughly) between the Kirk Mountains on the east, the Loangwa on the west, and the Zambezi on the south; their northern limit being about 13° or 12° 30' S. lat.

Since the advent of the Zulu tribes from the south (called the "Angoni," "Maviti," or "Mazitu"), the Achewa have been driven out of all the best country back into the hills, where they lead a miserable existence, harried constantly by the Angoni, and suffering almost every year from famine. In one spot only have the Achewa been able to hold their own—at Kasungu, some four days west of Lake Nyassa. This place, when visited by Livingstone, was a large and thriving collection of towns under a powerful chief named Muasi. I was there in 1888, and found the country round Kasungu thickly populated by Achewa under

* The journey west occupied from August 22nd to September 22nd.

† Chindondo is a word meaning "a large wilderness," or "uninhabited country."

a chief also called Muasi, but not the one who was there at the time of Livingstone's visit. He had died.

The Achewa language is almost identical with that spoken by the Maganja. The Achewa, Atonga, Atimboka, and Wahenga tribes are all closely allied, and evidently come from the same stock.

*A Visit to the newly emerged Falcon Island, Tonga Group,
South Pacific.*

By J. J. LISTER, M.A., H.M.S. *Egeria*.

On Wednesday, October 2nd, 1889, H.M.S. *Egeria* left Nukualofa (Tonga) to visit Falcon Island. It lies in the south-west part of the Tongan group, nearly in a line between the high volcanic islands of Tofooa, and Kao to the north, and Hongatonga and Hongahapai to the south. Tofooa is some 35 miles away and is seen in clear weather with the high conical top of Kao, 3030 feet high according to the chart, looking over the middle of it, as though it was part of the same island. Hongatonga and Hongahapai, two remnants of an old crater, are nearly always visible, pale purple or grey with distance, 15 miles to the south.

At the present time (October 1889) the island consists of two distinct parts. 1st. The remains of a very wide-based conical hill, the side of which slopes gently up, at an angle of about 6° to the highest part and then ends abruptly in a cliff whose base is washed by the sea at high water. Captain Oldham informs me that the present height of the island is 153½ feet. In a bird's-eye view the outline of this part of the island is a nearly symmetrical oval—the cliff presenting a convexity to the sea, and the base of the slope of the hill, where it joins the level, a convexity in the opposite direction.

2nd. A flat, extending away from the base of the hill in a northerly direction. This is about 10 to 12 feet above high tide level and is traversed by tide ridges, which run in a general way parallel with the shore of the flat and present a steep side towards it, and a more gradual slope in the other direction.

Except for some few seedling plants half-a-dozen of which were found during our visit, the island is entirely destitute of any vegetation. It is just a bare brown heap of ashes, round which the great rollers break and sweep up the black shores in sheets of foam.

The structure of the hill is seen in the cliff section. It is composed of fine-grained, dark greenish-grey material, arranged in strata. The strata are marked partly by slight differences in colour but chiefly by the salts, some white, some yellow, which have crystallised at the surface, more abundantly from some layers than others, and form pale bands. The strata are thickest in the highest part of the hill and thin out as it

becomes lower. Volcanic bombs are scattered over the slope of the hill. They are largest and most numerous at the highest part. There are two main varieties among them: one a dark whitish-grey stone with white crystals, which presents all stages of the vesicular structure; the other a coarse conglomerate. The blocks are generally rounded, and some of them present a spiral twist in their surface ridges. Though so abundant on the hill-side, none or very few of these bombs appear in the face of the cliff—which shows, I think, that they were ejected at the close of the eruption.

The flat consists of the same material as the hill, except that there are no bombs on it, and the very finely divided elements are absent. In the lower lying parts there are beds of very fine grey mud which has been washed down by rains.

As one walks over the hill-side there is a distinct whiff of sulphur in the air, and the distant parts are seen through a very thin blue haze.

The island is still hot beneath the surface. Two pits were dug, one near the top of the slope and one on the flat, and the heat was measured at successive depths.

On the *slope* the results were as follows:—

Temperature in shade on surface 74° F.
 „ 3 inches deep in soil exposed to sun .. 77·5°

Depth in Feet.	Reading of Thermometer before placing it in Boil.	Temperature.	Difference.
	°	°	°
1	..	77·5	0·0
2	..	78·0	0·5
3	74·0	80·5	2·5
4	74·0	85·0	4·5
5	74·0	93·5	8·5
6	76·5	96·5	3·0
7	76·0	100·0	3·5

On the flat, at 2 feet depth, the thermometer registered 85°, and at 6 feet 6 inches it registered 106·5°.

I expect that the reason why the temperature at corresponding depths is higher on the flat than on the hill is, that the flat is permeated by seawater which rises and falls with the tide and assists in communicating heat to the parts near the surface. In a depression between two of the tide ridges on the flat there is a pool at sea-level in which the water is salt and rises and falls with the tide. The small pebbles in the bottom of this were coloured red with iron. The temperature of the water in the hottest part of the pool was 113° F., and in a hole dug among the pebbles close by, the temperature of the water was 121° F.

At one place on the cliff were three small jets of steam, the surface round each whitened with deposited salts.

Landslips are of frequent occurrence along the cliff, ten or twelve were seen in one afternoon, after a wet day. They occurred at the time of high water. A slice from the face of the cliff went sliding down, with clouds of dust and steam—leaving a paler newly exposed surface, and every wave which broke on the freshly fallen heap caused it to steam again. All along the edge of the cliff above there are cracks running parallel with the edge which make it dangerous to approach.

Two young coco-nut trees, not in a very flourishing condition, are established on the flat, and specimens of three other plants were obtained: one leguminous; another possibly a seedling candle-nut, which is now in a flourishing condition in Captain Oldham's cabin; the third is a grass. There were several dry stranded fruits on the flat: *Barringtonia*, *Pandanus*, and others.

The only bird that I saw was a sandpiper—I think *Actitis incana* (Gmel.)—which flew on ahead as I walked along the shore. A small moth was the only other living thing that I saw—but the black sandy shore was bored with the vertical burrows of some creature.

Three small pieces of coral were picked up on the flat. I spent one afternoon in a boat, dragging an arrangement of hemp swabs over the north-east edge of the bank which extends some distance out to sea on the northern side of the island. There is a depth of 10–12 fathoms over the greater part of it, and the water deepens quickly at the edge. This was with ~~the~~ view of bringing up coral if there was any established there. I found none—a piece of seaweed was the only living thing that came up.

There is a considerable shoal area, about three fathoms in depth over the greater part, north of the island—i. e. opposite the highest part of the cliff. When the wind is fresh there are breakers over parts of this, and its position is nearly always marked by a patch of turbid yellow water.

The island was formed by a volcanic eruption which occurred four years ago. It was visited during the eruption by several of the residents in Tonga, who all say that the centre from which the materials were ejected lay entirely on one side of the heap that was being formed—and was bounded on that side by cliffs. In other words, the materials thrown out were all carried to leeward by the wind—or at least enough did not fall to windward to form a mound above the level of the sea. I have not been able to learn what was the direction of the wind at the time of the eruption, but judging of the position assigned to the focus, it appears to have been the usual east to south-east trade.

Accepting this evidence, a diagram may be drawn showing the relation of the island as it is at present, to the original formation when the eruption ceased.

The area occupied by the part of the original cone which has been

washed away, is indicated by the shoal water to the south of the island.

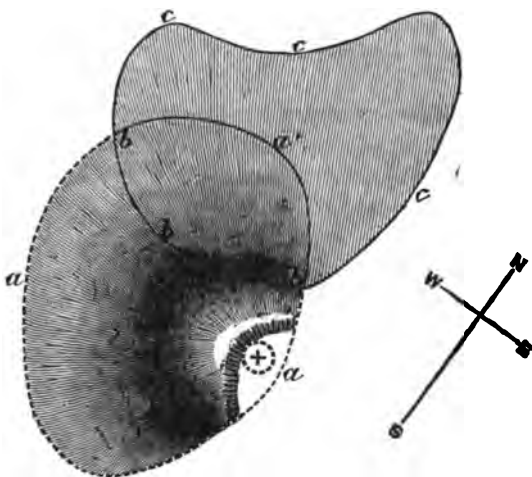



Diagram to show the relation of Falcon Island in Oct. 1889 to the original island when the eruption ceased in 1885.

⊕ the centre of eruption; *a' a a*, supposed outline of the original island (1885). *a' b b*, the remnant of it in Oct. 1889. *c c*, outline of the flat extending from the base of the cone.

Considering how rapidly the island is being carved down by the action of the waves, it is evident that in a few years, unless a fresh volcanic outburst occurs, it will have entirely disappeared beneath the surface of the ocean. Some distance to the east of it lie two islands, Nomuka-eki and Mango, which have since been visited by the *Egeria*. They are formed by stratified volcanic material deposited under water, and are now surrounded by broad coral reefs.* In them we may read the possible future history of Falcon Island—or if no elevation takes place, the volcanic stones and debris will give a resting-place to a host of marine animals and plants; banks of the shells of Foraminifera, Pteropods, and other pelagic organisms will accumulate in sheltered places; coral reefs will grow and reach the surface, sandbanks may be formed to which the seeds of coco-nuts, *Barringtonia*, *Scævola*, and *Tournefortia*, and other shore-loving plants will be drifted by the waves, and another green island be added to these summer seas.

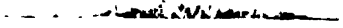
* These islands have apparently been elevated before any considerable thickness of coral grew on them, as I was unable to find any trace of a raised reef on either.



Falcon I². Looking E. & S. Oct. 1885. Am. Mus. Nat. Hist.

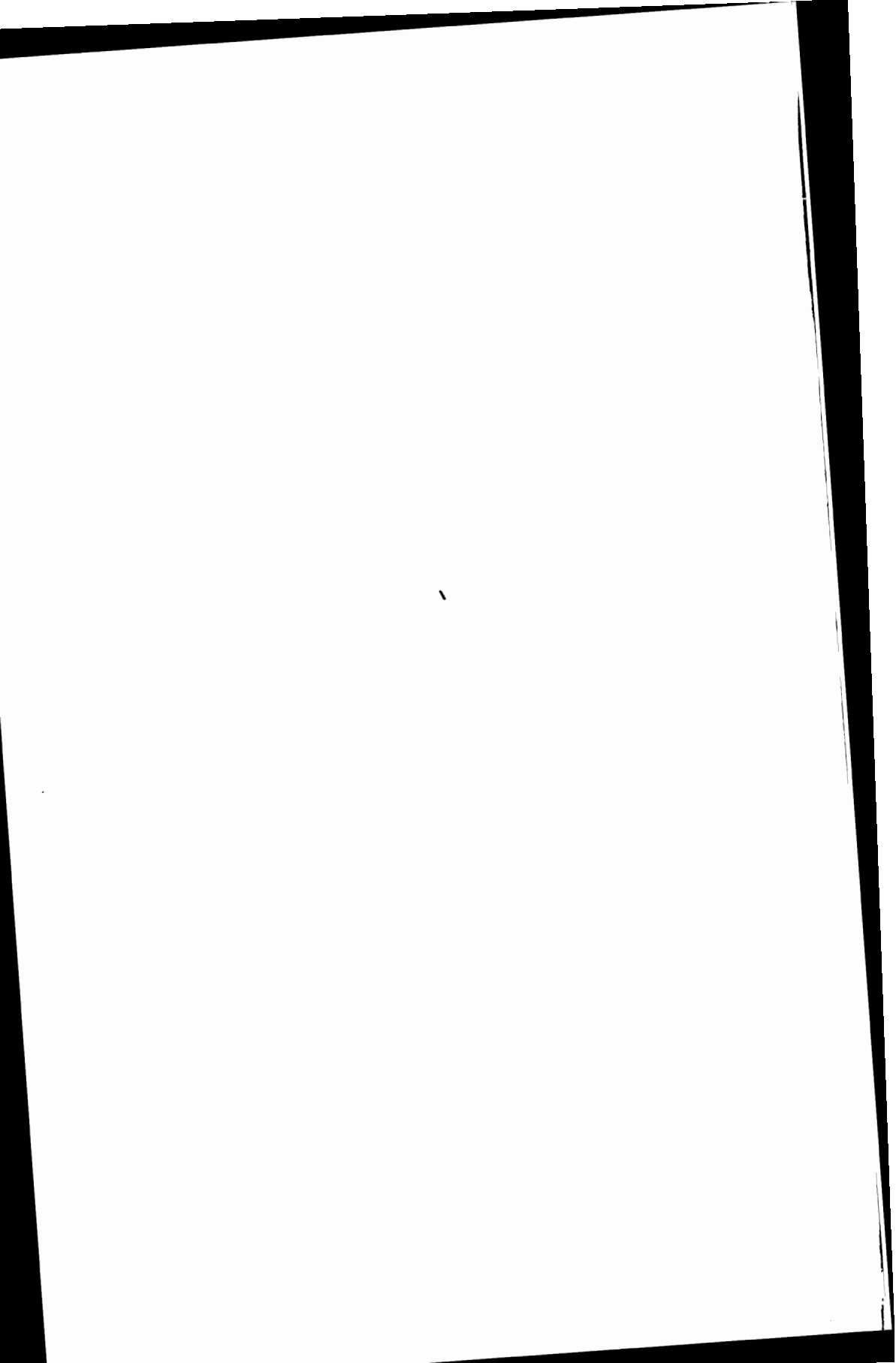


Falcon I². Looking S.W. Oct. 1885.



Falcon I². Looking N. & W. Oct. 1885. Am. Mus. Nat. Hist.

FALCON ISLAND, SOUTH PACIFIC, THROWN UP BY SUBMARINE VOLCANIC ERUPTION
OCTOBER 1885.—THREE VIEWS.



The Russian Expedition to Central Asia under Colonel Pievtsoff.

YARKAND TO NIA.

THE following is a continuation* of Lieut. Roborovsky's letters on the progress of this expedition, and gives an account of the journey made from Nia, in the autumn,† to reconnoitre the passes across the lofty range which bounds the plateau of Tibet in this direction:—

We reached Khotan September 22nd, and remained there until the 28th, occupied in replenishing our stock of provisions. From Khotan we followed our former route (1885) through Kiria and Keria to Nia. The weather was warm all the way; only at night sometimes there were slight frosts, so that the leaves turned visibly yellow and began to fall. Here and there in the oases were fields of uncut maize, but all other corn crops were reaped, and fruits, excepting apples, pears, and grapes, gathered. Melons and water-melons were offered us in abundance. There were no strong winds, but thick dust hung in clouds all the time, and hid from our view, as with a curtain, the snowy "Russian" range stretching parallel to our road at a distance of from 10 to 25 miles, with the unknown portions of North-west Tibet behind it.

Nia was reached October 19th, and on the 27th Pievtsoff, Kozloff, Bogdanovitch, and I, with three Cossacks and an interpreter, with five loaded camels, started for the mountains to the south-east of Nia to the tomb of Mondjilik-Khanum, to reconnoitre the passes in this neighbourhood. The baggage of the expedition and the rest of the people, under command of non-commissioned officer Bezdonoff, remained bivouacked at Nia, whilst the camels, with four men to guard them, were sent 12 versts down the river to the best pastures.

We followed the old route of 1885 for a distance of 100 miles to the south-east and east along the lower slopes of the mountains, and then struck off south and south-west to a place called Kara-Sai, whence the road runs to the local place of pilgrimage, the tomb of Mondjilik-Khanum. We reached Kara-Sai November 1st, meeting on the road a party of Chinese on their way from that place, where, as we afterwards learnt, they had committed excesses on pretence of collecting what they called an "adjutant tax." These taxes and duties, with most varied and often ridiculous names, are very numerous here; hardly ten days pass but what some ragged Chinese make their appearance in the village, and in the name of the authorities demand money, cattle, and local products, beating and ill-treating the inhabitants at will, until, having got all they can, they go off to renew their misdeeds elsewhere. Who they are no one exactly knows, but they always assume lofty titles, little consorting with their appearance or conduct. The natives, harried and misused to the last degree, dare not, nevertheless, offer any opposition to the shameless impudence of these robbers, and surrender whatever they are not lucky enough to conceal. In all probability these nomads are simply soldiers who have deserted, or been discharged by their superiors on consideration of a large share in their ill-gotten booty.

Kara-Sai occupies a space on the lower slopes on both sides of the river of the same name. The vegetation, fairly luxuriant, covering the ground, affords good pasture for cattle, and attracts the khoichi (shepherds) with numerous flocks of sheep. The most prevalent plants are the *Artemisia*, beloved of sheep; a *Eurotia*—

* *Vide* 'Proceedings R. G. S.,' *ante*, p. 19.

† *Ibid.*, p. 98.

probably *E. ceratoides*—a thick branched shrub some five feet high; a tansy; *Stachys aurea*; and an asparagus covered with red berries. The chief grasses are *Lasiagrostis splendens*; a species of *Stipa*, now nearly all devoured by the sheep; a *Lolium*; and, on the river, *Hedysarum*; and tamarisk scattered amongst the rocks.

Amongst the bushes flit, with melodious piping, tiny titmice (*Leptopæcile Sophieæ*), playing and chasing one another; the black-browed hedge-sparrows (*Accentor montanellus*) call to each other; the jays chatter gaily (*Podoces Hendersoni* and *P. Biddulphi*), and run out on the sand-heaps to gaze curiously at the traveller. Overhead, flocks of *Syrnhaptes paradoxus* pass noisily every few moments, and disappear from view. The kings of the feathered tribe, gryphons (*Gyps himalayensis*, *Vultur monachus*) and the bearded vulture (*Hipætus barbatus*) float circling high in air, and thence, with keen eyes, search out their prey; paying close attention to the movements of the ravens, for where the latter busily congregate there is pretty sure to be food for the vulture. When the latter swoops down, the ravens yield the glant (his wings measure 105 inches across) the first place at the feast, and he becomes master of the carrion. If there happen to be several vultures, they by no means divide the spoil in peace, but engage in battles, the seriousness of which is evidenced by the clouds of feathers and down that float in the air. These struggles, however, do not end fatally; the weaker soon give way, and retreat to join the ravens in the second line, and wait with what patience they can till the victors are glutted. Then comes their turn, and the poor ravens who found the booty get nothing but the scraps. Under the shade of the *Eurotia* numbers of rodents dwell in their holes burrowed amongst the roots of that shrub. Timid hares glance through the bushes, starting up often from under the very feet of the horses. They fall victims to the hungry foxes, who seem to hunt nearly every living thing here, not despising even the lizards—of which, though it was November, I found two species (*Erimias* and *Phrynocephalus*), though what they feed on it is difficult to say, for we saw no insects of any sort at the time.

The mouths of the Kara-Sai defile sheltered some wretched huts and still more wretched caves belonging to the shepherds. Here they live through the summer, and besides pasturing their sheep sow a little barley in some fields close by, watered by conduits from the rivulet running through the defile. These shepherds are generally hired labourers; they live in families, the wives and children helping the men in their occupations, and following the sheep along the mountains with the same astonishing agility. The masters, chiefly andijani (from Ferganah), Chinese or Russian subjects, trade in the towns or carry on commerce of various kinds, some not very laudable—usury, the buying of gold stolen at the mines, &c. They make unexpected raids into the mountains for the purpose of increasing their numerous flocks, gathering wool, the greater part of which goes eventually to Russia with other products, and at little personal trouble they make very considerable profit.

Having passed the night at Kara-Sai, and secured the services of an experienced guide, we entered the mountains to the south, through the defile, the sides of which, in one place, were so near together as to leave barely room for the abundant summer waters of the stream, and create a dark gorge, which soon, however, opened out into a wide and smiling valley, with clear springs bubbling freshly from the ground, and sloping sides overgrown with Altai oats (*Festuca altaica*), and *Stipa*, wild wheat (*Triticum*), *Lolium*, *Artemisia*, *Eurotia*, *Iris*, Caragana, lettuce (*Lactuca*), tansy (*Tanacetum*), Clematis, &c. On the northern slopes are small patches of an *Androsace*, which flowers very beautifully in spring. Besides these, from the bottom of the ravine up to a considerable height, golden bushes of *Lasiagrostis splendens*, reaching sometimes a height of 12,000 feet, and the loud and resonant voices of the mountain choughs (*Pyrrhocorax alpinus* and

Fregilus graculus) alternate with the cluck of the partridges which run clattering uphill away from man, and send showers of small stones down as they go. With such an abundance of animal and vegetable life, this defile must be very attractive in summer—now, however, winter had already laid his chilling hand upon it; the brawling rivulet was frozen, the vegetation had grown yellow and dead till next spring, the joyous feathered choir had flown off to warmer and more hospitable climes; the noisy marmots (*Arctomys bobac*) ever running from hole to hole, had sunk into their winter sleep at the extremities of their inaccessible dwellings.

Four miles from the entrance the gorge divided into two branches, one running north-east, the other, nearly opposite, to the south-west. We followed the latter, climbing a gradual transverse slope, covered with herbage, and came to a low pass, beyond which we descended through a rocky precipitous bed of a rivulet, running in a westerly direction and falling into the river Tolan-Khodja. We soon struck across another transverse ridge to the next pass, there being no difficulty in the ascent over a road laid in a soft soil of lias and sand. From the top of this pass we saw a fine panorama of mountains in unending masses, heaped in confusion, on our left. Due south ran the valley, bounded by the black wall of the Usu-Tag range, covered with fresh snow, the flat bed of the valley being cut by the great zigzags of the river Mondjilik-Khanum-Su. South-west beyond the horizon stretched the valley Sarik-Tuz, furrowed by the deep cuttings of the river Tolan-Khodja, and bounded on the left by the range Usu-Tag, a spur of which, stretching towards the point of vision, divides it from its neighbour. The spurs of the Usu-Tag are of gentle slope and covered with luxuriant vegetation. To the right of Sarik-Tuz rises the range Astuin-Tag, steep and bare, except at the very foot, but furnishing, like Usu-Tag, an abundance of springs and streams. It stretches far to the south-west and then seems to run precipitately (we found afterwards that it turned to the west). Straight in front to the west this range is riven by the foaming waters of the Tolan-Khodja, here rushing through a deep and precipitous gorge.

The descent from this pass is gradual and soft. Below stands the hut where dwells the head priest of the tomb, and some dwellings dug out in the earth, beyond which we came down to the channel of the Mondjilik-Khanum-Su, running between banks of conglomerate, and a mile and a half from the pass came to a small plain washed out in the soft alluvia by another river which debouches here, and by many springs bubbling out in the plain itself. The mountains coming down to the river from the right, bound it with a precipitous wall of limestone, whence, at a height of from 40–50 feet, jet numerous little springs, which, frozen into icicles, form a beautiful fringe of dazzling whiteness, from the ends of which fall drops that glisten many-coloured in the sunlight. Sometimes the icicles, thawing, fall with a rattle down the cliffs, frightening the mountain choughs, that fly off with loud cries. Above the springs higher up on the slopes are many sticks fixed into the ground and adorned with coloured rags, bunches of hair and tails of the wild yak. This is the plain called "Mazar-Mondjilik-Khanum," after a saint of whom the following legend is related:—A very long time ago, when people in Kashgaria were not yet all Mussulmans, and the latter were persecuted by the infidels, there lived in this neighbourhood a holy family, come from Mecca, and consisting of the Imaum Djaffer-Sadik, his wife Aitulan-Khanum, and their daughter Mondjilik Khanum, a maiden of surpassing beauty. The infidels persecuted the family till it was driven to separate; the Imaum entered the desert and there perished near the lower course of the river Nia, seventy miles from the oasis—his tomb, still extant there, is specially venerated by Mussulmans, and attracts crowds of pilgrims. The mother and daughter fled to the mountains, but the infidels followed them, and when already close up with the fugitives, Mondjilik prayed to God for help, not wishing

to fall into their hands. Her prayer was heard; the earth opened, and swallowed the unhappy maiden, but closed again upon her long plait of hair, which is still visible at this day, though no one but the head mollah, who performs service here once a year, is allowed to go near and inspect it. The spot is marked by the sticks ornamented with hair, and the springs gushing downwards are the tears of Mondjilik-Khanum. Her mother Aitulan perished six miles further to the south, and the memory of her death is likewise perpetuated by sticks and tearful streams falling from the cliff into a river called the Aitulan-Khanum-Su, an affluent of the river Toland-Khodja or Sarik-Tuz-Su, as it is called towards its source. Over against Mazar Mondjilik-Khanum is a resting house for pilgrims, built of great blocks of clay, with a very small courtyard surrounded by a wall of the same; the entrance is adorned with tufts of hair and yak tails; the roof of the Meshed is ornamented with horns of the Kundjain (*Ovis Nahoore*) and domestic sheep. We pitched our tent (*yourt*) in the yard and put our men in one of the rooms of the house.

On the 3rd November we decided to continue our journey, and spent the whole day in making enquiries of the local shepherds as to the country before us. On the 4th, at 7½ a.m., Kozloff, Bogdanovitch, and I, with an interpreter, a Cossack, and a guide, set out to reconnoitre our further route. The road led at first up a gentle slope to a not very high pass, from the summit of which we could see, trending away to the south-west, the valley of Sarik-Tuz, through which we were to ride, in order to make sure of the practicability of the region, for a distance of some 50 miles. Beyond that, according to the information we had gathered, there were no local difficulties to be encountered, the worst places being, within this distance, in descending and ascending the steep banks of the Sarik-Tuz river and its affluents, by which the valley was deeply furrowed. The descent from the pass is soft and gentle, the ground being covered with wormwood (*Artemisia*), *Eurotia*, Altai oats (*Festuca altaica*), iris (*Iris*), with caragana here and there, and also *Reaumuria kashgarica*. After seven miles we came to the river Aitulan-Khanum, crossing our road in a deep wide channel. This river has its sources in the mountain Uru-Tag, and gathering many abundant springs in the way, flows west to the Sarik-Tuz-Su, which it joins nearly opposite the point where the latter bursts, foaming and roaring by a narrow gorge, through the ridge Astik-Tag. The Aitulan-Khanum-Su dividing into several channels in its wide stony bed, forms little islands overgrown with *Myricaria*, a few reeds (*Phragmites communis*), certain kinds of grass, and amongst them single specimens of hawkweed (*Mulgedium tataricum*), and nearer its banks *Nitraria Schoberi*, *Reaumuria kashgarica*, and caragana.

Three miles beyond the Aitulan-Khanum-Su we climbed down by a steep path to the bed of the Sarik-Tuz-Su, of which in this part the general features resemble those of the Aitulan—the same pebbly bed over which the river rushed out between the same cliffs of conglomerate, covered with like vegetation. Near the ford were some flat spaces used as arable land, sown in summer by the local shepherds with barley. The ascent from the river-bed is rendered somewhat difficult by its steepness and the jutting crags of conglomerate, but presents no serious impediment, and can be made quite convenient by the forces of the expedition.

The road now followed the left bank of the Sarik-Tuz-Su through an upper valley, sometimes bending towards the mountains and along their lower slopes. There are no steep ascents or descents, but many springs of water flowing from the ravines of the Astik-Tag.

We travelled thus without difficulty for 16 miles, and halted where some shepherds had hollowed out two earth huts. They call the place Sarik-Tuzin-siagi. It is convenient for their sheep, having good pasture. The shepherds gave up one of the huts to us, and we disposed ourselves in it with some difficulty, owing to its

modest dimensions; the greatest diameter of the circular floor was only eight feet and the height of the arched roof 6 feet. The amount of air in the hut was not sufficient for five men, and we all woke up in the middle of the night nearly exhausted from the feeling of suffocation. After this we could sleep no more. Towards dawn there arose a strong south-west gale, driving up clouds of dust. Swallowing the stock of quinine we had with us, and waiting just till we had drunk tea, we set forward, notwithstanding our illness and the bad weather. It was very bad going; the gusts of wind were sometimes so strong that one could hardly keep one's balance on horse-back, and we had to go with our eyes nearly shut to save them from the drifting sand. The road lay along the edge of the Astik-Tag by the left bank of the Sarik-Tuz-Su. In the first eight miles we crossed six deep gullies running from the defiles of the Astik-Tag to the Sarik, all which crossings, though not extremely steep, requiring to be improved as far as our means would allow; all have high walls of conglomerate, and, running over pebbly beds, small streams that are nevertheless responsible for these mighty furrowings. By the last, which was dry, we turned down to the Sarik-Tuz-Su, coming out opposite where the river Turlik-Su flows into it from the Uzu-Tag Mountains, a fairly full river, which has likewise in its course washed out a deep corridor in the conglomerate. Near its source salt is obtained from pans of considerable size.

We rode along the bed of the Sarik-Tuz-Su nearly three miles, admiring the varied forms of its high banks, now taking the shape of some ruined castle, now showing cupolas, now simply spears, all due to the water rushing from the mountains. Having ridden three miles we turned up a gully entering from the right, and climbed up it to the mouth of the Yaalik Gorge. Altogether we had done 11 miles, and were glad to halt, for the storm continued all the way with undiminished force, and made our sick condition worse.

The mountains Astik-Tag diverge slightly to the north-west, while the Uzu-Tag maintains its south-west direction; the flat plain in front stretches beyond the horizon, and no more passes were to be seen. The vegetation was scanty. From the shepherds we learnt that following the ridge of the Astik-Tag one comes on the sixth day to the source of the Keria river, the first three days being through a region where in winter there is neither grass nor water. The Astik-Tag is crowned by several peaks rising above the line of perpetual snow. South-west along the Uzu-Tag three days' journey brings us to a wide and boundless plain stretching south-east and east, there being in those directions, according to the shepherds, no mountains for a very great distance. The natives could give us no more detailed information, as, being all shepherds, they cannot leave their flocks, and only learn a little about the country from passing gold-seekers who follow their occupations on the tableland. These people go perhaps very far, but one only meets them on the way in May and June. We shall have to seek further information from them, and must endeavour to find a good guide.

This ride of ours has proved that we can reach the plateau of Tibet quite well with a caravan by way of the skirt of the Russian range. We can only penetrate the heart of the country after fresh and frequent reconnaissances, for we can hardly hope to find a guide well acquainted with far-away places when there are no inhabitants.

Next day (November 7th) we started on our return, and the 8th reached Mazar-Mondjilik-Khanum, where Pievtsoff awaited us; the 9th we spent here, and the 10th started by our old route for Nia, which we reached the 17th. Here we set to work to adapt one of the houses for our winter quarters, as Pievtsoff, having made sure of a convenient way to enter Tibet, decided to winter in Nia. We made a window out of calico, hung the walls with reed matting, carpeted the floor with felt, and

thus made a fairly tight and warm lodging, consisting of three dwelling rooms, the dining room, baggage room, and a large one for the men; also bath-room and kitchen. We took up our quarters here the 24th November, and began a regular settled life. Here we shall gradually prepare for our summer excursion to Tibet, upon which we shall start at the end of April by way of our newly-found pass. In February I intend to drive to Cherchen by a new lower road, and from Cherchen up by the river of that name to Prejevalsky's route of 1884, which I shall join by leading in this direction with our winter station, Nia. This will take about two months, so that I shall get back just in time for the expedition to Tibet. We shall spend the whole summer in Tibet, and in autumn disperse each his own way. The scientific work of the expedition has gone on, and does still, without interruption. Pievtsoff levelled all the way and made astronomical observations; here at our winter quarters it is intended to establish a temporary meteorological station. Kosloff and Telesheff have made an interesting collection of birds, and are studying those that winter here. My own botanical collections this year surpass my expectations; I obtained 430 species during the summer, with a vast number of specimens. Our former passage through Kaahgaria gave only 240. I am now collecting seeds. I have also obtained some 1500 specimens of insects, and the collection of lizards and snakes grows steadily in number of species and specimens. Bogdanovitch made several geological excursions in the course of the summer, and brought back many specimens from the mountains.

Our forthcoming visit to Tibet promises, besides other results, much that is new and interesting to geography.

OASIS NIA, 29th Nov., 1889.

GEOGRAPHICAL NOTES.

A Proposed Antarctic Expedition.—Baron Nordenskjöld has brought before the Swedish Academy of Sciences the subject of an expedition for Antarctic exploration. It will be remembered that a similar project was on foot in 1887, at the suggestion of the Government of Victoria, but it fell through because the British Government did not see their way to support it. Baron Nordenskjöld a few weeks ago received a communication from Baron von Mueller, intimating that if a joint Australian and Swedish expedition could be arranged, the Geographical Society of Australasia would contribute 5000*l.* Baron Nordenskjöld laid the matter before Mr. Oscar Dickson, who most liberally offered to contribute another 5000*l.* Baron Nordenskjöld seems to think 10,000*l.* adequate for an Antarctic expedition, and is arranging for a start in the autumn of 1891. We learn, however, that the Baron is not himself likely to take the leadership of the expedition. Unless Dr. Nansen finally decides to try the North Pole, it is possible that he may be induced to take the command.

Captain Binger's Explorations in the Great Bend of the Niger.—A succinct account (with map) of the important work of exploration carried out from 1887–9 by Captain Binger in the region comprised within the great bend of the Niger, is contributed to the current number of

Petermann's 'Mitteilungen,' by Herr H. Wichmann. We extract the following:—Leaving Europe in February 1887, Captain Binger proceeded direct to Bamako, on the Upper Niger, the furthest station of the French Government. His first objective was the town of Sikaso, whither he arrived after a week's march through a depopulated and devastated region. Continuing, with many difficulties, owing to the country being in a state of war, his journey to the south-east, he eventually reached the important town of Kong on the 20th February, 1888, which had not before been visited by a European. On his route Captain Binger crossed several streams flowing south, one a tributary of the Lahu, and two others forming the head waters of the Akba, or Comoe, which empties itself into the Gulf of Guinea; the sources of these rivers are placed from 3° to 4° of latitude further north than hitherto supposed. Captain Binger concludes that the watershed between the basin of the Upper Niger on the one side, and the rivers (Lahu, Comoe, and Volta) which discharge into the sea on the Ivory and Gold Coasts on the other, is formed, not by a mighty range of mountains, but merely by rising ground, and that the Kong Mountains, placed by Mungo Park under 11° N. lat., and 3°–4° W. long., have no existence. The town of Kong, or Pong, numbers from 12,000 to 15,000 inhabitants, exclusively Mahomedans, and is a great trade centre. All European articles are offered for sale in the market. The chief industries are cotton-weaving and indigo-dyeing; horse-breeding is also a flourishing business. After a three weeks' stay in Kong, Captain Binger set out northwards, and crossing the upper course of the Comoe, arrived in the region of the head waters of the western tributaries of the Volta, the most westerly of which, the Black Volta, lies near the source of the Comoe. Hurrying through the northern part of the country of Gurunsi, which was in a state of anarchy, and had been scoured by plundering bands of Haussas, he contrived to reach Wagadugu (July 1888), but was soon forced to leave the town by the mistrustful ruler, and compelled to march southwards to Salaga, thus abandoning his intended excursion to Libtako in the north, where he would have been able to connect his surveys with those of Barth. The country of Mossi, of which Wagadugu is the capital, is very flat, and exceptionally well adapted for corn-growing and cattle-rearing. He arrived at Salaga in October, after a hazardous journey, having been detained 45 days in Wale-Wale through illness. Proceeding along the right bank of the Volta, he visited Kintampo, a town of 3000 inhabitants, celebrated for its trade in Kola nuts. Passing on through Bonduku, Captain Binger marched into Kong on the 5th January, 1889, and there met M. Treich-Laplène, who had come from the coast to his relief, and of whom he had heard before reaching Bonduku. After concluding a treaty of protection with the ruler of Kong, the two travellers took the shortest route to the coast, along the river Akba, which at Attakru first becomes navigable.

The country east of the Upper Niger traversed by Captain Binger contains no distinct range of mountains, but only isolated granite peaks rising above the plateau. In the western part of this region the culminating point is Natinian Sikasso (2560 feet); from its northern slopes several streams flow down to the Niger, while from its southern side the Comoe springs. The eastern continuation of this range forms the hardly distinguishable water-divide between the Comoe and the Black Volta. To the south the plateau sinks gradually; here the rivers Lahu and Dahbu take their rise. Among the isolated peaks in the east may be mentioned the granite summit of Komono (4757 feet) which obstructs the easterly direction of the Comoe and turns it southwards. From the Volta, which is surrounded by low ranges of hills, an extensive table-land stretches to the east, ascending from about 3250 feet to the summit of Nauri, which rises to the south-east of Wagadugu to an elevation of 5905 feet. This mountain, which is the highest met with by Captain Binger, is separated from the Gambaga Range by the valley of the Eastern or White Volta, which rises in Bussang. The plateau slopes rather quickly down to the valley of the Volta, which lies about 600 feet above the sea-level. Between the Comoe and the Volta there are only some isolated summits. The basin of the Niger is, according to Captain Binger's hydrography of this region, much less extensive than formerly supposed, for the greater part of the country inside the bend of the Niger is drained by the Comoe and the Volta. Sandstone and swamp-ore are the prevailing formations in this district. Vegetation is as a rule poor, except in the valleys and certain humid places. Agriculture flourishes, but suffers from want of water. The temperature rises from March to June to an extraordinary height; the mean day temperature in the shade was 104° Fahr., and the highest in the sun 140° Fahr. Captain Binger surveyed all his routes with the compass, and determined 13 points astronomically. The inhabitants of this region belong to seven great groups: the Mandingo inhabit Samory, Kong, part of Worodugu, Kurudugu, Diammara, and Gudja, with colonies in all directions; the Sienerih, or Sienufs, are found principally in the kingdoms of Tieba and Pegue, Follona, Djimmi, and part of Worodugu; the Gurunga are the prevailing race in Gurunsi and part of Bussang; the Mo inhabit Mossi; the Haussa the region west of the White Volta; and the Ashanti the country as far as the Black Volta. The Fulbe, whose principal abode is further north, are spread in numerous colonies up to 11° N. lat. The commercial and colonial results of Captain Binger's expedition are also of great importance. He has concluded treaties with the kingdoms of Tieba, Kong, Bonduku, and some of the smaller states, so that the whole country from the Senegal to the Ivory Coast is now under the French protectorate; while, by connecting the great trade centres of Kong and Bonduku with the Ivory Coast, a vast region is opened up to French commerce.

The Zhob and Gomul Expedition.—The expedition of Sir R. Sandeman to the Zhob and Gomul valleys, near the north-western frontier of India, and the submission not only of the tribes inhabiting those parts but of the Waziris also, will bring a large area of country under British domination. The Zhob valley was surveyed by Lieut. R. A. Wahab, R.E., in the latter part of 1884, on the occasion of Sir O. Tanner's expedition thither. Lieut. Wahab describes it as an alluvial plain throughout, with apparently a fertile soil and at any rate near the river a constant supply of water, but he adds that its advantages of soil and climate (its average elevation is about 4800 feet) seem to be entirely thrown away on its present inhabitants. The survey of the northern part of the valley fell to the well-known surveyor, Mr. G. B. Scott, but owing to the distance it was found impracticable to get on to the high range to the north, and extend the triangulation into the Kundar basin. Of the valley of the Gomul itself a survey exists from the journey of Lieut. J. S. Broadfoot, R.E., in 1839, reprinted as one of the "Supplementary Papers" of the Royal Geographical Society, in 1885. But there is a great deal of work required to fill up the blanks which intervene between that and the more recent surveys of the Khost, Kuram, and adjacent valleys. It is satisfactory, therefore, to see that Lieut.-Colonel Holdich is in charge of the survey operations, and we may be sure that he will leave very little ground unexamined on the eastern side of the line of watershed, to which the British boundary, we may rest assured, will very soon have to be extended. This would make our frontier march with that of the Amir, to the east of Ghazni and Lake Ab-istadah, and a very large slice of the independent territory between the two powers will thus be absorbed into British possession. The new headquarters, we learn from the special correspondent of the *Pioneer*, are to be at Apozai, and a house for the new Resident there is actually in course of construction. From the same letters we learn that the submission of the tribal chiefs from the Marris and Bugtis in the south to the Waziris in the north has been quite surprising, a fact which indicates that the formal as well as practical inclusion of these regions into Baluchistan (now *wholly* British) cannot be far distant.

Mr. Tietkens' Expedition to Lake Amadeus, in West-Central Australia.—The well-known explorer, Mr. W. H. Tietkens, left Adelaide in January 1889, in command of an expedition having for its chief object the determination of the outline and extent of Lake Amadeus, a long, narrow salt basin lying a little west of the overland telegraph, and between 23° and 25° S. lat. The journey occupied many months, and although no new tract of land fit for settlement was met with, the main object was attained, Tietkens, by a great effort in a region destitute of fresh water, succeeding in defining the western boundary of the lake, which he found to lie near Mount Unapproachable of Giles. The western end

for a distance of 20 miles was found to be nowhere more than five miles in width.

Mount Ruwenzori.—Colonel Sir W. F. Butler has addressed a letter to us, in which he points out that the honour of the discovery or re-discovery of Ruwenzori, the chief peak of the "Mountains of the Moon," belongs to Mason Bey, who obtained a distant view of it when making a reconnaissance of Albert Nyanza by order of General Gordon in 1877. Mason Bey's report is published in the 'Proceedings' of our Society, vol. xxii. (old series), p. 225, and contains the following brief allusion (p. 227) to the mountain seen from the deck of his little steamer when at the south-eastern end of the lake:—"On both sides of the lake the mountains diminish in altitude; and to the southward, at the foot of the lake and between the two ranges, was a large isolated mountain." The distance of Ruwenzori from Mason Bey's position would be about 40 miles. It is to be remarked that Mason Bey, in his letter to us on the river at the southern end of Albert Nyanza,* makes no allusion to his having sighted the famous mountain from that point.

Obituary.

Lord Napier of Magdala.†—The Right Hon. Sir Robert Cornelius Napier, Baron Napier of Magdala in Abyssinia, G.C.B., G.C.S.I., D.C.L., F.R.S., Field Marshal in the Army, Constable of the Tower, died at 63, Eaton Square, London, on the 14th of January last, and his remains were conveyed from the Tower of London on the 21st, with full military honours, to St. Paul's Cathedral, where they rest with those of the bravest of his countrymen. His last work was attending the committee of the Gordon Boys' Home on the 8th January; that night he went to bed with a heavy cold, from which he never recovered.

He was born at Ceylon, on the 6th of December, 1810, and was therefore in his eightieth year. His father, Major Charles Frederick Napier, of the Royal Artillery, married Miss Carrington, and by her there was also an elder son, who was many years in the Rifle Brigade; the family are partly Scotch, being connected with the Frasers of Lovat by the female line.

Young Napier, after receiving his early education in Belgium and the Military Seminary of Addiscombe, commenced his career in 1827, at the age of seventeen, by entering the Honourable East India Company's service as an Engineer Cadet in the Bengal Presidency. He was married twice—first in 1840 to Miss Pearce, by whom he leaves several sons and daughters surviving; and secondly, to the daughter of General Scott, R.A., by whom there are several children. His widow survives him.

During his service of sixty-three years in the Engineer Corps, he had not shown himself a geographer in its strictest sense, neither was he an author, but he was a great pioneer, and enriched India and its people by constructing vast works of public utility. He became a Fellow of our Society in 1868, and for some years was an occasional attendant at our evening meetings. He promoted geography whenever the occasion arose in his intercourse and influence with the Governors of Provinces, and the Governors-General of India. The men of science who accompanied the

* 'Proc. R.G.S.' 1890, p. 40.

† By Colonel J. A. Grant, C.B., F.R.S.

Abyssinian Army under his guidance, mapped the country and made exhaustive collections of all that was of interest in this wild inhospitable region. It was he who applied to the Government to have scientific men attached to the expedition as soon as it was decided on. While Commander-in-Chief in India, and on the Council, his sound advice on boundary questions was of the greatest service; and his last duty out of England, as Governor of Gibraltar, is best stated by a General officer of the Royal Engineers:—

“The new market-place, which was of great benefit to the people, was constructed and completed while he was Governor. The admirable manner in which it was worked under the rules laid down by his Lordship was well known to all who had to resort to it. The signal station at Windmill Hill was erected and established under his direction; an enormous boon was thus conferred on the shipping community at large, as the vessels in passing were enabled to make their numbers and transmit messages on almost every day of the year, there being on an average ninety days in the year during which the upper signal station was enveloped in fog. The civil hospital, constructed on the most approved plan, was erected by Lord Napier, and has tended greatly to relieve the sufferings of the sick poor at Gibraltar. A magnificent new lunatic asylum was erected by him, and he at all times took the greatest interest in this work, his object being to provide a comfortable home with a good look-out for the unfortunate people who were destined to be its inmates. Lord Napier always devoted great attention to the planting and culture of trees and shrubs, especially on the north front, where he cleared away many of the nuisances which he found there on his arrival at the station. He formed the fine esplanade, with sea wall, along the eastern beach. He also formed and opened the Victoria Road on the north front, which enabled the inhabitants to drive off the rock, and enjoy the sea breezes, of which they were so much in need during the summer months. The carriage road at the back of the rock to Catalan Bay was commenced by him, and the gardens on the north front were made. He also formed the new race course, which previous to his time encircled the cemetery in a most objectionable manner. He secured for Gibraltar a supply of condensed water, by the erection of condensers in the ditch near the Ragged Staff, within the fortress. It has proved thus far to be the only source of supply of pure water at the place, and it was of incalculable value for the inhabitants of Gibraltar during the cholera season of 1885.”

Lord Napier was often remonstrated with for his extravagance in the use of public money on public works, but he went on all the same, spending it on roads, bridges, barracks, canals, &c., all of which have been the means of keeping peace and plenty in the fair Punjab.

His principal engineering works were as follows. In 1828 he assisted in the Eastern Jumna Canal. In 1840 he made the road leading to Darjiling. In 1841 he was chief engineer at Kurnaul, and in 1844 he laid out the military cantonment of Umballa. While civil engineer for the Punjab, between 1849 and 1856, he superintended the survey of 8740 miles of country, the construction of 4949 miles of military means of communication, and the erection of 1500 bridges. The Baree Doab Canal, 466 miles in length, and canals Trans-Indus, were projected under his superintendence, whereby a million acres of land are now irrigated and under cultivation. The old native canals of Mooltan and Ferozpoore were remodelled under him.

General R. Maclagan, R.E., his brother officer, writes: “Lord Napier opened the way for the surveyor in lands not usually accessible except with an armed force, and facilitated future access by making roads. This he did in 1852, in the first Black Mountain campaign, when he commanded a column that was sent against the Hassanzai tribe; and the next year, in the expedition against the Bori Affridi.

(This was the first time these countries had been penetrated by Europeans.) The Punjab also, both before and after it had become a British province, he did much to open up to the surveyor, the traveller, and the trader, as well as to the requirements of the civil administration, and military movements by roads in all directions, particularly the great trunk line from Lahore to Peshawur, executed under his order by Sir Alexander Taylor.

Those who have seen him at the sieges of Multan, the relief and final capture of Lucknow, in the trenches and in the mines, can never forget his familiar figure and cheery smile as he moved fearlessly about, on horseback and on foot, ever affable, engaging in conversation with soldiers and natives of every grade and caste. He was a universal favourite, gentle in conveying an order, thoughtful of the wants of others rather than himself, modest to a degree, right-minded, and always courteous. With this charm of manner there was a determined will and a keen sense of humour. And, as one instance of his bravery, at the siege of Multan, he had actually taken his shoes off, and was standing in his "stocking feet" ready to run up the breach on the signal being given, when, to his disappointment, news was brought of the surrender of Mulraj. And, of his nobleness—A wounded officer, the present Field Marshal Sir Patrick Grant, was assisted off the field by Napier at the battle of Mudki.

Lord Napier's habits were active up to the last. While in Europe he often began to write, paint, or sketch at five or six in the morning, and if any business occupied him, he seemed quite independent of the requirements of food and sleep. As a young man, while at Lahore, he thought nothing of riding forty miles before breakfast—going full gallop all the way, never looking at the road, and changing his horses so as to make fifteen miles in the hour. He once rode every horse in an Afghan kafila till he got suited, and these Cabulee horses are not celebrated for their manners.

His military services can only be stated briefly. Present at the battles of Mudki, Ferozeshah, and Sobraon, the siege of Kangra, both sieges of Multan, battle of Gujerat, the Black Mountain and Afridi campaigns, 1852-3, the Mutiny (Chief of the Staff to General Sir James Outram). Brigadier at the capture of Gwalior. Defeated Tantia Topce and captured twenty-five guns. Commanded 2nd division in China, 1860. Commanded Abyssinian Field Force. Commander-in-Chief in India, Governor of Gibraltar, and Constable of the Tower. For these he obtained six medals and ten clasps, was wounded severely upon three occasions; had two horses shot under him, and received the thanks of the country on three occasions, as expressed on the 2nd July, 1868, by Mr. Disraeli:—

"This is not the first time, nor even the second, that the House of Commons has offered to him its thanks. Happy is the man who has been thrice thanked by his country!"

One more anecdote may be quoted. Sir James Outram was asked, shortly previous to his death, "In all your wide experience, which is the greatest soldier you have ever met?" The immediate reply was, "Robert Napier, of course."

The death of Lord Napier was described by Her Majesty the Queen as a national loss, and he was held in the highest esteem by the members of the Royal Family. The Emperor of Germany sent the following message on hearing of his death:—

"The British Army has just lost one of its ablest generals and bravest soldiers. I deeply grieve for the loss of the excellent Lord Napier of Magdala, and I hasten to express my sympathy to you and to the whole British forces. His noble character, fine gentlemanly bearing, his simplicity and splendid soldiering, were qualities for which my grandpapa and papa always held him in high esteem. Please convey my feelings of sincerest grief to the Queen and the Army."

REPORT OF THE EVENING MEETINGS, SESSION 1889-90.

Fifth Meeting, 10th January, 1890.—The Right Hon. Sir M. E. GRANT
DUFF, G.C.S.I., &c., President, in the Chair.

ELECTIONS.—*Robert Shand Anderson, Esq.; Chas. Henry Ashdown, Esq.; E. D. Atkinson, Esq.; Charles Bill, Esq. J.P.; John Bramston, Esq., C.B.; Colonel Louis Mansergh Buchanan; F. J. Byerley, Esq.; Henry Herbert Gordon Clark, Esq., M.A.; Maj.-General George Ayton Craster; Walter John Cutbill, Esq.; Rev. Charles Dent; John Little Dryden, Esq.; Frederick Gardner, Esq.; David Gill, Esq., LL.D., &c.; Adolph Peter Goodwin, Esq.; Rev. John Brown Griddle; William Guppy, Esq.; J. Warrington Haward, Esq.; Lieut. Francis E. Haigh, R.N.; Alfred Holness, Esq.; John Inglis, Esq.; James Macfarlane, Esq.; John Mac-kinnon, Esq.; John McEwan, Esq.; Thomas Marshall, Esq., M.A.; Chas. Gübert Master, Esq.; J. B. Moore, Esq.; Francis Muir, Esq.; T. Douglas Murray, Esq.; Rev. J. M. New, M.A.; George Newnes, Esq., M.P.; R. B. Orlebar, Esq.; Dillwyn Parish, Esq.; William Alfred Pitt, Esq.; Richard Pybus, Esq.; Thomas E. Ravenshaw, Esq.; Rev. Canon Rawlinson; Capt. Herbert Edward Rawson, R.E.; E. Thomas Read, Esq.; T. Rome, Esq.; Capt. Arthur Edmund Sandbach, R.E.; Ronald A. Scott, Esq.; Frederick William Smith, Esq.; F. Oldershaw Smithers Esq.; William Donald Spence, Esq.; Capt. Claude Stracey (Scots Guards); Sir Somers Vine; M. C. Vos, Esq.; Godfrey Dalrymple White, Esq.; Capt. Robert Charles Wilson.*

MR. STANLEY.

The PRESIDENT announced that Mr. Stanley had been communicated with at Cairo, with respect to the reception which the Society was preparing for him, but the time of his arrival in London was still uncertain, and no date could be fixed for the meeting.

The paper read was:—

Search and Travel in the Caucasus. An account of the discovery of the fate of the party lost in 1888. By Douglas W. Freshfield, Hon. Sec. R.G.S.

Illustrated by a large series of photographs by Sig. V. Sella and Mr. H. Woolley, which were exhibited in the Examination Room, adjoining the Hall, after the meeting.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—December 3rd, 1889: M. FERDINAND DE LESSEPS, President of the Society, in the Chair.—This was an extraordinary meeting, held in the large hall of the Sorbonne, for the purpose of receiving Captain Binger, on his return from Africa. Among those on the platform were General Brugere, representing the President of the Republic, M. Étienne, deputed by the Colonial Under-Secretary, M. Milne-Edwards, representing the Minister of Public Instruction, M. de Quatrefages, of the Institute, General Derrécaigaix, and Captain Péroz, representing the Ministers of War and the Navy respectively, Lieut.-Colonel Gallieni, M. de Brazza, Dr. Hamy, &c.—M. de Lesseps, in addressing Captain Binger, welcomed him very cordially in the name of the Society, and characterised his journey as being one of the most extensive and complete explorations of modern times. The country he had traversed, which was comprised within the two arms of the Niger

and the Gulf of Guinea, was previously but little known, and the result of his travels would be to fill in with details the comparatively blank space on the maps of this region. He (the Chairman) regretted the absence of M. Treich-Laplène, who commanded the expedition sent in search of Captain Binger, M. Treich-Laplène having been summoned back to Africa. Captain Binger then gave an account of his travels, which, with a map, will be inserted in the 'Quarterly Bulletin.'—In conclusion, M. de Quatrefages, President of the Commission on the awards of the Society, announced that the Commission, having discussed the merits of the most distinguished travellers of the current year, had unanimously awarded to Captain Binger a large gold medal, which was the highest reward the Society could confer, and one which was but seldom awarded.

— December 20th, 1889: M. Ferdinand de Lesseps, President of the Society, in the Chair.—This was the second general meeting for the year 1889. The General Secretary, M. Chas. Maunoir, read the principal passages in his annual report upon the work of the Society, and upon the progress of geographical science during the year. On the conclusion of the report, M. Borelli gave an account of his journey to the countries of the Anhara, Oromo, and Sidana (Southern Ethiopia), of which the following is a *résumé*. M. Borelli started from France in March 1884, and did not return until June 1889, the expedition, which was conducted entirely at his own expense, having thus lasted over five years. Several months were wasted on the Gulf of Tadjurra, in consequence of difficulties in forming his caravan. Crossing the deserts and steppes frequented by the nomadic and robber tribe of the Afars, M. Borelli arrived, after fifty-four days' travelling, at Ferre, a village of Shoa, and the first he had met with since leaving the coast. From there he proceeded to Ankobar, the former residence of the Kings of Shoa, and then to Antoto, the then place of residence of King Menelik. This region is very mountainous. As soon as the eastern slope of the mountain range, which dominates the desert, is crossed, the kingdom of Shoa proper is reached; beyond extend the immense plateaus of the Salla country, which, more or less hilly in character and with a slope towards the south, follow each other in regular succession. After a stay of some months with King Menelik, M. Borelli set out for Harrar. He was the first European to make the journey from Shoa to Harrar by this route, now one of the most frequented in Ethiopia. Returning to Shoa, he travelled southwards, with the object of exploring the course of the river Omo; the route lay through a well-populated, cultivated, and wooded country, of great fertility and abounding in water; the climate was temperate, as the elevation at times rose to over 6500 feet. Lofty mountains were observed, Harro-Wenchit, with its enormous crater containing a deep lake, May-Gondo, at the confluence of the Omo and Godjeb, which attains an altitude of 11,810 feet; the sides of this mountain are clothed with dense forests of bamboos. In September, 1888, Mr. Borelli was staying with the King of Djimma, whose country is very fertile and inhabited by an industrious population. Being repulsed in an attempt to penetrate into the territory of the Zingero, the traveller turned more to the south, crossed the river Omo and traversed the unexplored countries of the Hadia, Tambaro, and Wallamo, paying a visit to Lake Abbala, the locality of which had hitherto been uncertain. In this region the population is less dense, and cultivation correspondingly less extensive; small pieces of iron form the current money. Continuing his route southwards, M. Borelli traversed the petty kingdoms of Garo and Bosha, then crossing the Godjeb, entered Kullo. After experiencing many difficulties, and having been attacked by the inhabitants, he was obliged to retreat, without having penetrated beyond the sixth degree of latitude. M. Borelli was able, however, to assure himself that the river Omo does not flow eastwards and form the Juba, as supposed, but that after a course of some two

degrees westwards, it turns to the south and discharges itself into a large lake, Lake Rudolph, which has since been discovered by Count Teleki. The traveller then made a fresh attempt to enter the unknown country of the Zingero, and having made an alliance with a powerful native chief he advanced with him and a small army of over 1800 men across the borders. At first fortune seemed to favour him, two attacks being repulsed; but on arriving at Mount Bor-Gudda, where the natives offer their human sacrifices, the enemy, owing to treachery, was successful. M. Borelli, wounded, and without sufficient resources to continue the struggle, found himself compelled to beat a retreat to Shoa, whence, after two months' rest, he made his way to the coast. All the routes followed were carefully surveyed, a number of points were fixed by astronomical observations, the altitudes were in every case determined by the hypsometer, and the entire country was covered with a system of triangles, which form the basis for the construction of a map now in course of preparation at the Observatory of Paris.

— January 17th, 1890: COMTE DE BIZEMONT in the Chair.—The Chairman announced that the Central Commission had been re-constituted for the year 1890 as follows:—President, Comte de Bizemont; Vice-Presidents, Rear-Admiral Vignes and M. Cheysson; General Secretary, M. Mannoir; and Assistant Secretary, M. Jules Girard.—A letter (dated 22nd December, 1889) was read from M. Müller from Tashkend, giving the latest news of M. Bonvalot, who on the 9th October was on the eve of setting out from Kurla for Lob-nor. The writer was doubtful whether M. Bonvalot would succeed in crossing during the winter the lofty mountains which separate Lob-nor from the Upper Yang-tze-kiang.—The Chairman intimated that the Abbé Desgodius, Apostolical Pro-vicar of Tibet, was present at the meeting, and stated that for more than thirty years this courageous missionary had been endeavouring to gain access to Tibet. During the long time he had resided on the eastern and southern frontiers of Tibet he had made numerous scientific observations, more particularly in meteorology, and had compiled a comprehensive Tibetan dictionary. The Chairman also announced the presence of Colonel Gallieni, the well-known explorer and governor of Senegal.—M. Charles Rabot called attention to recent explorations of King Charles' Land (Wyche Island), east of Spitzbergen, made by a Norwegian fisherman of Tromsø, named Andreasen, who last summer discovered that the mountain of Haarfager, the western extremity of that island, was a distinct island from King Charles' Land. The General Secretary stated that this information agreed with the discoveries of MM. Kukenthal and Walter, two German naturalists, despatched by the Geographical Society of Bremen, who had the good fortune to approach four times close to King Charles' Land.

Geographical Society of Berlin.—February 8th, 1890: BARON VON RICHTHOFFEN in the Chair.—**Dr. Meyer's Ascent of Kilima-njaro.** Dr. Hans Meyer gave an account of his ascent of Kilima-njaro. A description of this ascent was given in the last number of the 'Proceedings'; the following account gives some supplementary information. The success which Dr. Meyer achieved on this occasion was due to the skilful dispositions which he made with regard to the regular supply of food and fuel. Dr. Meyer soon found, when he visited the Chief Mandara of Moshi, that the latter, who was troubled with gout and in an almost continual state of drunkenness in consequence of excessive indulgence in banana wine, would not furnish him with the necessary support for his undertaking. Of repulsive exterior, his arrogance increases in proportion to his impotence. His raids and slave hunts have laid waste extensive tracts of the country of Ugueno, and although he has extended hospitality to many Europeans, his leading motive has always been to gain by the introduction of Europeans an ascendancy over the other Chagga

chieftains. His avarice is insatiable ; years ago he robbed the defenceless missionary, Mr. New, of everything he possessed. But he has well nigh played out his rôle in Chagga ; in the west he is threatened by the energetic and bold Sinna of Kiboso, and in the east by the youthful and amiable Mareale of Marangu. To the latter straightforward prince, the model of a black chief in Africa, Dr. Meyer resorted. Having ordered substantial huts to be built by his caravan and the grounds laid out, he left the greater part of his followers behind at this point. At an altitude of 9515 feet he pitched a second camp by the side of a brook on the upper edge of the forest belt, where eight porters were lodged, while the expedition itself took up fixed quarters in a small tent upon the platform between Kibo and Mawenzi, at an altitude of 14,270 feet above the sea-level, and here the Pangani negro, Muini Amani, with wonderful endurance, looked after the wants of both travellers for sixteen days. Every three days four men from Marangu brought up provisions to the middle camp upon the edge of the forest, whence two men ascended to the camp upon the plateau with the necessary food for the travellers, and immediately returned to their own camp again. In this way the travellers found every third day a new supply of fresh meat, beans, and bananas, and were able, as from some club hut in the Alps, to carry out the exploration of the upper parts of Kilima-njaro upon a fixed plan. With regard to Mawenzi, Dr. Meyer is of opinion that the former crater is to be found to the south-east of the present highest peak, and that the whole composition of the primæval volcanic ruins points to fact that the mountain in its original formation approximated, at least in height, to the much more recent Kibo. The travellers found ice in October on Mawenzi in many clefts and ravines, but nowhere in considerable masses or covering any extent of ground. On the south-west side of Mawenzi, which is sheltered from the wind, numerous flowers and grasses were found blooming at an altitude of 15,750 feet, owing their existence to the favouring influences of a powerful insolation and some bubbling springs ; and the young grass shoots of the meadows are sought out by elks and antelopes, which from the north side of the mountain, where the forest belt dwindles away to a narrow strip or disappears altogether, mount up from the plains to these heights above the saddle of the mountain, in order to browse off the fragrant herbage. The primæval forest region on the south and east sides of Kilima-njaro comprises the whole zone between 6500 and 9750 feet; on the north side of Mawenzi it dwindles down to a narrow belt the continuity of which is in many places broken, and towards the west it becomes increasingly thinner, vanishing altogether on the northern sides of Kibo. Instead of the fertile and well-watered slopes and plains of the Chagga district, which extend on the southern part of the mountain between 4000 and 6000 feet, the waterless regularly-sloping declivities of the north reveal, as a rule, only a wilderness of bushes and grassy plains, over which the Masai, coming from the sun-scorched plains in search of pasturage, have scattered their kraals. From their fortnight's journey in the country of Ugueno, the travellers learned that this region is inferior to the Chagga lands in beauty and value, but ranks next to the highlands of Usambara. The travellers were unable to carry out their intention of exploring the south side of Kibo, as the rainy season had in the meantime begun, and heavy thunderstorms were now breaking over the mountain every day at noon. At those elevations these storms regularly brought new snow, and shrouded the mountain in clouds for the second half of the day, rendering extended mountain excursions out of the question. By chance the travellers had, in choosing October, hit upon the most favourable period possible for their explorations, as the summit is mostly clear, the atmospheric precipitations small, and the ice-covering has reached its minimum. In consequence of the unfavourable meteorological conditions in the upper parts of the mountains, the travellers decided to pay a visit to the forest regions lying away in the western

Chagga States, which had never been trodden by a European. They marched through the countries of Uru, Kindi, Kombo, and Maruma, where they, being the first Europeans, created no small agitation in the villages, and then crossing the two largest rivers of the Kilima-njaro region, the Ngombere and the Weri-Weri, arrived in the country of Madjame, which Von der Decken, thirty years ago, was the first European to visit. Here the travellers enjoyed the friendly hospitality of the young ruler, Ngamine. From no side is the form of the mountain so magnificent as from this point. The mountain mass rises up in a typical volcanic curve from the southern plains 2625 feet above the sea-level to the edge of the crater (19,650 feet) so regularly and uninterruptedly, that all details are overlooked. The dark forest zone here stretches further up the mountain, the bright grassy plain following on this is narrower and almost touches the lower edge of the ice-mantle, which, shut off on this side, sinks down from the summit, to the foot of the Kibo cone. The spectacle of this coat of ice, 6000 feet high, clinging to the sides of the volcanic form of the mountain, is a sight not to be equalled for similar beauty anywhere in the world. West of this ice-mantle Kibo opens from top to bottom in a magnificent ravine with steep walls, into which, from above, the great Kibo crater sends off a tongue of ice, which issues from the bottom of the gorge as a mighty ice-stream and forms the largest glacier of Kilima-njaro. From the front of this glacier the Weri-Weri river takes its rise, while the river Ngombe draws off, down to the Pangani, the water melted away from the ice-masses of the south side. On the 30th of November the travellers, after a successful three months' exploration, quitted the district of Kilima-njaro, and arrived on the 13th December in Mombasa, where they met with a most friendly reception from the officials of the British East Africa Company.

Geographical Society of Norway, Christiania, 18th February, 1890.—Dr. Fridtjof Nansen delivered an address on his project of an expedition to the North Pole. H.R.H. the Crown Prince was present.—Dr. NANSEN introduced his subject with a historical résumé of the attempts which have been made since the earliest ages to gain access to the Arctic regions, and he reminded his hearers of the important rôle Norsemen had played, from the earliest times to the present day, in these attempts, notwithstanding that the greater expeditions had been sent out from other countries. However, many of these had no other object than the discovery of a new road to China and India. The first road apparently tried in the endeavour to reach the Pole was that part of the North Atlantic Ocean which lies between Spitzbergen and Greenland, and probably the first to try it was the celebrated Henry Hudson in 1707. He got as far as about 80° north latitude. Parry tried the same route in 1827, and got to the north of Spitzbergen as far as 82° 45' N.; that is the most northern point as yet reached from that quarter of the globe. This expedition is the more remarkable since no one with steamships has reached anywhere near so far north as Parry did with his sailing ships. A powerful current, however, prevented him from penetrating further towards the Pole. The place which had been the starting-point for most of the attempts of those who desired to reach the North Pole was Smith Sound in the northern part of Baffin's Bay. The expedition which was fitted out to search for Franklin approached from there to 80° 56' N. A member of the expedition had declared that from an elevated place he had seen the open Polar Sea at a latitude of 81° 22' N. Greely later reached 83° 24'—the most northern point of our globe which has up to the present time been reached. He also started *viâ* Smith Sound. Because of the strong southerly current, there was little chance of getting very far north from that side when once land was left behind. Moreover, attempts had been made to reach the Pole *viâ* Franz Josef's Land. The Danish expedition under Hovgaard attempted to get northwards from the west of Franz Josef's Land, but was stopped by the ice and

had to return. From that side also very great difficulties had to be met, and he (Dr. Nansen) thought it very doubtful if it offered any approach to the most northern Polar regions. The only way which remained to be mentioned was that through Behring's Strait. It had only been tried once, namely, by De Long in 1879. He had also thought of the other roads, "but," said he, "the warm stream which flows up through Behring's Strait must help the vessel northwards, thence you have the stream with you, and in his opinion there was a chance in that way of finding open water." The *Jeannette* expedition at the same time was closed in by the ice, and drifted with it for two years, from September 1879 till the summer of 1881. Dr. Nansen did not consider that there was any possibility of approaching very far north overland. The northern part of Greenland in all probability does not stretch so far towards the Pole that we should be at all likely to be able to reach it from there, and by sea at most points the ice constituted an impenetrable barrier. Was there no other way by which the goal might be reached? He believed there was. If we made use of the means which we had at our disposition, an attempt would be made to reach the Pole by the surest and easiest way. The chief point would be to find a current which flows in the direction the expedition wishes—i. e. towards the north. So far the *Jeannette* expedition had had the right idea, and followed the only right course. The *Jeannette* drifted for two years—from Wrangel's Land to the New Siberian Islands; but three years later, in 1884, several articles were found on the west coast of Greenland which had undoubtedly belonged to the *Jeannette*. How had these things drifted on shore at Greenland? Professor Mohn showed, in 1884, at a meeting of the Scientific Society of Christiania, that they could hardly have come by any other way than one which might be marked down almost over our Pole. They did not come through Smith's Sound; that could be decided with certainty on account of the currents. They must have drifted by way of Spitzbergen, along the east coast of Greenland, and then northwards along the west coast. The time they had taken in thus drifting strengthened this supposition from the knowledge that has been acquired concerning the direction of the currents in northern parts, and of their speed. He held in his hand another proof that a stream flows from Behring's Sea on the one side, across the Pole to the Atlantic on the other. It was a piece of wood which Dr. Rink got from a Greenlander. This piece of wood, which was found on the coast among other drift stuff, was precisely of the same kind which inhabitants of the Polar regions use to cast their arrows with. The well-known Norwegian traveller, Captain Jacobsen, who saw this piece of wood in the University collection in 1886, at once exclaimed that it was precisely the same as the bows (*kastetraer*) which are used by the Esquimaux on the coast of Alaska. That its home was on the east coast of Greenland was, from what is at present known of that coast, incredible. The supposition as to the origin of that piece of wood is supported by what is to be found in the work of an American specialist, as well as by Professor Nordenskiöld, in his work on the Vega Expedition. Another proof of the correctness of the theory of a current passing by the North Pole is given by the drift timber which the Esquimaux fish up on the coasts of Greenland. This timber must either belong to America or Siberia. Among it have been found Siberian larches and red and white pine, which we cannot but suppose originally came from the other side of the Pole. That the timber should have drifted southwards of Franz Josef's Land and Spitzbergen was as little likely as that the articles from the *Jeannette* had drifted that way. It must be considered, therefore, that the timber accompanied a constant current by way of the Pole to Greenland. The Lecturer had moreover made many observations of the ice in Denmark Strait, which pointed to the existence of such a current. On many of the ice-floes he had found distinct traces of river mud, which

could hardly have come from anywhere else than the rivers of Siberia, or possibly America. They might, however, perhaps have emanated from glacier streams which flow under the ice in northern Greenland. In his opinion, therefore, these were not such certain proofs as the previous ones. At all events there was every ground to suppose that a current flows towards Greenland's east coast, which passes through the space between the Pole and Franz Josef's Land; and the broad stream which comes down between Spitzbergen and Greenland might be considered as a continuation of it. The soundings also which had been taken by the Norwegian North Sea Expedition showed that such a stream was probable. He considered, therefore, that there was every reason to believe that an expedition, fitted out with everything that was possible in these days to overcome the great difficulties which stand in the way of Arctic discoveries, would be successful. His plan would be to build a vessel as strong as possible, and on such a principle that it would be very difficult for the ice to crush it. Above all, its sides must be as sloping as possible, so that even if the ice packed around it, the vessel would be simply lifted up and not be crushed as were the *Jeannette* and most of the ships which have been sent on Arctic expeditions. He would go with this vessel through Behring's Strait, and make with all speed for the New Siberian Islands, and then plough his way into the ice. He thought the experience of the *Jeannette* expedition showed that he would in that manner be able to reach the most northern of those islands. That expedition had seen the so-called "sea sky," channels of open water all around, and then had traversed the distance from Bennet Island to the Siberian coast. Nordenskiöld had also found open water near the most southern of the New Siberian Islands. He would, therefore, as quickly as possible try to reach these islands and then go northwards as far as possible into the ice, moor the ship to it, and let the ice pack round it as much as it liked, in fact the more the better. The vessel would only be raised up and lie safe and sure. From that time he would think little of advancing, but just go with the current. There would be ample time for making scientific observations. In this manner the expedition would in the course of two years, or probably less, be carried through by the current to the sea between Spitzbergen and Greenland. Even should the vessel be crushed, there was little probability of the expedition being a failure. He and many others had had the experience that there was very little risk in deserting a ship and taking to the ice; two things only were necessary, good clothing and plenty of food. In his opinion, if efforts were made to get as good men as possible, and have as few of them as possible, and fit them out as perfectly as possible, they would have better chances of attaining their object than any former expedition. What is the good of such an undertaking? One hears such a question often asked. What is the use of rummaging about up there in the ice? There is nothing but ice, will never be anything but ice, and nothing of a practical use in science can ever come of it. He thought, nevertheless, that most of his audience would agree with him in believing that a North Polar expedition was an undertaking of the very greatest importance. Provided that scientific discoveries were of any value to humanity, polar discoveries had brought results of such great importance that it was at present impossible to foresee how far they would reach. In short, there was not one branch of science which had not reaped advantage from the past Polar discoveries, and it would be so in the future. Great scientific men had declared that an examination of the Polar regions would result in an amount of knowledge which would probably be far greater than any one up till now can have dreamt of. The science which first and foremost would reap benefits from such an examination is, of course, geography. The possibly unknown Polar regions offer probably better conditions for geodesical mensuration than any other spot on the face of the globe,

and without such measurements we should never be able to get an accurate knowledge of the shape of our own planet. It will be impossible to determine with precision how much warmth our earth receives from the sun until we discover the coldest point on the globe, &c.; moreover, an investigation of the temperature of the Arctic regions would be of the very greatest importance to meteorology, and especially give us a more certain knowledge of the meteorological conditions of those parts of the earth which we inhabit. An investigation of the conditions of the currents could not fail to be of the greatest importance in physical geography. Added to this there remains a large field for electric and magnetic investigations (variation, gravitation, &c.). Even if there had not been so many great scientific questions to solve, it was only right to attempt to penetrate into those parts of our globe which are as yet unknown. It is, as a geographer has said, the same as when we get a house—we wish to become thoroughly acquainted with it as soon as possible. It is only natural that men should try to make themselves acquainted with every single spot on our small planet. Norsemen had already helped considerably in the discoveries of the Polar regions, and it had been done quietly without notoriety. The men of Tromsø and Hammerfest had above all done services in that respect. They had sailed round Nova Zemlia, discovered large tracts of Spitzbergen, and had made many interesting observations in Arctic waters. Northern nations had on the whole great capabilities for adding considerably to the discoveries of the Arctic regions. De Long, the chief of the *Jeannette* expedition, wrote in a letter concerning those best fitted to take part in an Arctic expedition: “First of all try to get Norwegians, Swedes, and Danes; avoid Englishmen, Scotchmen, and Irishmen, and refuse altogether Frenchmen, Italians, and Spaniards.” The Lecturer finished by saying, “The Polar regions must and shall be investigated, and one can feel certain that this will one day be done. Let it then be Norsemen that pioneer the way! Let it be the Norwegian flag that first floats over our Pole!”

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

EUROPE.

[**Murray's Handbooks.**—A Handbook to the English Lakes included in the counties of Cumberland, Westmorland, and Lancashire. With Maps. London, John Murray, 1889: post 8vo., pp. xlii. and 160. Price 7s. 6d.

The present edition contains an additional number of routes, and an improved index embodying a deal of information useful to tourists with reference to accommodation, distances, conveyances, &c.

[—] A Handbook for Travellers in South Wales and its borders, including the River Wye. Fourth edition. With a Travelling Map. London, John Murray, 1890: post 8vo., pp. xl. and 214. Price 7s.

[—] Handbook for Travellers in Central Italy, including Florence, Lucca, Tuscany, Elba, &c., Umbria, the Marches, and part of the late Patrimony of St. Peter. Eleventh edition. London, John Murray, 1889: post 8vo., pp. xxvii. and 372, map and plans.

This edition is divided into two parts separately bound and indexed, Part I. dealing with Florence, and Part II. with Tuscany, &c.

[—] A Handbook for Travellers on the Riviera. With Maps and Plans. London, John Murray, 1890: post 8vo. Price 5s.

This volume consists of portions of the Handbooks to France, Part II., and North Italy, comprising Provence and Dauphiné and the coast-line from Marseilles to Genoa. It also includes a description of the interesting Greek and Roman cities Nîmes and Arles, as well as Avignon, Valence, &c. The information has apparently been brought up to date, and in its present convenient form the guide-book should recommend itself to visitors to the Riviera.

ASIA.

Dutreuil de Rhins, J.-L.—*L'Asie Centrale* (Tibet et régions limitrophes). Texte et Atlas. Pp. xvi. and 618, 4to., Paris, 1889. Price 2l. 8s.

This work, brought out under the auspices of the Ministry of Public Instruction, gives a complete summary of all the materials hitherto supplied for the geography and topography of Tibet with its border-lands. As a work on the comparative geography of those regions it deserves to take a high place, both on account of the laborious researches which it has necessitated, as well as for the impartiality and correctness of the criticisms contained. While other European States are more closely interested in Tibet, France does not forget that the Mékong, which debouches into her Indo-Chinese territory, derives its sources from the same country as the great rivers of China and British India, and that the works of her great cartographer d'Anville have still to be consulted by the student of Tibetan geography pending more precise researches and surveys in that *tellus clausa*. No further *raison d'être* are necessary for M. Dutreuil de Rhins' task, and he is to be congratulated on the able way in which he has fulfilled it. The introduction contains a general review of the geography and history of Tibet, followed by a classified bibliography of maps as well as books, Chinese and European, each title being accompanied by a few lines of explanatory text; a table of geographical terms in twelve or more languages comes next. The work itself is divided into four parts:—1. Regions bordering on Tibet; 2. South-eastern Tibet; 3. North-eastern Tibet; and 4. Western Tibet. Under these headings a vast amount of information, ancient and modern, has been collected, compared and sifted, so that the student should have no difficulty in obtaining a grasp of the subject without referring to the works from which the facts are derived.

Turning to modern itineraries and travellers, dating from the famous French Abbé Huc in 1846, the author shows how they have severally contributed to rectify positions and reconstruct maps, omitting for his purpose such explorations as have not resulted in adding to our cartographical materials. In reviewing the old travels on the north-western border between Kashgaria and the Chinese province of Kan-su, M. Dutreuil de Rhins calls attention to the services required by the geographer from Orientalists. At the same time he warns the former of the danger of too readily identifying places and altering itineraries on the basis of a similarity in names without taking into consideration such changes as the destructive powers of nature are capable of producing in a long course of time on the aspects of a country and the seats of long-passed away races.

The Atlas is separate from the text, and contains besides a large-scale map in two sheets of the region treated of, some very interesting reproductions of early maps and itineraries.—[E. D. M.]

Hickson, Sydney J.—*A Naturalist in North Celebes. A Narrative of Travels in Minabassa, the Sangir and Talaut Islands, with Notes of the Fauna, Flora, and Ethnology of the districts visited.* London, John Murray, 1889: 8vo., pp. xv. and 392. Price 16s.

Dr. Hickson's main object in visiting Celebes was to investigate certain problems connected with marine zoology, especially corals. In this respect his observations are of much interest, and some of them of original value. His notes on the country, the people, the life and aspects of the tropical forest, and especially of his visits to the Sangir and Talaut groups, between Celebes and the Philippines, are of much interest. Dr. Hickson spent some time on

Talisse Island, just off the north coast of Celebes, and has something new to tell of the topography and the people, and the daily life of the island. Much of the book, however, is devoted to the results of a journey he made through the district of Minahassa. The topography and scenery of the district are described, as also the people, their habits, customs, and mythology. There are several good illustrations, and two maps.

Rawlinson, George.—History of Phœnicia. Longmans & Co., 1889: 8vo., pp. xxii. and 583, maps and illustrations. Price 24s. [Presented by the Publishers.]

In compiling this work, Canon Rawlinson has had access to the principal and most important works dealing with the subject, which, together with his own knowledge of Oriental subjects, should make the present volume of considerable value. There are chapters dealing with the country, its climate and productions; the people, their origin and characteristics, industrial art and manufactures, ships, navigation and commerce, mining, religion, dress, ornaments, and social habits, writing, language and literature, &c.; also with the cities and the colonies, including (1) Colonies of the Eastern Mediterranean; (2) in the Central and Western Mediterranean; (3) outside the Straits of Gibraltar, the chief of which were Tingis (now Tangiers) and Lixus (now Chemmich), in Africa; and Tartessus, Agadir or Gades, and Belon, in Spain. A large portion of the volume deals with the political history of the country arranged in eight sections, as follows:—Section 1, Phœnicia before the establishment of the Hegemony of Tyre; section 2, Phœnicia under the Hegemony of Tyre; section 3, Phœnicia during the period of its subjection to Assyria; section 4, Phœnicia during its struggles with Babylon and Egypt; section 5, Phœnicia under the Persians; section 6, Phœnicia in the time of Alexander the Great; section 7, Phœnicia under the Greeks; section 8, Phœnicia under the Romans. The volume is illustrated with two maps, besides a number of plates and woodcuts.

AFRICA.

Wauters, A.-J.—Stanley au secours d'Émin Pacha. Paris, Maison Quantin, 1890: 12mo., pp. 424. Price 3½ francs. [Presented by the Publisher.]

—— Stanley's Emin Pasha Expedition. London, J. C. Nimmo, 1890: 12mo., pp. xvii. and 378. Price 6s. [Presented by the Publisher.]

This volume may be said to be divided into two parts, the first being a useful summary of the events which led up to the starting of the Emin Pasha Relief Expedition, the second part dealing with the incidents of the Expedition itself. The opening chapters describe the conquest of the Soudan, the revolt of the Mahdi, the siege of Khartoum, and Relief Expedition under Wolseley, followed by an account of the events in the Equatorial Provinces that led to the return of Dr. Junker. The greater portion of the volume deals with the Relief Expedition, largely consisting of a summary of Stanley's own letters. The volume is illustrated with a map of the route of the Expedition, and a number of portraits and illustrations. As will be seen, the price of the original French edition is but three shillings, whereas the English translation costs six shillings.

AUSTRALASIA.

Russell, H. C.—The source of the Underground Water in the Western Districts. [Read before the Royal Society of N.S.W., August 7, 1889.] 8vo., pp. 7.

ARCTIC.

Collinson, [Captain] Richard, C.B., R.N.—Journal of H.M.S. 'Enterprise,' on the Expedition in Search of Sir John Franklin's Ships by Behring Strait, 1850-55. With a Memoir of his other Services. Edited by his brother, Major-

General T. B. Collinson, R.E. London, Sampson Low & Co., 1889: 8vo., pp. xi. and 531. Price 14s. [Presented by Major-General Collinson.]

This most interesting volume is welcome for various reasons. It may be said to form the last link in the long chain of the literature of the many Franklin search expeditions; and it at last does justice to one of the ablest, most conscientious, and most modest of the leaders of these stirring enterprises. It would be unwise to revive old controversies, but it is only truth to say that Admiral Collinson did not receive the credit which his services to Arctic exploration merited. Admiral Sir G. H. Richards, in an introductory letter to the volume, writes:—"By those who knew your brother this narrative will, I believe, be recognised as a fitting monument of his whole life. There are comparatively few who are competent to pronounce a correct verdict on the merits of the various Arctic voyages of modern times; fewer still, perhaps, at the present time who can give an entirely unbiassed judgment. My own view has always been that the voyage of the *Enterprise* was the most remarkable of them all. There was no turning back, nor, in the mind of the leader, any thought of turning back, until all resources had been exhausted. In its relation no exaggerated or sensational pictures are drawn; a plain unvarnished tale, almost too plain." Admiral Richards then goes on to show that the real North-west Passage has not yet been discovered, and that the "cold shade of neglect" which fell on Collinson "is only to be accounted for by one of those gusts of popular impulse, which at times blind men's understandings, and obliterate their better judgment, until in the end injustice becomes more expedient than honourable recantation."

In the Prologue to the Journal General Collinson gives a brief but clear and accurate summary of the events that led up to his brother's expedition, and of its results. He shows what had already been done from the east, or Baffin Bay side, in connection with which the names of the two Rosses, Austin, Ommanney, Parry, Richardson, and Rae are prominent. The *Enterprise* and *Investigator* had been out under Sir James Ross, and it was these two vessels which in January 1850 sailed from the Thames to try the route by Behring Strait, Captain Collinson, the commander, being in the *Investigator*, and M'Clure, second in command, in the *Enterprise*. When the *Enterprise* arrived at the rendezvous in Behring Strait in August, she found that her consort, "by a fortunate boldness," had got before her, and they never met again. It will be remembered how in the spring of 1853 M'Clure, after abandoning his ship, joined hands with Kellett's party, over 180 miles of frozen sea. Meantime the *Enterprise* had to winter at Hong Kong, and returned to the ice in July 1851. In the course of the next two months Collinson succeeded in penetrating along the north coast of America and up Prince of Wales's Straits, and after various trials about Banks Island, wintered at the south end of the Straits. Sledge parties were sent out in the spring of 1852, one as far as Melville Island; and in the summer, shut in north and west, the *Enterprise* got as far east as Cambridge Bay, and there wintered. Next spring sledge parties were sent up Victoria Strait as far as Gateshead Island, where they found they had been forestalled by Dr. Rae. Another winter would have been spent in the region, had it not been discovered that a short supply of coal had been provided for the *Enterprise*, which was taken westward, and wintered near Point Barrow. After some attempts to send sledge expeditions northward in the spring, Captain Collinson returned through Behring Strait in the summer of 1854, reaching England in May 1855, after an absence of five years. He had most faithfully adhered to his instructions, and attempted to carry out the purpose of his expedition with a perseverance and determination which merited success.

The Journal itself is full of interest, and contains information which may well be regarded as a valuable addition to our somewhat scanty knowledge of the region with which it deals. Many useful notes are supplied in an appendix by General Collinson, along with an interesting record of Admiral Collinson's valuable services both before and after the Arctic expedition. There is a portrait of the Admiral, and several good maps.

GENERAL.

Dictionary of National Biography. Edited by Leslie Stephen. Vol. xxi. Garnett—Gloucester. London, Smith, Elder & Co., 1890: 8vo., pp. vi. and 444. Price 15s.

Among the notices in the present volume may be mentioned the following names, more or less connected with travel and discovery:—Sir William Gell, by Warwick Wroth, F.S.A.; Alexander Gerard, by H. Manners Chichester; James Gilbert Gerard, M.D., by the same; Patrick Gerard, by the same; Sir Humphrey Gilbert, by C. H. Coote; William John Gill, by Colonel Vetch, R.E.; Sir George Gipps, by E. C. K. Gonner; and George Glas, by H. Manners Chichester.

[Howard, J. E.]—Memoirs of William Watts McNair, late of "Connaught House," Mussooree, of the Indian Survey Department, the First European Explorer of Kafiristan. London, D. J. Keymer & Co. [1889]: oblong 12mo., pp. 83. [Presented by the Author.];

Brief notices of the late Mr. McNair have already appeared in the 'Proceedings' for October and November 1889. The present memoir enters more fully into the life and achievements of this distinguished officer and geographer. It includes a brief account of Mr. McNair's departmental career, a reproduction from the 'Proceedings' for January 1884 of his important paper on his visit to Kafiristan, and an account of his early and closing years. Two portraits of Mr. McNair illustrate the volume.

Parker, Francis W.—How to Study Geography. New York and London, Appleton & Co.: 8vo., pp. xxxv. and 400. Price 6s. [Presented by the Publisher.]

In this somewhat voluminous work by Mr. Parker the teacher will find some useful hints as to the points he ought to bring out in his geography lesson, and as to methods of teaching. The book might with advantage have been much reduced in size. The details given by Mr. Parker are often somewhat bewildering, and the long lists of figures, names of tribes, and other bare facts seem out of place in a book of hints. Still, notwithstanding its diffuseness and want of method, the book is welcome as an innovation on the old, dull, and unprofitable method of teaching geography. It will prove serviceable to teachers who have had no thorough training in geographical study, and no experience in methods of teaching the subject. After an introduction, a chapter or section is devoted to "Preparation for teachers," in which such subjects as river-basins, structure of continents, distribution of heat, of moisture, of vegetation, &c., are referred to. There are many useful and ingenious hints as to simple methods of illustrating special points by means of diagrams. Then we have an outline of study of elementary geography, for various grades of pupils. Next comes a chapter of suggestions and directions, in which a variety of subjects are dealt with—history, maps, relief maps, field lessons, &c. This is followed by notes upon the course of study, in which some of the subjects are treated over again. Chapter vi. deals with Eurasia; chapter vii., distribution of heat; chapter viii., distribution of nations. In this last the subject is not treated from the geographical standpoint, nor indeed after any very systematic fashion.

[Russia.]—Zapiski (Memoirs) of the Imperial Russian Geographical Society. Statistical Section, vol. vi. pp. 1-413. St. Petersburg, 1889.

Contains, among other articles, one on the development of manufacturing industry in Russia, by Maslennikof, and one on the history of exile to Siberia, by N. M. Yadrintsef.

The same series, vol. vii. fasc. 1. On the geographical distribution of the male population of Russia, according to size as compared with other countries (derived from facts obtained in the course of 1874-1883, when obligatory military service was in force), by Professor Anuchin.

— *Izvestiya* (Proceedings) of the Caucasus Section of the Imperial Russian Geographical Society, vol. ix. No. 2.

Contains report of the proceedings and state of the section in 1886; also a paper by N. V. Jukof on the search for the English alpine travellers, Messrs. Donkin and Fox, who perished while attempting the ascent of Koshtan-tau, read before the section on February 3rd, 1889. A map of that part of the Caucasus illustrates the paper, which is followed by a translation of some remarks by Mr. Clinton Dent, from the 'Alpine Journal,' November 1888.

— *Izvestiya* (Proceedings) of the East-Siberian Section of the Imperial Russian Geographical Society, vol. xx. No. 2.

Contains a paper by N. I. Vitkofsky on traces of the stone age in the valley of the Angara, with three plates of illustrations. Also the results of excavations of a tumulus near Yakutsk, &c.

— *Beiträge zur Kenntniss des russischen Reiches und der angrenzenden Länder Asiens*, 3rd series, vol. iv. Mixed contents, with a map.

This volume contains a review of the physico-geographical conditions of European Russia during the past geological periods.

Grodekof, N. I.—Kirghizes and Karakirghizes of the territory of Syr-daria. Vol. i. juridical customs. Tashkend, 1889: pp. 298 and 205. [Presented by M. Venukoff.]

In this volume, by the author of the famous 'Ride to Herat,' are collected a large number of materials bearing on the nomadic inhabitants of Central Asia—their traditions, tribal origin, customs, institutions, habits, character, their predatory raids, the establishment of a native court in 1867, the powers of its judges and mode of administering justice, with particulars of their games, race-meetings, proverbs, &c. Twelve illustrations and an ethnographical map of the Syr-daria territory accompany the work.—[E. D. M.]

Travel, Adventure, and Sport.—From 'Blackwood's Magazine.' Nos. 1–6. Edinburgh and London, W. Blackwood & Sons: 12mo. Price of each volume 1s.

These volumes form the first of a series now being published by Messrs. Blackwood, consisting of reprints of articles dealing with travel, adventure, and sport, that have appeared from time to time in 'Blackwood's Magazine.' Two of these parts, running to about 200 pages each, apparently make a volume, containing eight or nine articles, all of them interesting, and many of them of original value. The principal contents of No. 1 are—Discovery of the Victoria N'yanza, by Captain Speke; My Home in Palestine, by Laurence Oliphant; and, A Sketch in the Tropics; of No. 2—Narrative of the Red River Expedition, by General Viscount Wolseley, G.C.B.; A Ride to Babylon; and, The King of Tristan d'Acunha, a Forgotten Monarch; of No. 3—The North-East Passage; Two Nights in Southern Mexico; and, A Ride across the Peloponnese; of No. 4—A Journey from Herat to Orenburg, on the Caspian, by Sir Richmond Shakespear; The Inland Sea of Japan, by Andrew Wilson; A Run to Nicaragua, by Laurence Oliphant; and, Up Stream, on the Red River; of No. 5—A Reindeer Ride through Lapland, by F. Taysen; The Valley of the Shadow of Death (the Sutlej valley), by Andrew Wilson; and, A Cruise up the Yangtze in 1858–59, by Admiral Sherard Osborn; of No. 6—Among the Afghans, a Surveyor's Narrative, by G. B. Scott; and, the Americans and the Aborigines, Scenes in the Short War, from the German of Charles Sealsfield. Messrs. Blackwood are doing a good service in republishing these articles in a form easily accessible. Such papers as that by Sir Richmond Shakespear deserve to take a permanent place in the literature of travel.

The following works have also been added to the Library :—

Hurgronje, C. Snouck.—*Bilder aus Mekka. Mit kurzem erläuterndem Texte.* Leiden, E. J. Brill, 1889: large 4to. [Presented by his Excellency the Minister for the Netherlands.]

A collection of 18 photographs, comprising views of Mecca, its buildings, pilgrim gatherings, &c., in continuation of the Atlas illustrating Dr. Snouck Hurgronje's work on Mecca, noticed in the 'Proceedings' for November 1888 and May 1889.

Mallock, W. H.—*In an Enchanted Island, or a Winter's Retreat in Cyprus.* London, R. Bentley & Son, 1889: 8vo., pp. 298, frontispiece. Price 12s.

A brilliantly written account of a visit to Cyprus in 1888, with notices of Larnaca, Nicosia, Kyrenia, and Famagusta. As might be expected there is a certain fanciful air about the book, but Mr. Mallock reproduces with marked success the impression which a journey through Cyprus would make on a man of intelligence above the average. Though the book makes no pretence to be a work of scientific travel, the reader will obtain a very complete and accurate notion of what Cyprus is like.

[**Ptolemy.**—*Geographiæ vniversæ tym veteris, tym novæ absoltissimvm opus, duobus voluminibus distinctum, in quorum priore habentur Cl. Ptolemæi Pelvsiansis Geographiæ enarrationis Libri octo: Quorum primus, qui præcepta ipsius facultatis omnia complectitur, commentarijs vberrius illustratus est à Io. Antonio Magino Patavino. In secundo volumine insunt Cl. Ptolemæi, antiq̄æ orbis tabulæ xxvii. ad priscaas historias intelligendas summè necessarie. Et tabulæ xxxvii. recentiores, quibus vniuersi orbis pictura, ac facies, singularumq̄; eius partium, regionum, ac prouinciarum ob oculos patet nostro sæculo congruens. Vnà cum ipsarum tabularum copiosissimis expositionibus, quibus singulæ orbis partes, prouinciæ, regiones, imperia, regna, ducatus, & alia dominia, prout nostro tempore se habent, exactè describuntur. Auctore eodem Io. Ant. Magino Patavino, Mathematicarum in Almo Bononiensi Gymnasio publico professore. Anno 1597: pp. (vol. i.) 47 and 184; (vol. ii.) 292.*

Rusden, G. W.—*History of Australia.* 3 vols. London, Chapman & Hall, 1883: 8vo., pp. (vol. i.) x. and 642; (vol. ii.) 748; (vol. iii.) vi. and 700, map. [Presented by the Author.]

— *History of New Zealand.* 3 vols. London, Chapman & Hall, 1883: 8vo., pp. (vol. i.) viii. and 655; (vol. ii.) 606, viii.; (vol. iii.) 540, map, plate, and plan. [Presented by the Author.]

Samuelson, James.—*India, Past and Present; Historical, Social, and Political.* London, Trübner & Co., 1890 [1889]: 8vo., pp. xiii. and 390, map, portraits, and illustrations. Price 21s.

A useful summary of information on the past and present state of India. The first portion of the book is mainly of historical and ethnological interest; while the second part deals with India at the present day, describing the social condition of the people under the following heads:—Agricultural and Industrial, Educational, Medical, Theological, Judicial, Editorial, Political, &c. An important feature of the volume is a Bibliography, consisting of a brief and careful summary of the principal works for the study of the geography, history, religion, and literature of India, by Sir W. W. Hunter, K.C.S.I., &c.

Widdrington, [Capt.] S. E.—*Spain and the Spaniards, in 1843.* London, T. & W. Boone, 1844: 2 vols., 8vo., pp. (vol. i.) ix. and 436; (vol. ii.) vii. and 396.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

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ASIA.

Palästina.—Neue Wandkarte von —, von Heinrich Kiepert. Scale 1:200,000 or 2·7 geographical miles to an inch. Berlin, D. Reimer. 8 sheets. Price 8s. (Dulau.)

AFRICA.

Afrika.—Karte von —, von R. Andree und A. Scobel. Scale 1:10,000,000 or 137 geographical miles to an inch. Ausgeführt in der geographischen Anstalt von Velhagen und Klasing in Leipzig. Neuer revidierter und vermehrter Abdruck. Bielefeld und Leipzig, Verlag von Velhagen und Klasing, 1890. Price 5s. (Dulau.)

This is an excellent general map of Africa, on which the present state of our knowledge of that continent is accurately represented. With the exception of English, French, Portuguese, Spanish, and Dutch names, the system of orthography adopted is that which would convey a correct sound of the native names when spelt in German. There are four insets on which German East Africa, the Cameroon District, the Slave Coast, and the Cape de Verde Islands are given on an enlarged scale. The importance of places is indicated by the size of the lettering, and for the purposes of comparison the kingdom of Saxony is given, drawn on the same scale as the map. The map is a beautiful specimen of cartography, and on the cover will be found letters from Professors Schweinfurth, Kirchoff, and Dr. Erman, speaking of this map in terms of praise, to which it is justly entitled.

Africa.—Carta murale dell' —, disegno del Prof. G. Cora alla scala di 1:8,000,000 or 109·6 geographical miles to an inch. Riveduta sui più recenti documenti geografici e politici. 4 sheets. Torino, G. B. Paravia & Co. Price 8s. (Dulau.)

Kilimandscharo.—Der Kibo-Krater des —. Nach einer provisorischen Skizze des Dr. Hans Meyer, Okt. 1889. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Taf. 2. Gotha, Justus Perthes. (Dulau.)

Stanford, E.—Map of the British Possessions in West Africa. Scale 1:6,000,000 or 82·1 geographical miles to an inch. London, E. Stanford, 1890.

Zambeze.—Esboco do Curso do —. Scale 1:200,000 or 2·7 geographical miles to an inch. Ministerio da Marinha e Ultramar. Lisbon, 1889. (Dulau.)

The course of the river Zambezi between its delta and a position thirty-five geographical miles above Tete is exhibited on this sketch-map. In its general features it differs somewhat from the results of the late Admiralty survey of the delta, and the map compiled by Mr. Ravenstein for this Society, but as there is no graduation, it is not possible to decide the extent of these differences with any degree of accuracy. The Baena river, in about lat. 18° 30' S., laid down (with a ?) on Ravenstein's map, does not appear in this map. More important differences are observable in the distance between the junction of the Shire and Zambezi, and that of the Ziu-Ziu, which is about ten miles greater on the present map.

Zoutpansberg und Bonjal.—Kartenskizze von ——. Gezeichnet von C. Knothe, 1889. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 4. Gotha, Justus Perthes. (*Dulau.*)

AMERICA.

América Central.—Mapas de Colton^o ——. Publicados por D. Appleton y Compañía, Nueva York. Scale 1:1,705,000 or 23·3 geographical miles to an inch. 2 sheets, 1889. Price 1l. 11s. 6d. (*G. Philip & Son.*)

The compiler of this map appears to have spared no pains to make it as complete as possible. Departments, capitals of States, towns, villages, &c., are distinguished by symbols, and the style of lettering. A useful table of distances is given, and, in addition to insets of the Isthmus of Panama, there is a map of the World on Mercator's projection, on which the lines of steam communication between Central America and the principal ports of the world are laid down.

Brasil.—Originalkarte des nordwestlichen Teiles der brasilianischen Provinz São Pedro do Rio Grande do Sul. Nach den neuesten Materialien und mit Benutzung eigener Aufnahmen, entworfen und gezeichnet von Max Beschoren, 1886. Scale 1:1,250,000 or 17·1 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 96. Gotha, Justus Perthes. (*Dulau.*)

California and Nevada.—Bancroft's New Map of ——. Compiled from the latest and most reliable official sources and special surveys. 1889. Scale 1:759,200 or 10·4 geographical miles to an inch. Published by the Bancroft Company, San Francisco. Price 1l. 6s. (*G. Philip & Son.*)

On this map all means of communication are accurately laid down. The hill-shading is effective, and exhibits the physical features of the country in an efficient manner. Among the details given are the survey sections, which will be of service to those who may desire to locate any particular tract of land.

Gordon, Carlos.—Mapa de los Ferro Carriles de la Republica Argentina y los Países Limitrofes. Complado por Carlos Gordon. 1889. Scale 1:1,800,000 or 24·6 geographical miles to an inch. Maclure & Co., London. Price 15s. (*G. Philip & Son.*)

This is a rough outline map, and is only valuable as indicating the state of railway communication in the Argentine Republic.

Mexico.—Colton's General Map of ——. Published by G. W. and C. B. Colton & Co., New York, 1890. Scale 1:3,800,000 or 52·5 geographical miles to an inch. Price 6s. 6d. (*Dulau.*)

INDIAN OCEAN.

Comoro Islands.—Die westlichen Komoren (Angasija und Mohilla). Nach den Aufzeichnungen von Drs. K. W. Schmidt und älteren Quellen, gezeichnet v. Paul Langhans. Scale 1:833,333 or 4·5 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' 1890, Tafel 1. Gotha, Justus Perthes. (*Dulau.*)

ATLASES.

Bartholomew, John, F.R.G.S.—The Library Reference Atlas of the World, by John Bartholomew, F.R.G.S. London and New York, Macmillan & Co., 1890. Price 2l. 12s. 6d.

This Atlas contains 84 sheets of maps, and a copious index. Sheet 1 contains ten astronomical diagrams, which are very nicely drawn, and have been well selected for illustrating the different phenomena. Nos. 2 to 7 contain maps of the World, illustrating physical features, meteorology, ethnology, prevailing

religions, extent of the British Empire, commercial geography, &c. These maps are very clearly drawn, and the distinguishing colours employed have been well chosen. Sheet 8 contains maps of the North Polar and South Polar regions, coloured to show the different conditions of the surface soil. The remainder of the atlas is devoted to political maps, many of which contain insets. Eighteen maps (Nos. 10 to 27) are devoted to the British Isles. They are drawn on a conveniently large scale, and all means of communication are very clearly laid down. Sheet 31 contains small plans of London, Paris, Berlin, Rome, St. Petersburg, Constantinople, and Copenhagen. The map of Switzerland, No. 33, does not exhibit the physical features of the country in a satisfactory manner. The map of Palestine is worthy of special commendation, it is coloured orographically, and is altogether exceptionally good. Nos. 45 to 48 are devoted to India. Two general maps are given on an identical scale, one orographically coloured, and the other political. These are followed by a three-sheet map containing a large amount of information. The system of orthography adopted throughout the maps of India is that of Sir W. W. Hunter. Nos. 53 to 56 are maps of Africa, which have been carefully brought up to date. On the map of the North Atlantic, ocean currents, mail routes, and telegraph cables are laid down. Canada is shown on six good maps, and ten are devoted to the United States, they are up to date, and are drawn on a sufficiently large scale to be useful for reference. There are good maps of Australia and each separate colony, and the atlas concludes with a general reference index of the names of 100,000 places contained in the maps.

While giving credit to the author and publisher for having produced a thoroughly useful reference atlas, it may be remarked that except in special maps, the physical features are not shown in a sufficiently decided manner.

Bartholomew, J. G., F.R.G.S., F.R.S.E. &c.—The Century Atlas and Gazetteer of the World. Edited by J. G. Bartholomew, F.R.G.S., F.R.S.E. &c. London, John Walker & Co., 1890. Price 3s. 6d.

Considering the number and quality of the maps which this Atlas contains the price asked for it (3s. 6d.) is very small. The maps are 52 in number, all of which are drawn in a far superior style to those which are usually given in cheap atlases. The astronomical diagrams and physical maps are well suited to the purpose for which they have been published, while the political maps are very clearly drawn and not over-crowded with names. At the end of the atlas there is a Gazetteer containing 35,000 names, in which brief particulars of each place mentioned are given.

Hachette et Cie.—Atlas de Géographie Moderne, édité par Hachette et Cie. Ouvrage contenant 64 cartes en couleur, accompagnés d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, diagrammes, &c. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Librairie Hachette et Cie., 1890. 9^e Livraison. Price 10d. (*Dulau.*)

No. 2 contains four projections of the sphere. This sheet is accompanied by some valuable notes on projections by D. Aitoff. No. 12 contains a political and administrative map of France, and three maps on a smaller scale, one of the navigable waters of France, another illustrating the financial position of the principal French railway companies, and a third indicating the density of the population of France. The notes, by Camille Koechlin, which accompany this map are very interesting, and are illustrated by several maps and statistical diagrams. Sheet 18 contains an outline map of the World on Mercator's projection, on which the position of all the French colonies is indicated, the remainder of the sheet is occupied by eleven maps on which French colonies are given on an enlarged scale, on the back of this sheet a résumé of French Colonial History, by H. Jacottet, is given, which is illustrated by maps, and furnishes statistics as to the area and population of the French possessions in the different parts of the world.

Philip, George, and Son.—Philips' Imperial Atlas of the World, a Series of Eighty Maps, illustrating every aspect of geographical Science. Engraved from

original drawings compiled from the latest surveys and the works of eminent travellers and explorers. London, George Philip and Son, 1890. Price 8*l*.

A comparison of the present edition of this excellent atlas with that of 1864, will show the care which has been taken in its revision, and the valuable additions which have been made to it. The edition published in 1864 contained fifty-one sheets of maps, the present one eighty. The first five sheets are devoted to physical geography, meteorology, the distribution of animal and vegetable life, and the hydrography of the Atlantic Ocean; the remainder of the atlas is devoted to political geography, with the addition of maps containing information that cannot fail to be of value to the student. Among these latter will be found the following: orographical maps of the British Isles, Europe, Asia, Africa, and North and South America, a geological map of England and Wales, a hydrographic map of the Mediterranean Sea, and several others of the same description. The following maps are worthy of special commendation:—the general map of India in two sheets, which has been carefully brought up to date, and the hill-shading is a great improvement on that of the map in the earlier edition; Syria and Palestine, which appears to have been almost entirely re-drawn. The large-scale map of Africa, on three sheets, is entirely new, and exhibits all political divisions and modern discoveries. On Sheet 71 a new map of Chili has been added. A copious index is attached to each of the political maps, and taken as a whole, this is a very complete and useful atlas. It would, however, have been better if the physical features on many of the maps had been more plainly indicated; as it is, the hill-shading is not sufficiently pronounced to convey a correct idea of the relief of the country.

Stieler's Hand-Atlas.—Neue Lieferungs-Ausgabe von ——. 95 Karten in Kupferdruck und Handkolorit, herausgegeben von Prof. Dr. Herm. Berghaus, Carl Vogel und Herm. Habenicht. Erscheint in 32 Lieferungen (jede mit 3 Karten, die letzte mit 2 Karten und Titel). Neunzehnte (19) Lieferung. Inhalt: Nr. 38, Grossbritannien, nördliches Blatt in 1 : 1,500,000, von A. Petermann. Nr. 48, Ost-Europa, Blatt 5 in 1 : 3,700,000, von A. Petermann. Nr. 51, Balkan-Halbinsel, Blatt 1 in 1 : 1,500,000, von C. Vogel. Gotha, Justus Perthes, 1890. Price 1*s*. 6*d*. (*Dulau*.)

Sheet 38 is a map of Scotland on which insets are given of the Shetland and Orkney Islands, Loch Lomond and the Trossachs, and a plan of Edinburgh. The style in which this map has been produced is hardly equal to that of the other maps in the present edition. Sheet 48 is part of the five-sheet map of East Europe, and contains portions of Southern Russia, and the Balkan Peninsula. No. 51 is part of the four-sheet map of the Balkan Peninsula.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in November and December 1889.

No.		Inches.	
177	m =	2·4	Mediterranean, Italy :—The Faro or strait of Messina, 2 <i>s</i> .
136	m =	9·0	India, bay of Bengal :—River Húgli, Sangor point to Calcutta, 2 <i>s</i> . 6 <i>d</i> .
1272	m =	2·0	Bay of Bengal :—Approaches to Yé river, 2 <i>s</i> .
389	m =	10·1	China, east coast :—Shanghai harbour, 2 <i>s</i> .
1236	{m =	4·0 }	China, Pe Chili strait :—Approaches to Port Arthur or Lu Chun Ko. Port Arthur. 1 <i>s</i> . 6 <i>d</i> .
	{m =	9·0 }	
2349	m =	0·25	Australia, east coast :—Magnetic island to Double point, 2 <i>s</i> . 6 <i>d</i> .
253a	Gulf of Aden :—Plan added, Khor Ambada anchorage.

(*J. D. Potter, Agent*.)

CHARTS CANCELLED.

No.		Cancelled by	No.
177	Strait of Messina	New plan, The Faro or strait of Messina	177
136	River Húgli	New plan, River Húgli	136
389	Shanghai harbour	New plan, Shanghai harbour	389
1392	Plan of port Arthur on this chart	New plan, Port Arthur	1236
2349	Magnetic island to Double point	New chart, Magnetic island to Double point	2349
1948	Rockingham bay to Palm islands }		
1166	Worms head to Pwll-du head.		
2346	Winga sound.		
1235	Long Point bay.		
1418	Saddle group.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2011. England, west coast:—Holyhead harbour. 1170*b*. England, west coast:—Holyhead to Liverpool, eastern sheet. 1185. England, river Thames:—Sea reach. 121. Baltic, Skagerrak:—Koster islands and approaches to Marstrand and Klädesholm. 196. Baltic entrance: Nidingen to Hönö, including Winga sound and approaches to Göteborg. 2296. Baltic, gulf of Bothnia:—South Quarken to Hornslandet. 2115. Denmark:—The Sound. 650. Africa, east coast:—Inambán river. Kilimán river. 664. Africa, east coast:—Sheet 10: from 6° 38' S. to 4° 23' S. 838. Andaman islands:—Andaman strait. 2414. Gulf of Siam. 1392. China, north coast:—Pe-chili strait. 2394. China. Liautung gulf, Liau river entrance. 2405. Manchuria, or Russian Tartary:—Kuril islands from Nipon to Kamchatka. 2460. North-west Pacific ocean:—Kamchatka to Kodiak island. 985. South Pacific ocean:—Minerva reefs.

(*J. D. Potter, Agent.*)

North Atlantic Ocean.—Pilot Charts of the —, January and February 1890. Published monthly at the Hydrographic Office, Navy Department, Washington D.C., Henry F. Pickens, Captain U.S.N., Hydrographer.

Portuguese Charts.—Bahia de Tungue. Parte Oeste. Provincia de Moçambique. Comissão de Cartographia. 1889.—Barra e Rio Linde. Reconhecimento hydrographico até. Provincia de Moçambique. Comissão de Cartographia. Lisbon, 1889.

Service Hydrographique de la Marine, Paris.—No. 4360. Océan Indien. 1889.—No. 4233. La Rance de St. Servan au Chatelier. Côte Nord de France. 1889.—No. 4346, Corse, Ile Rousse et ses Environs. 1889.—No. 4357, Guatemala, Port Livingstone (Embouchure du Rio Dulce). 1889.—No. 4354. Océan Pacifique Sud. Ports et Mouillages dans les Iles Samoa. 1889.—No. 4310. Nouvelle Calédonie, Nouvelles Hébrides. Service hydrographique de la Marine, Paris.

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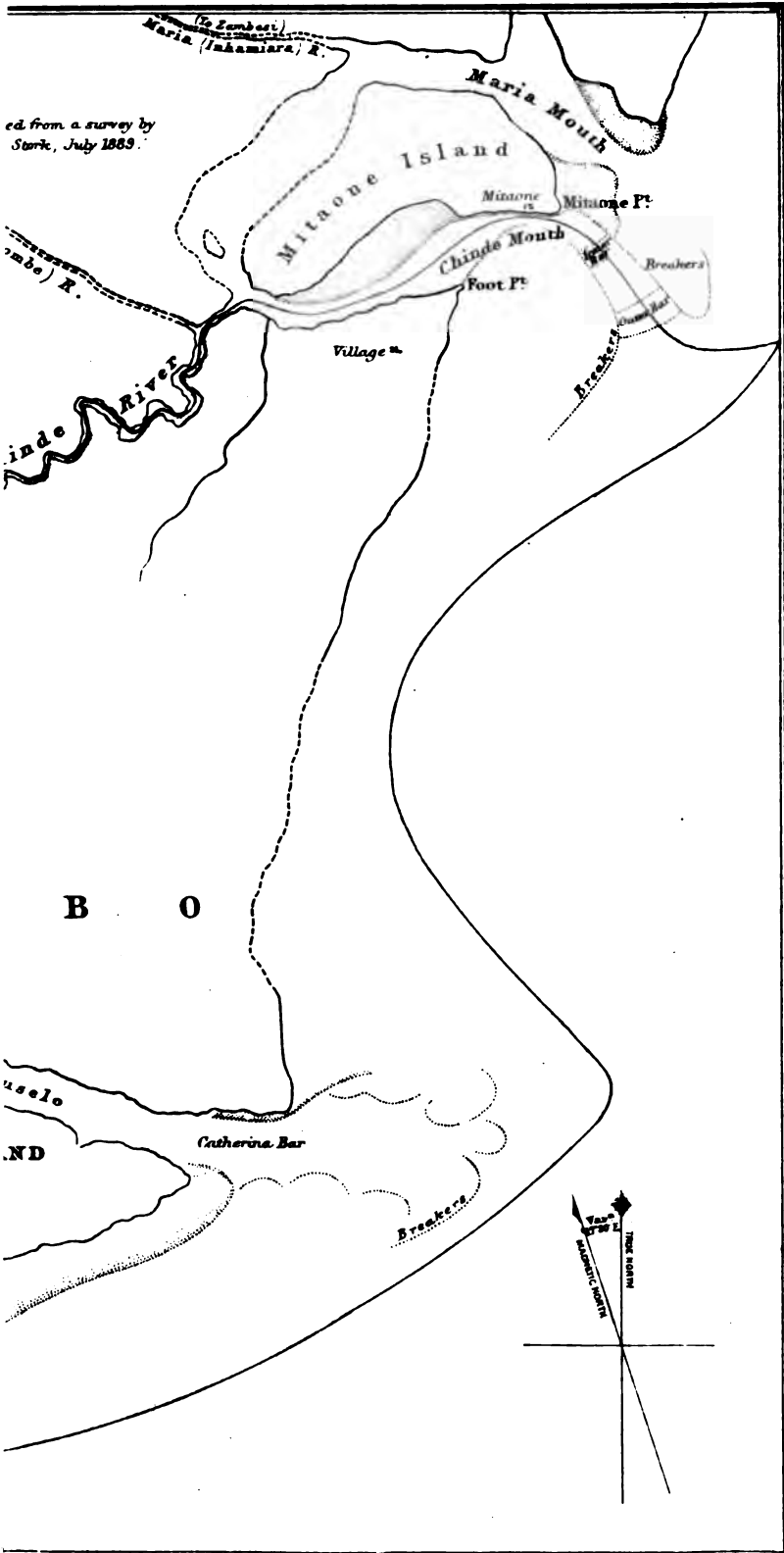
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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Journey to the Summit of the Owen Stanley Range, New Guinea.

By Sir WILLIAM MACGREGOR, K.C.M.G., Administrator of New Guinea.*

(Read at the Evening Meeting, December 9th, 1889.)

Map, p. 256.

WHEN on a visit of inspection to the district of Doura, a coast district to the north-west of Port Moresby, I learned that a river named the Vanapa entered the inlet known as Galley Reach, and that it was probable this river would be found to run towards the great mountain ranges of the interior; and I then determined to devote some time to an ascent of the river in question, if found navigable by boats. With this object in view, I left Port Moresby on the 20th of April, 1889, in my boat manned with a native crew, accompanied by my staff, and proceeded along the coast to Manumanu. On the 22nd we entered one of the mouths of the Vanapa river, which opens into Galley Reach on its eastern side, about five miles from Manumanu. This entrance to the river lies in a bend of the inlet where the coast is covered by mangrove swamps, and escapes observation unless one is searching expressly for it, which no doubt explains its being omitted altogether on many charts of this part of the country.

We got some seven or eight miles up the river the first day, having the tidal water for about three or four miles; but beyond that point, in consequence of recent heavy thunderstorms inland, the river was swollen and muddy and the current against us strong. As far as the tide ascends the river, mangroves grow on the banks, and the Nipa palm on the river's edges; but beyond that the banks become 10 or 12 feet high, and are clothed with large trees, the soil being deep and rich, but whether liable to occasional flooding cannot at present be stated.

On the 23rd we continued our course up the river for about seven miles. During the afternoon we began to approach the first low hills in the river's course, and had to ascend two rapids, the first we had met.

* Being the Report (with slight abridgment) of Sir W. Macgregor to H.E. Sir H. W. Norman, G.C.B., Governor of Queensland.

Below the rapids the river bottom contained many "snags"; not enough to impede the passage of the boat or even to make it dangerous going up against stream, but requiring very careful watching in coming down the river. The course of the stream we found to be very crooked, at times running north, at times due south. No natives, and hardly any trace of natives, were seen during these two first days of our journey. The nature of the country was much the same as that traversed the day before, there being a large amount of deep, flat, alluvial land on both sides of the river, of which, however, probably a large amount is wet, and liable to be flooded periodically. On the 24th we had much difficulty in poling and dragging the boat up some rapids, the current being very strong, and the river, though falling, still deep; so that it was difficult to see and avoid the large boulders that stud the bottom of the river at this point. On this day we entered between the first low ranges of hills, which are covered by forest. There is no appearance of forest-clearing or cultivation anywhere, nor any trace of natives. On this day we accomplished only about four miles, in spite of the best exertions.

On the 25th we continued our ascent, poling, pulling, or dragging the boat, according to the nature of the different bends of the river. We passed a number of rapids, and by night found ourselves with hills on all sides of us. These are very steep, of a slaty nature, and covered by trees, which, from the extreme steepness, are not as a rule very large. One of our party had a narrow and lucky escape from a large snake, on which he put his hand when picking up sticks to make our fire with. This reptile was cleverly noosed by a native, and the skin secured for our collection. We passed a large rock on the right bank of the river, which seems to be quite exceptional in its formation in this part of the country. It would apparently make an extremely fine building stone. Specimens were obtained for examination. It is a grey stone, full of crystalline needles, like manginite.

After we had pitched camp, I went to examine a native-built suspension bridge, which our hunting party had discovered about a quarter of a mile up stream—a remarkable structure, occurring in such a locality and built by such a primitive people as the inland natives are in this district. At the spot where the bridge stands the river is narrowed by a rocky point that encroaches on the left bank from a steep hill immediately adjoining; advantage has been taken of this in building. The bridge, which is thus only about 70 yards long, is chiefly supported by a large banyan tree, which grows on the rock on the left bank about 20 feet from the water's edge; it starts from this tree at an elevation of about 50 feet above the pool below, descends in midstream to about 12 or 15 feet from the water, and rises to about 20 feet on the right bank, where it is suspended to a tree not sufficiently large or strong to receive the whole of this end of the bridge, and is therefore supple-

mented by a post put into the ground, and this again is strengthened by a cross-bar to the live tree, and fixed by stays extending backwards to trees behind. The material employed is rattan cane. Of these, fifteen are used to form supports, but as they have not all been long enough to cross the river, some of them have been joined by knotting. The floor of the bridge is formed of four of these canes, but, as two appear to have been broken, the second pair have probably been laid down in effecting repairs. About 2 feet 6 inches from the floor there are two rattans on each side, and about 2 feet 3 inches above these again are three rattans on the lower, and four on the upper side. They are not plaited or twisted but are kept in position by split cane worked from the floor to the middle and top rattans, which serves the double purpose of connecting the several strands, and would probably prevent one from falling into the river should one stumble in crossing. A transverse section of the bridge would show it to be nearly V-shaped, but with the sides slightly rounded. The height of the V is about 5 feet, the width at the top about 3 feet 6 inches, and the distance of the middle strands from each other about 2 feet. The top strands are kept apart by a cross-stick, the ends of which are tied to the top of each strand. Suitable platform approaches have been built at the ends, and the whole structure is both strong and graceful. Five of our people crossed it at one time, and, from all appearance, it could have borne many more.

On the 26th the river had become narrower as we advanced, and we had to contend with some strong rapids. The hills are steep, but in this part there is some good timber. On a hill on the right side of the river we saw a small platform of branches near the top of a high tree, evidently a "look-out" from which the natives of the district could obtain a view of anyone approaching; and from the point where we had lunch at mid-day some clearing for planting purposes and some bananas were visible on the left bank of the river; but we neither saw nor heard any natives. During the halt for lunch there occurred the first case of fever we had on the expedition, but it soon ceased under the usual treatment. The patient was one of the Europeans. The weather, favourable from the start, still continued so, rain falling only at night as the thunderstorms originating further inland gradually extended their radius.

On the 27th we found the rapids so strong, and of such frequent occurrence that it was concluded it would not be advisable to continue to proceed in the boat beyond this day's journey, and accordingly a suitable camp was looked for, and found at a spot on the right bank of the river, where there was a small point of nearly level ground at the foot of a steep hill extending some distance inland. This place became our principal depot for the expedition. By our estimate it is 40 miles from Manumanu by water, 35 miles of this being on the Vanapa itself.

I had now satisfied myself that it was possible to conduct an expedition of sufficient magnitude up the Vanapa river, and to find a way

from our camp towards the interior. Mr. Cameron, my private secretary, left camp on the morning of the 28th to proceed to Port Moresby for the necessary carriers, provisions, &c., and I remained with a party of two Europeans, two Polynesians, and two Papuans, intending to find out what our future route should be. I was able to trace the Vanapa river several miles upwards, to lay down a line of march towards the main mountain range, to obtain certain data with regard to the relative position of the mountains, &c., which proved to be of great value to us in our further journey. But these operations were greatly impeded by the ill-health of the party, none of whom, excluding myself, escaped fever. A thunderstorm began daily on the inland ranges about 1 or 2 p.m., and rain, sometimes in torrents, followed, reaching our camp early in the afternoon. The forenoons were sultry, and the forest very wet in the morning. Everywhere there were traces of natives, where they had been fishing or hunting. No natives were seen, nor could I observe anywhere any indication of permanent native residence, except at a distance of several days' march from our camp. The furthest distance inland from the camp reached by me was between six and seven miles, and up to that point we laid out and cut a road through the "bush," but I had only one man with me up to that spot, such was the unsatisfactory condition of the health of my small party.

All the hills in this district were found to be of a slaty formation, with numerous thin veins of white quartz; in some of the creek beds there were a few large boulders of conglomerate, and many smaller ones of basalt, but these were all isolated, the fixed rocks being without exception slaty. No trace of gold or other precious metal was found. The hills are so steep that the probabilities would be against finding, by the ordinary means of search, any trace of gold in the numerous creeks. There is, however, a large quantity of timber in the district, which is clothed everywhere with dense forest, and the Vanapa river would afford an easy, cheap, and safe conveyance for it to the sea. Unfortunately, the trees were not in flower then, and it was not possible to obtain such specimens as would determine the species of the different kinds of timber; but there are many cedar and ilimo trees, the latter of which is said to resist the white ant. The hills are so steep, and the gorges by which they are separated are so narrow, that there is no land fit for cultivation beyond ten or twelve miles from the opening of the Vanapa river into Galley Reach. At our depot camp this river is about 70 yards broad and contains a large volume of rapid running water; indeed there is no perceptible difference in its size near the mouth and at this camp, 35 miles up; we observed only two creeks worthy of notice on the way up opening into it.

About two and a-half miles from camp we discovered, on 30th April, a rocky height on the first mountain we traversed (Mount Gleeson), whence a very fine view of all the mountains of the interior, right up to

the summit of the Owen Stanley Range, could be seen. It was named, and is known to us as "Jack's Rock," and is strongly recommended to future travellers as an excellent observing point, although its altitude is only about 1000 feet.

On the 12th May, Mr. Cameron arrived, with fifteen men carrying supplies. He had left the main body of the expedition to come up in two whaleboats, and as the river was flooded he, fearing we should be quite out of provisions in camp, had left the boats and pushed on overland. He reported the overland journey as something dreadful, on account of the extremely rugged nature of the hills. Cameron's party, however, came into contact with the natives that live in the country in the vicinity of the bridge spoken of. Mr. Cameron described them as very noisy, at first frightened and suspicious, but as being after a little time very friendly, offering food and inviting his party to their villages. On the morning of the 16th the two whaleboats arrived, all the stores and provisions being in good order. The afternoon rains ceased totally about the 10th, and the river in about two or three days fell to its normal volume, which greatly facilitated the passage up of the two boats. The whole of the day after the arrival of the boats was spent in preparing the packs for the march inland, to commence next morning.

We left camp on the 17th. There marched out, all told, forty-two persons: four Europeans including myself, George Belford (a Samoan half-caste, a man of excellent character and well acquainted with this country, who proved of the greatest use to me), five Polynesians, and thirty-two Papuans. There was such difficulty in transporting our baggage that every man, without respect of person, had to leave camp with all he could carry. Two Europeans, who were already too weak to accompany us, remained in camp. As the path had been cut for the first day's march, we covered about four miles before we camped in the afternoon at Exton Junction, where the Exton Creek enters the Vanapa river. We traversed the long spur of Mount Gleeson, its highest point being 1292 feet, and had to cross another ridge about 800 feet high, while the altitude of our camp at Exton Junction was only about 300 feet. Some of our carriers had to do a double trip, as there were some three or four packs we could not bring with us from camp. For this they were promised a moderate addition to their pay—three sticks of trade tobacco each.

We left Exton Junction early on the morning of the 18th, and had at the start some very steep ridges to cross, which did not, however, take us before lunch over any ground exceeding 700 or 800 feet in height. We passed several creeks in slate and quartz formation, which looked, especially one, very promising for gold, but no trace of that metal was found on washing gravel. At noon we halted at Taula Creek, at an altitude of 583 feet, for lunch, having walked over rough road, about two miles from Exton Junction. The same formation of

slate and quartz was observable here, but the hill sides were very precipitous, and the timber not as a rule large. We then ascended the steep western end of Guba Hill, which we crossed at about 1000 feet, and towards 3 p.m. camped on a spur, about half a mile from its summit, having walked about three miles. The weather remained fine, and the health of the party was good. There were many traces of the passage of natives along the ridges, where they had "blazed" trees and broken branches; but none were seen or heard.

As a native cannot carry more than about three weeks' food for himself, say for fifteen days of forward march and six days returning, it was necessary to detach a number of men from our party to fetch up supplementary supplies, as otherwise we should soon come to the end of our stock. Accordingly Peter Lifu was despatched from the top of Cæsar Hill with eight Kapakapa men, who proceeded on the morning of the 19th to Manumanu by boat, in order to bring up the river to our depot there all stores left at the coast. Some of the Kapakapa men expressed great reluctance to leave me personally, and declared they were extremely anxious to remain by me on this inland journey; but the truth was they were rejoicing to get away. Their departure made our packs very heavy for the next few days until our stores became lighter by consumption. On the 19th we marched about three-quarters of a mile along the top of Cæsar Hill, and then crossed, at a height of about 500 feet, a fine clear stream about 20 yards broad, named by us the Atoa. Its bed was contained by rocks of slaty formation, but the boulders in its course were principally basaltic. At this creek we lunched, and Mr. Cameron went ahead with two men to find and cut a path. In the afternoon we ascended a spur of Mount Kowald, and, continuing through the same sort of country as previously traversed, encamped in the evening on the top of a ridge 1500 feet high, having travelled about $2\frac{1}{2}$ miles.

The 20th was memorable, as being the first time our native carriers expressed a desire to go no further. Some of them had to do double duty, as the packs were more than the reduced party could carry, and therefore some men had to return to the last camp to bring on to the new camp what had been left. The road in the forenoon was both steep and rough, crossing the ridges of Mount Kowald. Many reasons were now assigned why they should return. We had some men who had accompanied Mr. G. Hunter and Mr. Cuthbertson to Mount Obree in 1887, and they declared they were fed much better then than the "Kovana" fed them—that I gave them no meats, jams, or biscuits; others said they thought of their wives and children, to whom they wished to return; and some thought the road impassable. On this occasion Mr. Belford, by the exercise of patience, by threats and expostulation, managed to bring the whole company into camp on the north side of Mount Kowald, about 500 feet from the summit, so that it

was not necessary for myself to return to bring them on. On this mountain were many traces of the wanderings of natives, but none were seen. The weather continued fine, but a little rain fell in the afternoon. We found, on taking stock in camp, that we had rice, on which the natives were almost exclusively fed, for fourteen days. The temperature at this altitude, 2750 feet, did not fall below 75 degrees F. We omitted lunch on this day, because there was no water convenient; but we found it preferable to have only two meals a day when on the march—a practice we followed regularly afterwards on the outward journey.

We required the whole of the 21st to descend the north side of Mount Kowald, at the foot of which we camped, on the right bank of the Vanapa river, which is here very rapid, in a rough and rocky bed, but only slightly smaller than at the depot camp. On the march down this mountain a fresh source of alarm arose for our native carriers. A small native village was seen in a northerly direction on a hill some five or six miles from us. The desire to turn back was universal. When Mr. Belford and Mr. Cameron were out of camp looking for a ford or the means of crossing the river, the two chiefs, Kebokanamo and Vale ni Koro, came to me and said the "boys"—meaning thereby all the natives, and more especially themselves—wished to turn back, because no man could ever reach the great mountain. I asked them whether they had seen the village of the mountaineers. They replied in the affirmative. And I said I should certainly not give them permission to return, nor food; but if they went I should go over to the mountaineers, when they would have to reckon with them and with myself, not as friends. In a very short time I received repeated assurances that "all would go forward; none would go back." Mount Kowald was of the usual slaty formation. It contains a large quantity of fine straight timber, but not many trees of great size. On it we killed two or three snakes, a matter worthy of mention only because we saw none further inland. The river, at our camp at the foot of Mount Kowald, we found to be about 800 feet above sea level. In the afternoon and evening there was a thunderstorm further inland, which deluged us with rain and caused the river to rise three or four feet, a circumstance that rendered our crossing it next morning a matter of some difficulty, as several people suffered here from fever. Our party was weakened, but we had no serious case.

On the morning of the 22nd, Mr. Belford volunteered to cross the river and build a raft on the other bank, with the assistance of the Polynesians, there being good timber for that purpose on a small shingly plateau about 400 yards up the river from our camp. The river, which was muddy, and running very strong, containing many rocks and boulders, seen and unseen, was not an inviting one to cross by swimming. Belford, with a line to be used in pulling tools, canes, &c., across, was the first to take the water, and in about two hours had constructed an excellent raft of light wood, which would have served very well to transport in a

short time all our carriers, who, being mountaineers, were not swimmers, as well as our baggage; but the rattan by which it was being pulled over from the left to the right bank gave way before it was more than half way across, when the raft was hurried down stream by the current and carried off. Belford and Cæsar Lifu were on the raft at the time, but could do nothing to save it, and had to jump into the rapid stream and swim to the side where they could effect a landing. Between one and two o'clock another raft was prepared, and we were by four o'clock all safely encamped on the other side with our baggage dry and in good condition. But we had only covered $2\frac{1}{2}$ miles in two days, although those two days had been very fatiguing.

On the 23rd, we travelled about three miles, at first along the left bank of the Vanapa, and then up one of the spurs and crest of Mount Belford. It was hoped that we might be able to keep in the channel of the river for at least two or three miles, so as to reach the western end of Mount Musgrave, thus doubling Mount Belford instead of having to cross it; but it was found that the river bed was narrow, with very deep pools, confined between the ends of mountain ridges that project their heads, bare and solid rocks, into the river at each side; and past these it was impossible to get without leaving the bed of the river. The first one of these deep pools we came to we evaded by a laborious ascent of an exceedingly steep ridge several hundred feet high. When we were rounding the second one in similar fashion, we found we had got so high on the spur that I declined to descend again to the river bed, feeling sure it was much better for us to keep on the crest of the ridge and get as far from the river as possible. We therefore cut our path along the crest of Mount Belford and camped in the afternoon at an altitude of 2530 feet. Mount Belford does not differ in formation from Mount Kowald and the other hills already noticed. It is exclusively of a slaty nature, with thin quartz veins interspersed. It is not a rugged mountain, speaking comparatively; it contains a large quantity of fine trees, and is more frequented by birds than any mountains crossed by us, unless perhaps Mount Kowald. It appears, from the presence of native paths and camp sites, to be a favourite hunting ground; but no natives reside on it or plant on it. We had some light showers of rain here, but no thunderstorm.

As it appeared desirable to get further east before approaching the main range, it was deemed well to follow further along the crest of Mount Belford, whence it was hoped a spur might be found on its northern side that would lead us to Mount Musgrave, and our march was therefore continued along the top of Mount Belford during the whole of the 24th. By about 3 p.m. we had come about three miles, and I began to think it inadvisable to proceed further in that direction. Unfortunately we were completely enveloped in mist and could not see the next range. We camped at a small hunting-house—a thatched

"lean-to" with a cooking oven, consisting of a hole in the ground and about half a bushel of small slate stones showing quartz veins, a kind of stone that would not be selected for such a purpose were stones of a different sort obtainable. The altitude of this native camp was 3500 feet. The thermometer stood at 74° F., at 3 p.m.; but towards morning we felt it, for the first time on this expedition, decidedly cold, although the thermometer did not show less than 65° F. The weather was wet, but the rain that fell was not heavy. We saw much fine timber on this day's march.

On the 25th one European, and all the natives of the party except eight, turned back to proceed to the depot camp on the river to meet Peter Lifu and the Kapakapa men on their return from Manumanu, and to help them to bring on the additional stores. Those remaining now comprised two Europeans besides myself, Mr. Belford, two Polynesians, and eight Papuans. Our provisions consisted of five bags of rice and one bag of flour, with some tea, a few tins of meat, and one ham; with these things and camp furniture we were again overloaded. Mr. Cameron laid out a track for us, which we cut, down the north side of Mount Belford, but it was an exceedingly bad one, extremely steep in some places, and very rough at others. We got only a few hundred yards beyond the creek at the foot of Mount Belford, and had to camp in a wet, gloomy, very narrow gorge, where we were soon enveloped in mist and rain. We had descended only about 1000 feet, and had not put more than a short mile of road behind us. One redeeming point of the country travelled over on this day's march was the presence of some fine botanical objects; there were tall and graceful wild bananas; a pepper, nearly of the kind used as the national beverage in Fiji and elsewhere, but here growing as a tree 20 or 30 feet high; and several other things that, though rare and valuable as specimens, were too bulky and too heavy for transport. Very noticeable was a remarkably fine rhododendron, dried specimens of which were obtained.

About three-quarters of a mile from our camp of the 25th we came next morning at an altitude of 2635 feet to the Joseph river, a fine mountain stream of about 20 yards broad, running along the southern foot of Mount Musgrave. Here we were able to dry our soaked baggage, and to get a thoroughly enjoyable cold bath, and it afforded some of us great satisfaction to pick out of our skin the ticks that had been securing a lodgment therein for the last two or three days, Mount Belford being more frequented by these pests than any place I have any experience of. The scrub itch insect, which had been causing us great discomfort, was, however, not so easily got rid of as the ticks, and it may be doubted that all those that attached themselves to the expedition are yet extinct. In the afternoon we camped on a spur leading us right up towards the crest of Mount Musgrave, at a height of 3380 feet. We had been lucky enough to select a spur, up the crest of which there was a native hunting

path. Such a path is not passable to men with packs, but it requires less cutting than a ridge on which there is no track at all, and it gives a direction, which also saves time. At 7·30 p.m. the temperature in this camp was 77° F., but the position was a sheltered one. It rained a little during the night and everything was enveloped in fog. At daylight next morning the temperature was 73°.

On the 27th we continued the ascent of the ridge, following the native path; but unfortunately, our progress was slow, as most of our carriers had^d to perform a double journey to bring on all our baggage. About 10 a.m., Mr. Cameron, myself, and the two men clearing our path, got to the top of the ridge, about 5000 feet high. There we found a large hunting house, called by us "Goodwin Lodge." It had evidently been recently occupied, a native dog was running about, but no natives were seen, nor did any respond to our shouts. The house was about 25 feet long, 10 feet wide, and 6 feet high; the roof was covered by the leaves of a dwarfish pandanus, common there. The temperature at "Goodwin Lodge" at 10 a.m. was 71° F. The ground was soaked with moisture, and, as the sun was shining right on the clearing at the end of the house, and the earth there was warm, it seemed to be literally alive with leeches. There was the small wiry-like leech about three-fourths of an inch long, and the larger leech as thick as a goose quill and about two inches in length. Both kinds were present in hundreds and thousands. Mosquitoes were in swarms at the same place, so that we did not remain long at "Goodwin Lodge." Fortunately for us the crest we had reached turned round towards the west and north, and led us towards the main crest of Mount Musgrave, which was reached on the next day's march. We camped at an altitude of 5588 feet, on the top of the ridge, having walked about four miles, the unusually great distance being due to the presence of the good native path we followed. Fog began to close round us before noon. Most of the trees at this elevation seemed to belong to the myrtaceous family; they are not of large size. Towards evening the temperature was 65° F., and a little rain fell. During the night we could hear the sounds of native festivity and dancing, apparently proceeding from a large number of people some two or three miles north-west of us, the direction in which it appeared the native path we had followed proceeded. As we had covered more ground than usual during the day, Mr. Belford and the native carriers slept in the camp below, which we had formed the previous evening, to bring on their second loads next day, so that, having to wait for them, we were unable to shift camp on the 28th. Mr. Cameron and myself took advantage of this halt to follow up the native path some distance, and before proceeding much more than a quarter of a mile we were able to obtain a good view of the Owen Stanley Range, and to get angles, &c., from the western end of the crest of Mount Musgrave. From this point we saw a large native village on one of the ridges on the south-

west foot of Mount Knutsford. Mr. Cameron, who is a qualified and experienced surveyor, was of opinion that it would take as long to go from Mount Musgrave to Mount Victoria as it had taken to come to Mount Musgrave, although the distance in a straight line was not more than thirteen miles from the western end of Mount Musgrave to the summit of Mount Victoria.

It appeared then to be worthy of consideration whether the easiest way of reaching the highest point of the Owen Stanley Range would not be to ascend Mount Knutsford and cross from its summit, rounding the head of the Vanapa river, to the main range, along the top of which it appeared possible to proceed to Mount Victoria, a route that subsequent events compelled us to adopt. At that distance, however, it was not possible to see how extremely steep are the two great spurs that come from the summit of Mount Victoria down to the Vanapa river, and up one of which it was hoped we might force our way. It was therefore determined that we should proceed eastward along the crest of Mount Musgrave until nearly opposite Mount Victoria, and then look for a ridge on the north side of Mount Musgrave leading down in the desired direction.

On our way back to camp we heard in it the characteristic gabble of excited Papuans, and knew at once we were receiving a visit from the natives. We found there a man with whom we were soon on friendly terms. Four others soon arrived, and we, without difficulty, induced them to bring more natives to see us and to fetch us a pig and some native food, which we received before night from a score of natives—men, youths, and boys. We were visited by these people, sometimes by forty or fifty at once, as long as we remained in the vicinity, and received from them sufficient food to be of great service to us; and throughout we were on the most friendly terms with them, sometimes returning their visits, which they always invited us to do. They speak a language that has strong affinities with that of the Koiari people on the one hand and with that of the people between them and "Doura" on the other; that is a Papuan dialect. They are physically stronger than the coast men, perhaps a little shorter, having long and strong bodies, but generally shorter and more muscular legs. They do not tattoo, nor wear nose nor ear ornaments. The older men wear caps made of the best of cuscus fur, with a frontal ornament made of white shells ground down to thin plates and then sewn together, and with cheek pieces of black cassowary feathers. Others wear caps that are more elaborate, but less picturesque, trimmed with boars' tusks and the teeth of dogs.

Youths generally wear on their heads a piece of native-made cloth, apparently manufactured from the paper mulberry, into which they gather their copious mops of hair. On the breast they wear a piece of net-work, with a small mesh, about 8 or 10 inches deep, and long

enough to extend rather more than half-way round the ribs. It is fastened behind by strings from its four corners. They all wear the perineal band, as worn at the eastern end of New Guinea; but in addition to that every man and boy is clothed in a girde of paper mulberry cloth about 10 or 12 inches deep, but cut up into lappets, and over this they wear in front as an apron a small net bag, about 9 inches or a foot in length. On the neck, legs, and arms they wear rings of cane, sometimes plain, sometimes plaited or twisted. Their features are decidedly good, their faces indicating more character and strength than those of the average coast men. In not a few the cheekbones are rather broad and prominent. The nose is generally of the Semitic type, the nostrils either not arched or much less so than is usual in Papuans, and the chin and underjaw are also stronger. They possess all the volubility of the Papuan race, are less shy than tribes that have seen more of white men, but are apparently superstitious and easily frightened. They informed us that they used both the bow and the spear, but we never saw one of them with a weapon, and I could not induce them to bring any to camp; not, as it appeared, as if they mistrusted us, but seemingly doubting whether it might not be misunderstood should any of them with arms in their hands meet any of our party away from camp. It is much to be regretted that personally I was such a short time near them that I was able to obtain from them only a brief list of words of their dialect. They always left our camp before nightfall. They are fond of, and will give food in exchange for, salt, beads and cutlery. Tobacco they do not prize greatly, as they grow very good tobacco themselves. I procured from them a small parcel of tobacco seed, and some peas and beans which they cultivate; all these will be forwarded to the Agricultural Department of Queensland. They grow yams, sweet potatoes, and several varieties of bananas, and have abundant food.

On the 29th we were able to resume the ascent of the crest of Mount Musgrave, along which we proceeded about two miles on this day, and camped at 7180 feet. Here the temperature was 70 degrees at noon, but fell at night below 60 degrees. We found the climate raw and foggy. Everything is draped in moss, which gives the forest a soft and lonely aspect; and at that time all objects were saturated with moisture. It seemed strange that in such a place mosquitoes should make themselves troublesome. Water for culinary purposes was not at first very good or abundant; but a copious supply was discovered a day or two afterwards, and this point was made a permanent camp. At first, too, there was great difficulty in getting fuel to burn, but it was soon found that some of the green timber burned far better than fallen wood. In the afternoon we were visited by a large number of natives, who assisted our people in transporting the baggage, and brought food for sale. Endeavour was made to induce three of them to accompany us to the Owen

Stanley Range. The man that appeared to have the greatest influence among them showed much respect for my authority, and was very frank and friendly. But when it was intimated to him, by words and signs, that I wished him to go with us, he made what were understood to be very complimentary speeches; but they always ended with a pantomime of signs and expressions, which seemed to indicate that his legs were not strong enough, that his breath was too short, and that it was impossible to get up to the tops of high mountains. Neither he nor any of his people were understood to make any objections on superstitious grounds; and it may be stated here that no Papuan on this expedition ever expressed on religious scruples any fear or disinclination to ascend the Owen Stanley Range. The chief of these people and two young men finally appeared to consent to go with me; and I understood the chief to say and mean he was going home to fill his net-bag with food for the journey; and they received small presents on this understanding. But as they did not arrive before we started next day, which, however, we subsequently learned to be impossible on account of distance, we did not wait for them; and we had no guide beyond this.

Mount Musgrave does not differ in formation from Mount Belford; but, somewhat to our surprise, we found it to be composed of slate and quartz right to the top. Our path was crossed at several places, between 6000 and 7000 feet, by well-marked veins of white quartz. There is much fine timber growing below 6000 feet, but above that altitude the trees are smaller, and often very crooked. The summit is narrow at some places, but not so rocky as its appearance at a distance led our party to expect.

On the 30th we advanced eastward along the crest of Mount Musgrave; but after reaching a height exceeding 8000 feet, and finding that there was no prospect of meeting with any spur running towards Mount Victoria, and fearing that the greater the altitude reached on Mount Musgrave the greater would be the difficulties of descent, it was determined to retrace our steps for about a mile, and to descend on the north side of the mountain in the best way we could, as there was no ridge to guide us. We accordingly left the mountain top at 7180 feet, and cut a path almost right down its northern face. We camped at about 6000 feet at half-past four, completely enveloped in mist, and unable to find our way further on account of a line of precipitous rocks which crossed our path at right angles. The temperature in the morning was 60° F., at noon 67°, and at night about 58°. We had some rain during the night, but no thunder; thunderstorms were now becoming much less frequent, being no longer of daily occurrence as they had been a month previously. On the morning of the 31st Mr. Cameron reported, after examining the ground all round, that there was no way down the mountain. I went to examine the rocks below, and found a place where it appeared possible to descend, and I therefore

returned to camp to set the people in motion. But I was at once informed that the Papuans would go no further, as they wished to carry back one of their number who was sick. We had only eight Papuans with us, two of whom I found to be ill—one of fever, the other of headache. They promptly received medicine, and were ordered back to camp; a third one, who said he too had fever, was cured instantaneously by a dose of quinine, and within two or three minutes the six remaining carriers were under way in obedience to my order. A road was cut down the rocks and precipices, but it was the steepest one, without exception, I have ever traversed by carriers. Mr. Cameron overtook me about noon to say the carriers could not and would not descend; but they made their appearance about an hour later with all their packs. By dint of great exertion we descended in this day's march 1700 feet. We camped on the edge of a small creek at an altitude of about 4300 feet, everyone excessively tired and greatly discouraged by the small progress made.

When we left camp on the 1st June, Mr. Cameron, at his own wish, returned to the camp on Mount Musgrave, as, not feeling well, he did not think it prudent to go further towards the main range. He was therefore directed to ascend, during my absence, the highest point of Mount Musgrave and Mount McIlwraith, in order to determine the watersheds of the Vanapa river, and to map out the Brown river, &c. He reached the summit of Mount Musgrave, which he found to be 9150 feet high, but did not cross the ravines that divide it from the more lofty and precipitous Mount McIlwraith. My own party now consisted of Mr. Belford, two Polynesians, and six Papuans. Proceeding across a succession of steep cliffs and rugged gorges, we, by ten o'clock, reached a clearing, on which there had been a native garden a year or two before, and after experiencing great difficulty in descending the steep rocks at the foot of Mount Musgrave, we reached the Vanapa river about noon, at the foot of Mount Knutsford. The river was here not much more than half the size it was when we last parted from it at the west end of Mount Belford. It ran west by south; had a channel about 30 to 40 yards wide, but was so full of immense boulders (of the same formation as the rocks of Mount Victoria, as was found later on), some of them being as large as a house, that it was difficult to see fully the volume of water, as much of it ran below these great rocks and was invisible. It was our hope that we should be able to proceed up the bed of the river to the foot of Mount Victoria, the nearest end of the lowest spur of which was judged to be three miles distant; but after examining the river-bed the men declared that without packs they might perhaps be able to find their way, with some danger, up the channel, but that it was completely beyond them to do so when loaded. Another consideration induced me to give up the idea of marching along the river bed; a single thunder-storm would swell the river so as to completely cut off from us, for some

time, the possibility of advance or retreat. The point at which we reached the river was at the foot of one of the leading spurs of Mount Knutsford, and it was manifestly an undertaking of such difficulty to cross, parallel to the river, the foot either of this great mountain or of Mount Musgrave, so as to reach the nearest part of Mount Victoria, that we saw ourselves compelled to adopt the plan that had suggested itself before when we were on the west end of the ridge of Mount Musgrave—viz., to ascend Mount Knutsford. It is difficult to believe that it should have been considered impossible to traverse the three miles which, at this spot, separated us from Mount Victoria; with time no doubt we could have effected it, searching our way through the dense undergrowth, and up and down the mighty rocks that would have lain in our path; but our experience in descending the north side of Mount Musgrave created a fear that the greatly higher and more precipitous Mount Victoria would present ridges too steep to be accessible. This could, however, only be a matter of inference, as that mountain was completely out of view at the point where we then were in the confined river-bed.

We had considerable difficulty in crossing the Vanapa, on account of the quantity of water and the rapidity of the current. Mr. Belford, however, bridged it, in about a couple of hours, in a manner that did him great credit as a man of resource; but there are not many people that would wish to cross that bridge often, a fall from which near the right bank would be certain death, as it there crosses a waterfall, where the powerful stream dashes down into an eddying pool full of great sharp rocks. The others walked across it; I crawled over it. The altitude of the river where crossed was 2790 feet, and the temperature at the time, midday, 68° F. Immediately on effecting the passage, we were at the foot of Mount Knutsford, the first mountain we touched connected directly with the Owen Stanley Range. We ascended about 500 feet from the river, over a quarter of a mile of road, and then camped. From this camp we could see the numerous gardens and garden houses on the north side of Mount Musgrave belonging to the natives that visited us; these gardens were from two to four miles distant from us in a straight line, and the fact that we camped at a halting place of the natives containing two rather well-built houses, convinced us that their villages could not be nearer than the gardens we saw. We had no rain, but the mountains were partially covered by fog from an early hour in the afternoon.

On the 2nd we continued our ascent, being fortunate enough to find a native path which we could follow now and then, it being distinct wherever the ridge was quite narrow, but not traceable when it widened out. A temperature of 69° F. was marked before sunrise, and by 10 A.M. it had risen to about 77°, at about 5000 feet. We camped for the night at an altitude of about 6500 feet, where the temperature at 3 P.M.

was 72°, and at 6 p.m., 67°. The road traversed was estimated at two miles. Fog enveloped us completely by the middle of the afternoon, but we had no rain. There was some difficulty in getting water, which had to be carried a long way up very steep ground. It was found that the geological formation was not essentially different from that on Mount Musgrave, slaty rocks and quartz cropping out here and there along the line of march. The forest at this altitude had the myrtaceous appearance noted on the higher regions of Mount Musgrave; and here, as there, the trees were not as a rule large. It was still necessary to keep one or two men employed to clear a path for us with large knives. Game there was none, except a few mountain pigeons, and they were not easily got, and could not be counted on. In the forenoon we heard some natives shouting in the forest a mile or two on the left, in the direction of their villages, but they did not overtake us.

Next day, 3rd June, we started at 7.30 a.m., and by noon estimated that we had travelled one mile, when we were completely enveloped in dense fog; temperature 64° F. Very noticeable was the death-like stillness of this place. Hardly a single bird uttered a "call," not a leaf rustled, and the men spoke in whispers when they spoke at all, which was seldom. The feeling of loneliness was increased by the striking appearance of [the trees; roots, trunks, and branches were wrapped up in thick coverings of moss, even the leaves were not free from it. Everything was soaking wet, and the fog, especially when the clouds lifted a little from the ravines or broke on the rugged spurs, made the crags and ridges look much more formidable and inaccessible than they really were, and forced one to think that we should never be able to continue the upward march next day. We camped in the afternoon on a ridge so narrow that it barely afforded width enough for the path. The altitude was about 8300 feet. An hour or so before we halted we were gratified to hear our native friends shouting to us not far behind. They stopped short, however, at the foot of an exceedingly steep and difficult ascent on which we were then engaged, but called out, urging us to return, as we could not go further, inviting us to come to their villages, and they would feed us with sugar-cane, pigs, yams, sweet potatoes, bananas, and everything they had. We replied we would visit them on our way back to the coast, but never interrupted our march; which at the time was up the face of a spur not far from the perpendicular, quite inaccessible to men with packs but for the moss-swathed trees that grew there, through the roots, trunks, and branches of which we crawled, climbed, and dragged ourselves up, often walking entirely off the ground on the roots and gnarled trunks of the stunted trees as if crossing a mangrove swamp. We could find no water at this camp, but fortunately we were able to catch rain-water enough to cook about half a meal of rice for the native carriers, but not enough to make any tea for the others. This was the last shower of rain we had on the outward journey.

On the morning of the 4th a Polynesian, whose feet were very sore, and three Papuans were sent back to Mr. Cameron's camp on Mount Musgrave, as it was becoming plain that my party was too large for the provisions remaining. We left twenty pounds of rice hid in a secure place near this camp. Our total armament and provisions now amounted to two shot guns and one revolver, fifty pounds of rice, thirty pounds of flour, about six pounds of ham, and about the same quantity of salt beef. The party consisted of myself, Belford, Joe Fiji, and three Papuans. We expected to be overtaken in a day or two by about half-a-dozen carriers with supplementary stores, but we could not wait for their arrival. As there was no water procurable, we had to start without any breakfast. After we had gone about three-quarters of a mile we came to a native hunting camp, a "lean-to" roof, suitable for about three men, provided with three cooking places, each of which consisted of an excavation in the ground about 18 inches wide and nearly the same depth, with small stones sufficient to half fill it. A halt was made here, as we felt sure there must be water somewhere in the vicinity of such a camp. We did not proceed further that day, as it was thought prudent to bake bread sufficient for two or three days lest there should be no water higher up. The altitude of this native camp was 8815 feet, the temperature at noon in the shade 63° F. We were evidently about to emerge from the zone of moss and fog; the trees were larger and straighter, and moss was far less abundant than from 6000 to 8000 feet, and we found that we were just at the upper edge of the afternoon fog that had settled down so dense on the mossy region immediately below us.

On the following day, 5th June, we first came into contact, at an altitude of about 9000 feet, with an undergrowth of bamboo. At first this did not cause us much trouble or delay, as the stems were generally about an inch in diameter, and therefore easy to cut; but about 500 feet higher the bamboo changed its character; the stems grew as close together as wheat in a field, but of such length that they often ran completely over the tops of, and entirely covered up, large trees. To cut a path through this was tedious and tiresome. This kind of bamboo met us off and on until we left Mount Knutsford, and beyond that, fortunately, there were none. The zones of moss and mist end together; a dry and fine climate begins with the bamboo, and it is never lost until one descends again, at 8000 to 8500 feet, into fog and moss.

At 2 p.m. on the 6th June we reached the summit of Mount Knutsford, 11,100 feet high. It is not until within some 500 feet of the summit of this mountain that Alpine plants and flowers are met with. The top of the mountain ends in two masses of rock, each about 100 feet high, that stand about a quarter of a mile apart; a smaller and lower mass of rock lies about half-way between them. These peaks were found to be covered by an Alpine flora; but as the area was limited, so was the number of species and varieties obtainable. Indeed, this great mountain

is very disappointing in regard to its flora, as, except above 10,000 feet, little grows besides trees, moss, and bamboo. I believe, with some confidence, that I obtained specimens of almost every Alpine plant that grows on the mountain. The quartz and slate formation extends to the top. The climate was magnificent, dry and cold, between 60° and 70° during the middle of the day in the partial shade of the forest there, and as low as 45° to 40° at night and early morning. Here we were in the afternoon clear above the great masses of snow-white cumulose clouds which lay below us some two or three thousand feet and completely cut off all view of the hills and valleys beneath.

The upper surface of this vast ocean-like cloudy expanse was almost dazzling in its whiteness, extending its rugged masses, more uneven than the jagged peaks of any mountain land, so far that nothing could be seen beyond their horizon. These great cumuli lay apparently perfectly still, like an arctic world of frozen snow; but every now and then small jets of mist shot with arrow speed up narrow ravines right to the summit of the mountain as if projected upwards by the weight of the superincumbent cloudy matter forming the upper layer of the stratum. These clouds are formed locally, and are not brought up by the south-east wind, from the force of which they are protected by the Owen Stanley Range. The stratum is usually about 4000 to 5000 feet thick. The tops of the higher mountains on the south and south-east, Mount Service, Mount Morehead, and Mount McIlwraith, projected above this stormy-like sea of cloud, clear, bold, and dry, at least 2000 feet; Mount Victoria towered 4000 or 5000 feet clear over it, and on the north and north-east Mount Griffith, Mount Douglas, and other striking heights, which will be mentioned later on, reared their lofty crests several thousand feet above mist and damp into one of the finest climates on the globe.

On the evening of the 6th, some of my party were certain they had heard guns fired on the slopes below us, from which it was inferred that those who were to bring us additional stores were close at hand. So sure were they of this that I was induced to remain at the top of Mount Knutsford the whole of the 7th to permit of the party behind joining us. But no one appeared, and I therefore lost a day, except that I was able from the peaks of Mount Knutsford to select the route to be followed to the top of Mount Victoria, and had an opportunity of completing my collection of the Knutsford flora, and of filling in geographical details in the forenoon before the country below was covered by its pall of cloud. In the morning a clear view could be had from the summit of all that lay between Mount Knutsford and the south coast. The native community we had come into contact with on Mount Musgrave, it was clearly seen, have nearly all their gardens and garden-houses on the north side of that mountain, but the permanent villages, four in number, were distinctly visible, three on the lower spurs of Mount Knutsford, and one on Mount Griffith, at a height not exceeding in any

case 4000 or 4500 feet. This occupation on the two mountains last-named is the only representation of human habitations seen on any of the mountains of the Owen Stanley Range.

At about 10 a.m. the low country began to become obscured by small points of clouds, rising up sporadically, and somewhat later the view presented would have satisfied the wildest imagination as a picture of chaos, for ocean, earth, and sky seemed so thoroughly commingled and confused that no idea whatever could be formed where one began or another ended.

The top of Mount Knutsford is the best point from which to note the rise and course of the river Vanapa. Nothing can possibly be more clear than that it drains the whole of the south side of the entire Owen Stanley Range from Mount Victoria to Mount Lilley. Indeed, besides that draining, it carries almost nothing else to the ocean, as all the water it receives after reaching the north side of Mount Kowald is insignificant. At the north-west end of Mount Musgrave it divides into two great branches; one runs west, and drains the eastern slopes of Mount Cameron, the east and south sides of Mount Lilley, and the south sides of Mount Thynne and Mount Griffith; this branch cannot be much less than the eastern branch. The latter lies at first between Mount Knutsford and Mount Musgrave, and then for a short distance separates Mount Knutsford from Mount McIlwraith, until a projecting spur of Mount Victoria divides them. This branch then splits up into five distinct streams; the first one lies between Mount McIlwraith and Mount Morehead, the second between the latter and Mount Victoria, the third between Mount Victoria and the southern aspect of Mount Douglas, the fourth between Mount Douglas and Winter Height, and the fifth, the principal branch and real head of the Vanapa river, flows between Mount Griffith and Mount Knutsford on the west and that part of the main ridge of the Owen Stanley Range called Winter Height on the east. From the west end of Mount Musgrave to the sea this river is well suited for the transport of timber; beyond that point its channel is so full of immense stones and boulders that it would afford no water carriage.

No other river receives any part of the drainage of the southern aspect of the Owen Stanley Range. Between Mount Victoria and the Brown River there lie the great mountains, Mount Service, Mount Morehead, and Mount McIlwraith, all from 10,000 to 11,000 feet high; and to these perhaps should be added, although the Brown does not approach them, Mount Musgrave (9150 feet) and Mount Belford (about 6000 feet). As we could not see what course the Brown takes, a European was sent up the Laroki to make a traverse of that river and to look for the Brown, and he has reported that the latter is a branch of the Laroki, and describes the Laroki itself as being much smaller than the Vanapa.

We were now left with six days' food, and there was no appearance of any more reaching us. Our three native carriers were very much disquieted, and volunteered to Belford the information that their countrymen who had gone back for supplies had informed them, before they left, that they would run away during the night, and would not return. Mr. Belford was directed to tell them they were lying, and that I was determined to proceed, whether we received more food or not. To myself they offered no objection, and at starting no demur was expressed.

It was, however, not without some amount of anxiety that a forward march was ordered on the morning of the 8th. I had estimated that we could make our six days' food last for ten days, and that by forced marches we could double the head of the Vanapa and reach the top of Mount Victoria in four or five days, and return to where we were in three, whence in one day we could reach the 20 lbs. of rice we had left at the third camp on Mount Knutsford. Belford gallantly offered to accompany me himself if there was not sufficient food to take on the whole party, or if they should refuse to go; but I decided to carry forward the total number of my five companions; not omitting even Joe Fiji, his objectionably rapacious appetite notwithstanding. We accomplished fully five miles in a northerly direction along the summit of Mount Knutsford, and camped on a small creek that divides it at its northern end from Mount Griffith. About 9 a.m. next day we crossed the Vanapa for the last time on the outward journey. The altitude of this crossing was 10,130 feet, the temperature 59°. It is even there a fine mountain stream about five yards broad, with a very rocky bed. On crossing we began the ascent of the central ridge of the Owen Stanley Range. At this point there are several large spaces on the face of the mountain where grass grows freely, but on which there are no trees whatever. As wild dogs were howling in the vicinity, some of our people expected to find natives at these clearings, but I could see no trace whatever of human presence except our own, either past or present. Mr. Belford, when in advance of the three men who were carrying all our food, set fire to the grass as a signal to those behind who had lingered about the river and must have been fully half a mile from us. To my great alarm, the fire in a few minutes covered scores of acres and swept like a tornado in a straight course towards the river, whence our men were coming. I feared they should have to throw away their packs and run for their lives, but very fortunately there was a wet strip along the middle of this great grassy patch which did not burn, and along this they soon appeared, greatly to my relief. The surrounding forest growth, although it looked very dry, did not burn. Early in the afternoon we reached the top of the great ridge at the point named Winter Height, which has an altitude of 11,882 feet; and about 5 p.m. we camped, after having walked about five miles, on the lowest part of the

great central ridge at a point where the top of a glen on the south side meets the top of a glen on the north side, forming the lowest part of the central portion of the Owen Stanley Range, to which has been given the name of Dickson Pass. Its height is 10,884 feet, and it divides Mount Douglas from Winter Height.

In our camp at Dickson Pass the morning temperature before sunrise was 44° , and at 8 a.m. it had risen to 55° . The forest here was mainly composed of cypress. We had water near. We passed over the top of Mount Douglas, 11,796 feet, and had an opportunity of picking strawberries there; they were not of large size, excellent in flavour, but not quite ripe. At 5 p.m. we pitched camp, after a march of about five to six miles, some four hours' march from the top of Mount Victoria, the name I have given to the highest crest of the great Owen Stanley Range. Soon after we had camped there arrived two Polynesians—George and Cæsar Lifu, and four Papuans, sent by Mr. Cameron to bring us supplies. They had brought rice and flour, which we could manage without, but of meat, of which we had practically none, they did not bring an ounce. Indeed, it was clear that their enthusiasm to get to the top of the "Great Mountain" was greater than their consideration for us, for even the rice and flour they had left on the way, and now they joined us with empty hands and empty stomachs, and we had to share our scanty stock with them. They did not, however, return so light, as geological and botanical specimens had to be transported.

At about 11 a.m. of the 11th June I reached the top of the north-west peak of Mount Victoria, and at once set to work to collect geographical data and botanical and other specimens. I do not feel competent to pronounce on the geological formation of Mount Victoria; the specimens will be duly examined by competent authority hereafter, but it may be mentioned that a few hundred feet from the top of the highest crest I saw the largest vein of quartz I have seen in the Possession, about 15 inches thick. There are no trees on this mountain within 1500 feet of the top, and but few bushes grow within 1000 feet of the summit. The flora is disappointing, except as regards grasses, which were numerous, far beyond my expectation. There are probably few species or varieties of flowers or grasses of which we have not brought away examples, but the total will, it is to be feared, be surprisingly small. There are several varieties of daisies, buttercups, forget-me-nots, heaths, &c. There are very few birds, the most noteworthy being a lark, only one specimen of which was obtained by my private collector, Joe Fiji; but to my great disappointment I learned the day after we had left the mountain that Cæsar Lifu and Joe had eaten two of my three new birds obtained on the mountain, and that one of the two was the lark.

We were camped two nights on Mount Victoria, the 11th and 12th of June, at an altitude of 12,452 feet, that is, about 670 feet from the

top of the highest peaks, and we therefore can speak of its climate with some degree of authority. The temperature rose in the middle of the day, on the tops of the peaks when the sun shone straight on them, to 70°; in the morning the grass was all quite white with frost before the rays of the sun reached it. Icicles were brought into camp the afternoon of the day we got to the top; and next day I saw one, the largest I observed, more than an inch in diameter and seven or eight inches long. During the day, from about 10 a.m. till 4 p.m., the temperature in the shade was between 50 and 60°. The sky was blue and cloudless, except when the wind was blowing strong from the south-east, when there was some haze. At night there was no trace of cloud to be seen, except those that lay like lead in the great valleys below, and the stars shone out as brilliantly as on a frosty winter's night in the British Isles. From the dryness of all plants and trees on the Owen Stanley Range it was apparent there had been no rain for several weeks, and the whole range did not show a single cataract or waterfall of any kind, nor even was there the murmuring of a mountain stream to break the deep oppressive silence that reigned on this great lone mountain. Mount Victoria is, during this season at least, emphatically a dry mountain, and the same may be said of all the other great mountains of the Owen Stanley Range traversed by us; but yet, strange to say, water oozes from some of the gigantic rocks on the crest of Mount Victoria, and only 200 or 300 feet from the top of the south-east peak I caught a small frog which was floating benumbed with cold in a little pool of water, where there was sufficient to enable one to say it was "running." We suffered much from the cold, as we had not sufficient clothing to protect us, so that in spite of fires a good deal of discomfort had to be endured. It seemed also to sharpen the appetites of a party already not strangers to hunger.

The crest of Mount Victoria runs from south-east to north-west, and may be described as composed of six different peaks, but they might be divided differently by different observers. The north-west one and the south-east one are a few feet higher than any of the others, and perhaps 50 or 100 feet higher than some. It is impossible to say which of these two is the higher; after examining both, the one from the top of the other, I hold them to be of equal height. They are also more easily ascended than the central masses, being broader, longer, and far less rocky. The distance between the north-west and south-east peaks is from a mile to a mile and a quarter in a straight line; the chief portion of two of the intervening peaks lies to the north of this straight line. Up the sides of the north-west and south-east peaks there are great breaks in the rocks, that are now filled up with débris and growing grass, up which one can walk without the least difficulty if sure of one's feet and head, and the top of each is not less than eight or ten yards long. On this nearly level ground made up of decomposed rock there grew

flowering moss and heath, and it was easy to drive a peg a foot or two into the ground on which to rest the compass in taking angles. So easy is the ascent of these two peaks, that I walked with hobnailed boots right up the north and down the south side of each, without having to creep, scramble, or use any support. But it is very different with the central peaks, to the top of all of which I climbed only after tremendous exertion. The upper hundred feet or more is usually perfectly bare rock, sometimes nearly perpendicular, sometimes overhanging; but patience will enable one to get to the top of each of them if one is prepared to incur a little risk. Fortunately the surface of these rocks is rough, and provides good footing, and supplies holding ground for the fingers. The different peaks, or parts of the same peak, are sometimes separated by chasms many scores of feet in depth so that to pass from peak to peak, a somewhat perilous descent and a laborious ascent has to be undertaken, often several times before a way to the bottom or top can be found. Mr. Forbes, in speaking of what I take to be the portion of the Owen Stanley Range I have named Mount Victoria, says in a report to the Scottish Geographical Society, published in August 1888:—"The Owen Stanley Peak is a gigantic isolated pyramidal block standing in weird loneliness, detached from the main range, on its own base, culminating in several acuminate rugged central peaks and pinnacles, whence radiate sharp spurs with precipitous flanks, down whose gorges dash impetuous torrents, whose waters filled the air with a ceaseless moan, to join the Warumi and the Naoro. On the topmost of these—Huxley Pinnacle—I have bestowed the name of my honoured master in biology, who, from the deck of H.M.S. *Rattlesnake*, described and named the range in honour of her captain."

The relation of Mount Victoria to other mountains will be mentioned later on; but it must be remarked here that there is no topmost pinnacle on Mount Victoria, and that, therefore, I was unable to identify the one that was named Huxley Pinnacle by Mr. Forbes. I have, however, myself given no name to any particular peak on Mount Victoria, deeming the name of the Sovereign, bestowed on the mountain as a whole, sufficient to meet, for the present at all events, all practical purposes. Great rocky precipitous buttresses are thrown out by the mountain, exceeding 12,000 feet in height, two on the northern side, two on the southern side, and a mighty one on the south-east, and all of these are bristling with peaks and pinnacle-like rocks, and contain hundreds of inaccessible crags and precipices, more than enough to try one's resources in bestowing names, were they each to be specified.

Mount Victoria is far from being the isolated block it has been customary to represent it. It is simply the eastern end of the Owen Stanley Range, which runs without any break, as one continuous whole, from the south-east end of Mount Victoria until the range meets Mount Griffith and Mount Scratchley; the length of this part of the range (for

it continues further west, into Mount Thynne and Mount Lilley) is about 20 to 25 miles. The lowest part of the Owen Stanley Range from the east end of Mount Victoria to the junction mentioned is Dickson Pass, which, as already stated, is 10,884 feet in height. It need hardly be said that it was because of the fact that Mount Victoria is only a crest at the end of the great Owen Stanley Range that we adopted the route we took round the head-waters of the Vanapa and along the top of the range itself, which gradually led to the summit of Mount Victoria. The Owen Stanley Range ends at the east in Mount Victoria, beyond which there are a number of low rounded hills separating it from the range in which Mount Obree is situated, a range which trends away northwards and forms one side of a large valley, which will be mentioned again. It is therefore quite erroneous, from a geographical point of view, to speak of Mount Obree as being part of the Owen Stanley Range, but the low country that intervenes between the ranges cannot, in all probability, be seen from Mount Obree itself by one looking thence towards Mount Victoria, and it is not distinct from the coast.

Mr. Cameron's calculations and my observations make the height of Mount Victoria 13,121 feet, an estimate that comes very near to that given on maps and charts, 13,205. This close approximation was not expected, as Mount Obree is entered on our charts as 10,246 feet high, and was found by Mr. Cuthbertson (*vide* Report of Royal Geographical Society of Victoria, vol. v. part. ii.) to be only 8000 feet. But Mr. G. Hunter and some of the natives that went on that expedition say they did not go to the highest point of the Mount Obree Range, and Mr. Hunter says distinctly that he had a glimpse of a peak about 1500 feet higher than the one ascended, lying some distance to the north of it. This may account for the above great discrepancy between the estimated altitude and that ascertained by Mr. Cuthbertson. The weather, it appears, was so thick at the time that only occasional glimpses could be had of the neighbouring mountains. But, of course, all these measurements, my own included, are only approximate.

The view northwards from the top of Mount Victoria was of the greatest interest. It has been already mentioned that the Owen Stanley Range meets Mount Griffith and Mount Scratchley. The first sight of the top of this latter mountain was had from the top of Mount Knutsford, whence it could be seen rising at some distance over Winter Height. It presents a bold rocky serrated crest, with well-defined outline. Like Mount Victoria, it is at the top destitute of trees, and for 500 feet downwards consists of bare rocks or patches of brownish grass. It is about 12,250 feet high. It runs in a north-easterly direction for three or four miles, and then opens out into two great ridges, which run down for about half a score of miles to end opposite Mounts Gillies and Parkes. A few miles further north than Mount Scratchley,

and running nearly in the same direction, is the second highest mountain in the Possession, so far as at present known. To this mountain I have given the name of Albert Edward, in honour of His Royal Highness the Prince of Wales. About 1000 feet of the top of this mountain is treeless, consisting of rock partly bare, partly grass-covered. Only some four or five miles of the crest of this mountain was visible from Mount Victoria. Its height has been estimated at 12,750 feet.

The north coast was for several hours in the forenoon plainly distinct from the top of Mount Victoria. This mountain is some fifteen to twenty miles nearer to the south than to the north coast. The country lying between it and the north coast is far less mountainous than that between it and the south coast. Looking from the top of Mount Victoria, between 360° and 90° magnetic compass, only two great mountains are seen between the Owen Stanley Range and the north coast; these two are Mount Gillies and Mount Parkes, both great mountains, but evidently divided from each other and from the Owen Stanley Range; they are probably 7000 or 8000 feet high, but it is very difficult to estimate such altitudes looking down on them from a great height, as in this instance. Mount Gillies, the more westerly of the two, is a rounded mountain without any rugged peaks, clothed in unbroken forest. It cannot be less than 15 to 20 miles long, running in a north-westerly direction. It is separated from Mount Scratchley and Mount Albert Edward by a valley a mile or two wide, and from Mount Parkes, which lies immediately east of it, by a river. Mount Parkes resembles Mount Gillies in general features; it has no sharp well-defined peaks, is generally covered with forest, and has a length of 25 to 30 miles, and runs in nearly the same direction as the Owen Stanley Range. Mount Douglas which, looked at from the south side, appears only as a moderate elevation on the Owen Stanley Range, runs north and east for several miles until it nearly meets a south-east spur of Mount Scratchley. A valley some two or three miles long lies between Mount Parkes on the north and the ends of Mounts Scratchley and Douglas on the south; this valley widens out and separates Mount Victoria from Mount Parkes, and bending round towards the north-east, separates Mount Parkes from the end of the Mount Obree Range. On this valley I had noted three large lakes, as I supposed, and had actually sketched them into my note-book, when I was saved from this blunder by a native setting fire to one of them, when I could see they were great grass clearings in the forest. Smoke was rising from many other points in this valley, which is not less than 30 miles long, and will average four or five broad. It appears to carry a considerable population. Far away in an easterly and southerly direction were several mountain ranges. The highest peaks easterly were those I supposed to be on Goodenough and Fergusson Islands, and higher still, in a south-easterly direction, were the mountains in the

Mount Obree Range. There is thus north of the Owen Stanley Range and between it and the north coast a great extent of comparatively flat country; and there is much more population there than on the south side. It was impossible to see which way the rivers ran. Rivers could be seen, as between the end of the Mount Obree Range and Mount Parkes, and again between Mount Parkes and Mount Gillies; but it was not possible to determine in which direction they ran, as those two mountains are of immense size and there is low country, nearly flat, all round them,

Carefully taken angles having been recorded, outlines of the mountain chains made, and collections as complete as practicable secured, we left the top of Mount Victoria on the morning of the 13th on our return journey. Driven into the ground on the top of the south-eastern peak I left the peg I used for resting the compass on in taking bearings; and Mr. Belford informs me he left a powder-flask on the top of the north-west peak, containing a paper, on which he has written that I ascended the mountain on the 11th June, 1889, and named it Mount Victoria.

With regard to the nomenclature of the few mountains named on this expedition, it may be as well to state briefly the principles on which this has been done. No names have been given except where they were believed to be required for the purposes of description. Native names were not as a rule obtainable, but where they exist and are known they are adopted. The intention was that the names given to the mountains of or near the main range should present a permanent historic record of those concerned in forming British New Guinea. The name Owen Stanley is retained for the whole range; its highest crest, the great and rugged mountain mass forming its eastern end, is named after the sovereign. It is not necessary that remark should be made here on the others individually, beyond this: that it was well known that there was already, for example, a Mount Scratchley and a Mount Douglas; but these names (and it will be found that the remark applies to all others that have been repeated) have previously been bestowed on small hills that do not merit such great names and that possess native appellations. In future maps these will probably resume their native names. I cannot but express the hope that the historic names that have been bestowed on this expedition, every one of which has been given on public and not one on personal grounds, will become identified with British New Guinea.

I regret that neither myself nor Mr. Cameron could identify many of the places named by Mr. Forbes. That gentleman is undoubtedly a competent and careful observer, but his nearest approach to Mount Victoria was at such a distance from that mountain that, on account of the rugged and mountainous nature of the country, we have found it far from easy to determine how many great mountains or mountain spurs intervened between Mr. Forbes and Mount Victoria with the

Owen Stanley Range beyond it. That there were such is plain from the position he assigns to the Brown river. Mr. Forbes has clearly been looking at the south-east end of Mount Victoria, so that the mountain has shut off from his view its great extension on the north-west into the Owen Stanley Range. Mr. Forbes would probably also look into the deep, dark glen that separates Mount Knutsford from the central ridge of the Owen Stanley Range, and which looks at a distance of a few miles as if it cut off Mount Victoria from the part of the range lying to the north-west. This appearance at first deceived us when on Mount Musgrave. Hence Mount Victoria has presented to Mr. Forbes, somewhere south-east of it, the appearance of being an isolated pyramidal block, which, as has been shown, is far from being the case.

On the 16th we found ourselves in camp on the south side of Mount Knutsford, near the Vanapa river. We now desired to pay our promised visit to the natives. It was necessary that some one should cross the river and ascend the dreaded north side of Mount Musgrave to collect those of our party we had left there, and to get them to descend that mountain to meet my party near the river lower down. There was really no one except myself at all able to undertake such a hard march, as I alone wore shoes, and the others suffered greatly from sores and blisters on the feet; and I therefore felt myself called on to make it, which I did, accompanied by one Papuan. The rest of the party, carrying all the arms, &c., were to go by way of the villages. I reached Mr. Cameron's camp about 4 p.m., and found all well except one native carrier, who was dying of chest disease. All preparations were made for a move next morning in the direction of the native villages. I started with a native boy for the villages on the foot of Mount Knutsford, where I hoped to meet the party returning from Mount Victoria; but when I got down to the nearest village I found that they had not come that way, and concluded they must for some reason have changed their minds and braced themselves for the ascent of Mount Musgrave after all. I accordingly returned the same day to camp, so that next day should not be lost, and found them all safe there. The natives received me very kindly. As we descended the mountain we met a number of them on the way to our camp with food for sale. The chief man and some others turned back and accompanied me to their nearest village, which, however, turned out to be only a small collection of garden-houses. They presented me with sugar-cane and some newly dug taro, and were very friendly and communicative until I began to sketch an outline of the mountain range before me, which seemed to alarm them, as they soon left us on different pretences, some to bring us a pig, others to fetch different articles for barter. But as we had to leave before their return, in order to get back to camp before night, we did very little trade that day. One of our party had a similar experience when he visited them and began to sketch the same mountain

outline ; but this was unknown to me at that time. In coming down the river I stopped to visit the natives of Tohila, the owners of the suspension bridge mentioned above. They brought us pigs and native food, and I was able to obtain a short list of words of their dialect. They much resemble the Mount Knutsford natives, but are less robust, and have not so well marked features. Their language has a close resemblance to that of the Mount Knutsford tribe, but it has many words that are the same as or akin to Motu. They also are evidently Papuans without any trace of any older race. They were very friendly, and did not appear to be distrustful. They carried no arms, and we saw several children and girls.

The return journey from the top of Mount Victoria to the coast was accomplished in twelve days. The whole expedition may be said to have ended without mishap. I greatly regretted the death of the poor man who succumbed on Mount Musgrave ; but there were besides him several men who proved physically unfit for such a journey. Unfortunately I had no opportunity of selecting them when they started. Several of the party suffered severely from fever, but only one was seriously ill. The collections made have not fulfilled the hopes entertained. The official collection of birds contains a few new ones of value, and several specimens of rare kinds. To encourage those that carried guns in collecting, I allowed them the same advantages as I gave to my two private collectors. Of each sort of bird I took the first specimen ; the person shooting took the second ; I the third, and so on. This collection will reach Brisbane for examination by the first trip of the *Merrie England*. The geological collection will, I trust, in the hands of Mr. Jack, the Government Geologist of Queensland, tell a connected tale of much interest, as it covers the whole ground traversed. The botanical collection is being forwarded to Baron Sir Ferdinand von Mueller, from whom we shall hear of its value in due course.

GOVERNMENT HOUSE, PORT MORESBY,
1st July, 1889.

The above was read, in the absence of the author, by Mr. A. P. Maudslay, who prefaced it by the following remarks :—

“The paper which I am about to read is the report of Sir William Macgregor, Governor of British New Guinea, on his ascent of the Owen Stanley Range in the months of April to June last. The exploration of this lofty range of highlands, which extends along the south-eastern peninsula of New Guinea at a distance of 60 or 70 miles from the coast, has been, as you are aware, the great desideratum in the geography of the British part of this great island, since Port Moresby was settled by our missionaries about twelve years ago. It was first discovered, I believe, by Lieut. Yule when surveying the coast from the Gulf of Papua in the schooner *Bramble*, in 1846. On that occasion the westerly end only was sighted, where a peak, named Mount Yule on our charts, was seen and carefully triangulated, its height being found to be 10,046 feet. The extension of the range to the south-east, and its more lofty peaks, were discovered by Captain Owen Stanley on his surveying

expedition in the *Rattlesnake* in 1849 and 1850. The range, hidden by a lower coast range when close inshore, was seen from a distance out at sea (for the expedition never landed in this part), and the altitude of a number of peaks was ascertained by triangulation on two separate occasions. Seen at this distance the range appeared as a continuous elevation, and is so described by Mr. Macgillivray, the historian of the voyage, who states that on a clear day it was visible in a length of 300 miles. One of the important geographical results of Sir William Macgregor's expedition is to show that the range is not a continuous ridge, but a broad belt of steep and rugged mountains separated from each other by valleys and ravines. To ascertain the nature of this range of highlands and that of the country beyond, whether a plateau suitable for settlement or not, has been the object of many expeditions since the settlement of Port Moresby. First in the field was the enterprising missionary, Mr. Chalmers, who reached the lower hills at the foot of the highest peak in 1879. Since then Mr. Goldie explored the valley of a river which flows from the range, along which a party of Australian gold-hunters reached the foot-hills. Expeditions were next, in 1883, despatched by the enterprise of two Australian newspapers, for the express purpose of reaching the summit and, if possible, crossing the island to the north coast: that of the *Argus* was commanded by Captain Armit, and the other, sent by the *Melbourne Age*, by Mr. Morrison. Both failed to reach even the foot of the high range; the failure being due partly to physical obstacles—the extremely rugged nature of the intervening country—and partly to the ill-will of the natives. In 1886 and 1887, Mr. H. O. Forbes, the well-known traveller, partly under the auspices of our Society, made two attempts to make the ascent, both of which resulted in failure. All these attempts were made from the south or south-east from Port Moresby, from which side it is now believed the high peaks are extremely difficult to reach. New attempts made from lower down the coast in 1887, were more successful. In that year Messrs. Hartmann and Hunter reached a considerable height, and a more important expedition, sent by the Government of Victoria, under Mr. Cuthbertson, reached, as it was thought, the summit of Mount Obree (10,246 feet). But this lies at the lower south-eastern end of the range, and has been found by Sir William Macgregor not to form part of it."

This paper was illustrated by lantern-slide views of the scenery and natives, exhibited and explained by Mr. A. P. Goodwin, one of the European companions alluded to by Sir W. Macgregor, who accompanied him as far as the summit of Mount Musgrave.

In the discussion which followed, BARON VON HÜGEL said the people whom Sir William Macgregor had met on his way to the high peaks of the Owen Stanley Range were most interesting from an ethnological point of view, but the paper did not give many details about them. Judging from the little that was known, they evidently belonged to a different tribe from those on the coast. As yet, so far as he knew, no weapons or manufactured articles had been procured from the interior. All the other New Guinea implements, utensils, and weapons, were very characteristic in their ornamentation, and the northern people had a totally different way of ornamenting clubs, spears, &c., from those of the south-west.

Mr. G. R. ASKWITH said he went with Sir Peter Scratchley's expedition to New Guinea. He remembered how, as they approached the shore from the south-west, the peaks of the Owen Stanley Range were seen above the clouds, looking like a cloud themselves. No man, as far as was known, had ever reached those heights, and Sir William Macgregor might proudly claim honour for that which he had accomplished. The white man trusted that beyond lay a land more fertile than on the coast. The native would have claimed that there dwelt only the ghosts of the departed, and that as those became lighter and lighter, and ceased to haunt the

plains, so they were "numbered with the many" upon the distant and unknown mountains. It was to be hoped that Sir William Macgregor had shattered the belief of the natives, and had shown that there might be a country beyond the peaks useful to those who now held rule over the land. New Guinea was situated with regard to Queensland just as Ireland was to Great Britain. It required to be developed, taken care of, and fostered, not the less because it had a large population of aborigines. He was sure that Sir William Macgregor would think it no disparagement of his work if it were said that ten years ago it would have been impossible to get to the top of the range. Sir William had been in a position to build on the labours of his predecessors, and it was owing to the labours of naval officers such as Captain Moresby, and such missionaries as Mr. Chalmers and Mr. Lawes, that he had been able to get Papuans to follow him through districts where hostility might have been expected. Formerly the only carriers a traveller could have obtained would have been the inhabitants of the particular village in which he found himself, who would not have dared to go beyond the borders of their own village. But Sir William Macgregor had been able at Port Moresby to get carriers to accompany him through the country, where without doubt some rumours of the British name had spread. When he (Mr. Askwith) was at Port Moresby, some hill-men came down, attracted by the news that a ship had put into the harbour. They were covered with blotches of hair, hideous in themselves, and still more hideous in their wives. If such natives had not known who the people were who had come among them, they would with the greatest pleasure have put an end to them on any plea which commended itself to their view. He himself, twelve miles from Port Moresby, had met some natives of the Koiari tribe head-hunting. Some neighbouring villagers had taken the lives of some of their people, and they were determined to have heads in return. What chance would unwary travellers have against men whose aim was unerring? He had seen a penknife put upon a bank, and a native hit it, at twenty yards' distance, three times in succession. As to the future of this land, no man could as yet foretell. He could only hope that its harbours might be busy coaling stations on the highway between Australia and China, and that the country beyond those misty heights might become a sanatorium for Queensland, as Darjeeling was for Calcutta.

Mr. P. L. SCLATER, F.R.S., said New Guinea was a most attractive ground to any student of Natural History, particularly to one who had devoted the greater part of his time to the study of birds. The great group of Paradise birds was peculiar to the mountains and lands of New Guinea and the adjacent parts of Australia. Mr. Goodwin had drawn up some notes about those that were found during the expedition. There were twelve or thirteen of them, some being of the most extraordinary character. Now that Sir William Macgregor had shown the way up the Vanapa river, it was to be hoped that others would follow him. Of course, the few plants and animals as yet obtained from the Owen Stanley Range were a mere sample of what would be found by future explorers. He hoped that all the specimens obtained during the expedition would be placed in the hands of competent persons.

The PRESIDENT had no doubt that the members of the Society would have given a warm welcome to Sir William Macgregor if he had been able to come among them after his very arduous and important expedition; but as he was far away, they were extremely fortunate in having his friend, Mr. Maudslay, to read the paper for him. They had also been fortunate in finding in London Mr. Goodwin, who formed part of the expedition. He had but one remark to make in the nature of criticism upon the paper. It should be distinctly understood that the Royal Geographical Society must not be considered as in any way committed to Sir William Macgregor's nomenclature. It would very likely turn out that the mountain to which he had

given the name of Mount Victoria was christened some forty years ago Mount Owen Stanley. Evidently Sir William Macgregor was under the impression that the name of Captain Owen Stanley had been given only to the range, and not to the peak. The Admiralty charts of 1850 would hardly bear out that impression.

Mr. J. T. Last's Map of Eastern Africa, between the Rovuma and the Zambezi.

Map (in two sheets), p. 256.

MR. LAST having left England for Zanzibar soon after reading the paper, June 27th, 1887,* in which he gave a general account of the expedition with which he had been entrusted by the Society, and having since proceeded to Madagascar, where he is still engaged in zoological researches, he has been unable up to the present to furnish the report which he then promised on the scientific results of his journey. His valuable maps, field-books, and tables of observations were, however, duly handed over to the Society before he left England, and, as the region which he explored is now become one of much public interest, we have thought it well not to delay any longer the publication of his map.

The chief objects of the expedition, as stated in the instructions given to Mr. Last, were to make a survey of the Namuli Peaks, and to study the climate and economic products of the district, and the character and languages of the native tribes. He was also to determine by accurate observations the position of the junction of the rivers Lujenda and Rovuma, and in travelling thence to the Namuli Hills, to take the hitherto unexplored native caravan route through the Medo country, visiting also the Mavia people, and, if he visited Lake Shirwa and the Scottish Mission station of Blantyre, he was to connect his survey with that of Mr. Consul O'Neill. Finally, he was to return to the coast by way of the Lukugu valley, and thence proceed to Mozambique.

In carrying out his mission, Mr. Last visited Blantyre and made from that place a joint excursion with the British Consul, Mr. Hawes, north-westward to the Angoni country and the southern shore of Lake Nyassa. A report of this journey was sent by the Consul to the Foreign Office, and Mr. Last's own narrative, with a map, was published in the 'Proceedings R.G.S.,' 1887, p. 177.

Mr. Last's original MS. map consists of seven sheets, the scale being about 1 : 550,000, or $8\frac{3}{4}$ statute miles, or $7\frac{1}{2}$ geographical miles, to one inch. In the map illustrating the present paper the scale has been reduced to 1 : 1,500,000, or 23 statute miles to the inch. His positions have been retained and Consul O'Neill's routes inserted. Although both these travellers visited the Namuli Hills, they do not appear to have touched at the same villages, so their routes cannot be absolutely tied together.

* *Vide* 'Proceedings R.G.S.,' 1887, p. 407.

The coast-line of the map is laid down from the latest Admiralty charts, with slight alterations made by Mr. Last in the neighbourhood of Quillimane, the new navigable mouth of the Zambezi (sounded by Mr. Rankin and confirmed by the Admiralty) being also inserted.

Mr. Last divides his work into four journeys, viz. :—(1) From Lindi to Blantyre and Zomba; (2) the Angoni journey referred to above; (3) the Namuli and Quillimane journey, see 'R.G.S. Proceedings,' 1887, p. 42; and (4) from Quillimane to Blantyre and Ibo.

1. Lindi to Blantyre and Zomba. Mr. Last left Lindi on the 24th October, 1885, reaching Blantyre on the 18th January, 1886, and Zomba on the 9th May. On this journey observations for latitude were taken at 50 positions, and for longitude at 18 positions. At Blantyre four sets of five observations each were taken for latitude (the mean of these various observations has been adopted). Altitudes were settled by boiling-point thermometer at six positions.

2. The Angoni journey, from May to 25th June, 1886. Observations for latitude were taken at 27 positions, and for longitude at 12 positions. A series of observations were again taken at Blantyre and Zomba, both for latitude and longitude. Altitudes by boiling-point thermometer were settled at 10 positions.

3. The Namuli and Quillimane journey, 11th July to 18th November, 1886. Observations for latitude were taken at 47 positions, and for longitude at 24 positions. At Ana Guruwe's six sets of seven observations each and four sets of five observations each were taken for longitude, and 17 observations were taken for latitude. Seven of the peaks belonging to the Namuli Group were fixed. Eight sets of five observations each were taken at Quillimane for longitude.

Altitudes by boiling-point thermometer were settled at 14 positions.

Meteorological observations were taken at Ana Guruwe's village at the southern foot of the Namuli Hills, from 1st September to 20th October, 1886; also at Quillimane from 17th November to 10th December.

4. Quillimane to Blantyre and Ibo. 14th December to 12th April, 1887. Observations for latitude were taken at 74 positions, and for longitude at 44 positions.

The principal series are as follows:—Blantyre, 26 observations for longitude; Zomba, 10; Che Chekweo, 14; Mlumbi, 25; Mpwina, 38; left bank of Msalu river, 21; Ngoronji (Nekutu's village), 20; Mweli's, 20, and 10 for latitude; Podo Hill, 14; Ibo, 28, and 10 for latitude.

Altitudes by boiling-point thermometer were settled at 18 positions.

All the positions where latitude and longitude were observed are shown on the map, the former by a red circle on the route line, and the latter by a red spot. In every case where longitude was fixed, the latitude had also been observed.

Mr. H. H. Johnston's Journey North of Lake Nyassa and Visit to Lake Leopold.

MR. H. H. JOHNSTON, Consul at Mozambique, in a letter to Mr. Bates, just received, gives the following account of his journey north of Lake Nyassa and his visit to the little known Lake Leopold. The letter is dated from "Msisi River, Nkana (Thomson's Mkana), Wunyamwanza, half-way between Nyassa and Tanganyika," November 19th, 1889.

I am scribbling these few lines to you in my tent on the banks of a tortuous stream called the Nkana, which flows into the Laisi, one of the main feeders of Lake Rukwa. To the west of me rises a great wall of mountains stretching with singular uniformity till it is lost in the distance north and south; to the east another range of lower and more irregular hills, and before and behind lies a ten-mile-broad plain enclosed within these parallel ranges, a plain through which the Nkana serpentine, with an attendant ribbon of dark green forest. Behind my encampment is a native town, a densely packed mass of beehive huts and clay-plastered granaries, shaped like Kentish oast-houses, the whole enclosed in a grim stockade of stakes and thorns and encircled by a moat. A hundred and fifty porters, speaking very nearly that number of Bantu dialects, are jabbering over their camp-fires, and the preparation of their mid-day meal. A triple ring of staring savages encompasses my tent, and amid this Babel I am attempting to send you a little news, by means of some porters who are being sent back to Nyassa.

On November 9th I had reached a place called Msankwa (visited by Thomson in 1880, but not quite correctly placed on the map) on my irregular way from Nyassa to Tanganyika. I was accompanied by Mr. J. L. Nicholl, my assistant, and also by Dr. Cross, of the Free Church Mission, who had joined company with me for a few days. At Msankwa, we heard that the south end of Lake Rukwa was only three days' journey distant (under 60 miles) so we got a guide, and started to see the lake, the first glimpse of which I obtained from high hills, a day and a half's journey from Msankwa. Our route lay about N.N.E., through the Wunyiha (Unyika) country. I have not as yet had time to work out my rough survey, but when I do, I shall be able to show that Lake Rukwa is much longer and extends further to the south-east than has hitherto been supposed. The existing lake is, however, a shrunken vestige only of a much greater extent of water. On the south and west it is skirted by an almost absolutely level plain, varying from 15 to 30 miles in width, and almost flush with the water of the lake; but on the east coast of Rukwa high mountains rise straight up from the shore. The whole basin is, however, girdled with a wall of mountains which rise abruptly either from the water's-edge or the lake-like plain. On the south-east coast there is a remarkable bay or inlet winding into the mountains.

The only river entering Rukwa on the south is the Songwe, a poor
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muddy little stream which rises quite close to the other Songwe, an important river flowing to Nyassa. The Saisi, a big river with many affluents, among which is the Nkana, enters Rukwa on the west coast about the middle of its length. The approximate level of Rukwa by boiling-point observations is 2900 feet. The water of the lake is brackish, and almost undrinkable. It swarms with hippopotami, crocodiles, and fish. Elephants, buffalo with singularly fine horns, zebra, many kinds of antelopes, lions, hyenas, and immense numbers of guinea-fowl, francolin, and ringdoves, haunt its unlovely shores.

Unlovely and almost uninhabitable they are indeed for man. I said to the sullen inhabitants of its southern shores, the Wa-ungu, "Your country is possessed of seven devils—hunger, thirst, a scorching and skinning wind, thorns, a blazing sun, venomous flies, and wicked men." The people to whom this outspoken language was addressed were the Wa-ungu (the country is called I- or U-wangu), who inhabit the ghastly sun-stricken plain at the south end of Rukwa. They cannot grow anything nowadays in their country, where no rain has fallen for two years, and simply live by rapine and the chase of wild beasts, in which they are very adroit. The superfluous flesh of the animals they daily slay is dried and taken to more favoured countries north and south-east, to be exchanged for grain. The slaves they are continually capturing and the ivory they obtain are mostly taken to be sold in Unyamwezi, a country with which they have great dealings. Many speak the Swahili language with purity and fluency, and have evidently had considerable dealings with the Arabs.

In the past, coast Arabs frequently visited and even resided in this strange land, which in those days is said—and the numerous deep, dry watercourses bear out the assertion—to have had its fair share of rain and to have been much cultivated; but since the rapid desiccation which set in about twenty years ago and the hunger which followed, the coast people ("Arabs") have entirely forsaken U-wangu. No white man had ever been there before the arrival of my expedition, and had the Sultan of U-wangu known of our coming, he would probably have prohibited our entry into his dreadful country. But we were among them with 150 followers, before they had time to realise the situation, and they received us not badly after all. I left, however, as soon as I possibly could, as the thermometer in the shade at noon stood every day at 79°–99°; the water, even of the Songwe was brackish, there was no food, and the whole caravan began to sicken.

I have now travelled back through north-western U-nyika to the edge of the Chambezi plateau, which I shall descend to-morrow on my way to Tanganyika. I trust to be back again at Mozambique in January, and as soon as I have leisure I will draw up and send you a sketch map and brief account of Lake Rukwa, or Rukuga, as the natives indifferently called it. It is but one lake, however, and not two; this is the unani-

mons assertion of the natives, and is confirmed, to my thinking, by the extended views of the lake northward which I have had from its encircling mountains.

Notes of a Recent Visit to Peru and Bolivia.

By Major H. LESLIE ELLIS, F.R.G.S.

FROM what I saw during the journeys from which I have recently returned in Peru and Bolivia, I fear I can add very little to what is already known of their geography. I found no reliable maps of small scale in either country, and those on large scales referred mostly to the coast districts, and to places where mines have been established. There is no apparent desire on the part of the Governments of these republics to survey the Montaña (the interior forest region) and the eastern slopes of the Andes, and even if there is the desire, nothing is being done, and I imagine no funds are available or are likely to be. I made inquiries on this subject at Lima, Cuzco, and La Paz. Nothing is known, and nobody, except a few foreigners who are interested in these parts, cares. No doubt the handing over of the Peruvian railways to the bondholders will give an impetus to the extension of the different lines, and accurate large-scale surveys of the valleys and cañons of the Andes, through which they are expected to run, will be made by foreign, probably English, engineers. By this means, and by the discovery of new mines, and consequently by the construction of new lines of transit from them to the coast, the Cordillera may, as time goes on, be accurately surveyed. I fear there is no such thing as geographical enterprise in Peru or Bolivia in the present day, and but little hope of it from the natives themselves. The western slopes of the Andes are of course sufficiently well known for practical purposes, although but very indifferently mapped, and in many parts not mapped at all, but the Montaña of Peru, together with the provinces of El Beni, Santa Cruz, and Chuquisaca in Bolivia, have never been put on paper, that I can discover, except in the roughest way.

I should perhaps here except Colonel Labre's recent explorations in the region of the Madeira, Beni, and Purus rivers, an account of which has been given in the 'Proceedings' of the Society.* A German whom I met has made an apparently very good survey of some of the valleys on the right bank of the Urubamba river in about latitude 13°, longitude 72°, embracing about 400 square miles of country between the above-named river and the Paucartambo river. I saw him at Arequipa on my way to Ollantay-tambo, and he showed me his survey, which he said was intended for the Berlin Geographical Society, and that it would

* *Vide* 'Proceedings R.G.S.,' vol. xi. (1889) p. 496.

probably be published in the course of this year (1890). He gave me also an idea of the difficulties to be met with in these parts, and from what I afterwards saw I do not think he exaggerated them. He had a commission from his Government, so I conclude that the Germans are alive to the necessity of doing something here.

One of the main questions that seems to exercise those who study the geography of these regions is, which river forms the parent stream or real source of the Amazon? The Ucayali is, I believe, generally admitted to contain the real head-water, although the Rio Grande, rising near Cochabamba, in Bolivia, may possibly be entitled to consideration. The Ucayali divides into two streams about latitude $10^{\circ} 40'$, longitude $73^{\circ} 45'$, one the Quillabamba-Urubamba-Vilcamayo branch, rising in the La Raya Pass, about five leagues north-west of Santa Rosa, and the other the Apurimac branch, supposed to rise near Cayllama. I dismiss (possibly wrongly) the claims of the Rio Grande, pending further exploration of the regions through which it runs, but I contend that the question of the Vilcamayo and Apurimac is one which urgently needs settlement. Most Peruvians incline to the idea that the Vilcamayo, trickling as it does from the little lake which I visited at the summit of the La Raya Pass, is the parent tributary. To decide the point it would be necessary to traverse both branches, and survey on each about 400 miles of stream. The cost would be considerable, the time required about a year, and the country such that almost all supplies would have to be obtained from Arequipa and Cuzco. I travelled down the Vilcamayo from the La Raya Pass to northward of Ollantay-tambo during last October, and just before the commencement of the wet season. I particularly noted the capabilities of the Urubamba portion for boat transit, and can see no reason why goods could not be embarked here, for the Atlantic seaports or for Europe, to meet the steamers lower down the Amazon. As the country develops, there appears to be nothing to prevent the great river from being the principal, and probably the cheapest, trade route from west to east.

Although on a very small scale, I found the last edition of Stieler's Hand-Atlas, sheet No. 92, very fairly accurate, and the names correctly spelt. I would draw attention to the following books which can be obtained at Lima, viz.:—(1) 'Noticias de los Departamentos de Tacna, Moquegua,' and 'Arequipa, con una carta geografica.' (2) 'Memoria sobre las Cordilleras del Desierto de Atacama, con varias Mapas i vistas.' Por A. Bertrand. (3) 'Atlas Geografico del Peru.' Por Soldan. Numbers 1 and 2 are new; number 3 was published in 1865 at the Libreria de Fermin Didot, Hermanos Hijos y Ca., 56 Calle de Jacob, Paris. I might add that while at La Paz I heard on good authority that there are remains of a fine quadrilateral Inca fort near Santa Cruz (de la Sierra), in Bolivia. No mention is made of these by any explorers that I know of.

I add to my notes the following list of altitudes given to me by the engineers of the Arequipa and Puno Railway, and as I have every reason to believe that they are correct in the main, they will be useful for comparison with other authorities:—

Nature.	Name.	Height above Ocean.	Position.	Remarks.
Mountains	Coropuna ..	22,800	About 80 miles N.W. of Arequipa	Visible from the Arequipa and Puno Railway from P. de Arriero.
	Charchani ..	19,000	About 20 miles N.N.W. of Arequipa	
	Misti	18,650	About 10 miles N.N.E. of Arequipa	Visible from the Arequipa. Volcano.
	Pichu pichu	17,800	About 20 miles N.E. of Arequipa	Visible from Arequipa.
	Ubinas ..	16,000	About 40 miles E. of Arequipa	Visible from Colca. Volcano.
Lakes ..	Saracocha ..	13,595	In the Cordillera E. of Puno	Visible from Railway. { Probable size of both these lakes about 7 by 2 miles.
	Cachipascana	13,585		
Towns and Railway Stations on the Arequipa and Puno and Santa Rosa line.	Titicaca ..	12,505	Between Peru and Bolivia	Chillilaya is the principal Bolivian port.
	Ensenada ..	32	13½ miles from Mollendo.	
	Tambo ..	1,000	19 " " "	
	Cachendo ..	3,250	34½ " " "	
	La Joya ..	4,141	54 " " "	
	Quishuarani	6,125	84 " " "	
	Arequipa ..	7,550	107 " " "	
	P. de Arrieros	12,300	44 " " Arequipa.	
	Vinocaya ..	14,360	96 " " "	
	Cruero Alto	14,666	118 " " "	Highest point on the railway.
	Saracocha ..	13,940	140 " " "	
Juliaca ..	12,550	189 " " "	Branch line from here to Santa Rosa.	
Puno	12,540	218 " " "		
Pucara ..	12,738	35 " " Juliaca	On branch line from Juliaca to Santa Rosa.	
Santa Rosa	13,100	82 " " "		End of line towards Cuzco.

GEOGRAPHICAL NOTES.

The Stanley Meeting.—The meeting of the Society for the reception of Mr. Stanley and to hear from him an account of the Geographical Results of the Emin Pasha Relief Expedition, will be held on Monday, the 5th May, in the Albert Hall. Our President, the Right Hon. Sir Mountstuart E. Grant Duff will be in the chair. Their Royal Highnesses the Prince of Wales, Vice-Patron of the Society, and the Duke of Edinburgh, Honorary President, have signified their intention of being present at the meeting. A circular was posted on the 25th ult. to all Fellows of the Society whose addresses were known in the United Kingdom and on the Continent, which explains the arrangements of the meeting.

Emin Pasha.—A telegram was sent to Emin Pasha on the 12th March, as follows:—"Geographical Society, London, to Emin Pasha, Zanzibar. Congratulate you on recovery, and hope to welcome you in London." To this the following answer was received:—"Zanzibar, March 13th. Thousand thanks kind message, best reward for me, hope express gratitude personally. EMIN."

Dr. Hans Meyer.—We are glad to be able to announce that Dr. Hans Meyer, the enterprising and observant traveller who, after two persevering attempts, succeeded in reaching and studying the peculiar formation of the summit of Kilima-njaro, is coming to London for the purpose of reading a paper on his explorations to our Society. The date fixed is April 14th.

The Ugueno District, South-east of Kilima-njaro.—We take the following description of the district known as Ugueno, which lies to the south-east of Kilima-njaro, from a short article contributed by Dr. Hans Meyer to 'Petermann's Mitteilungen,' giving an account of his recent excursion into this hitherto little-known region. Ugueno is a mountainous country of gneiss formation. More recent volcanic formations extend in the north to the Rufu, in the west to the Moshunga, and in the east to Lake Jipe. The highest range of mountains is the Usangi range in the south-west, with several culmination peaks. The river Junguli is the principal stream, taking its rise in east Lambo, and receiving a tributary, the Jego, before issuing into the plains. The western part of the country is watered by the Wangobi. The watershed between the north and south is formed by a comparatively low range of hills, lying between Ngovi and Lambo. None of the streams of Ugueno reach Lake Jipe or the Rufu; they all lose themselves in swamps. The people of the country, the Wagueno, are a race very similar to the Wambugu of Middle Usambara. In the north-west, Ugueno is as far as the Wangobi valley quite uninhabited and desert, thanks to the regular raids of Mandara in this region. The middle and southern portions are the most thickly populated and best cultivated. Bananas form the chief food of the people; then sweet potatoes, beans, millet, maize, and sugar-cane. Sheep and goats are reared in but small numbers, and cattle by the chief Naguvu himself only; the natives fearing to excite the cupidity of Mandara and of the Masai. The outer mountains and the uninhabited north-west are clothed with forests and bush-woods, while the rest of the country, where not cultivated, is covered with grass. With regard to the much talked-of iron-smelting carried on by the people of Usangi, Dr. Meyer states that the ore is obtained generally in the form of sand from the shingle of the Jego brook, and is smelted with the aid of bellows by the women. The Jego stream erodes the iron very probably from the quartz strata which pierce through the gneiss. Where the surface disintegration has laid

bare the ore in larger pieces, as Dr. Meyer saw it on the outer western and eastern slopes of the mountains, it is smelted on the spot. Dr. Meyer is of opinion that, were it not for the proximity of Mandara, the country with its mean altitude of about 4600 feet would not fall much behind Usambara in its productive capacity.

The Tsavo district east of Kilima-njaro.—Mr. T. Stevens, the American newspaper correspondent, who was the first to meet Mr. Stanley on his march towards the coast, and who had previously accompanied Dr. Abbott, the naturalist, to Kilima-njaro, sends us the following interesting note on a previously unexplored tract of country east of the great mountain:—Dr. Abbott and myself were returning from that part of Masai-land north of Kilima-njaro, in July 1889. From the higher crests of the rolling upland-plain east of the Useri fountains, which are situated a dozen miles or so from the north-east base of Kimawenzi, we could, with our field-glasses, make out what appeared to be the course of the stream, which had its source in the southern slopes of the Kyulu Mountains, and at a point some 30 miles south flowed into the Tsavo. That dark streak of vegetation must surely fringe a stream, and if so, then a considerable area of country north of the Tsavo and east of Kilima-njaro, marked on the maps as uninhabited deserts, might contain interesting and hitherto unknown features. Our geographical knowledge of the region in question was confined to the map of Mr. Joseph Thomson, in his book 'Through Masai-land,' and as no such stream was marked thereon, we resolved to investigate. We followed down the Useri river to the point where its waters, supplemented by the lesser volume of the Kimangelia and other small streams, becomes the Tsavo of the above-mentioned geographer's map, and to our delight found our new stream flowing into it, a cold clear volume of water, waist-deep and 20 yards wide. Crossing the Tsavo we proceeded up the right, or east, bank of the stream. In a very short time we found ourselves in a country most difficult to traverse. The river was now flowing at the bottom of a cañon 150 feet deep, while we scrambled up the lava hills and down the hollows of a weird area that had been tossed and heaved like the waves of the sea, by volcanic action. We continued on, now losing sight of the river, now finding ourselves again on the brink of its crevice-like bed, but all the time getting into rougher country. After three hours we discovered that we had unwittingly crossed over to the west side of the river on a crust of lava. We were now in a place where it was next to impossible to get about. It was the roughest piece of broken lava country imaginable. We had stumbled into a nest of small extinct craters, between which the lava had been most tumultuously broken up into hills and hollows. Our stream had disappeared from view entirely—had become a subterranean stream. Up and down we continued to climb and scramble, wondering as we reached its crest what new revelations of fantastic ruggedness would be

revealed. At length we found ourselves standing on the rim of a crater in the bottom of which nestled a lovely little lake, fringed with *Borassus* palms. After some search we found a way down, and formed camp on the margin of the lake. We found its water cool and marvellously clear, and it was swarming with fish so tame that they could almost be caught by the hand. They were of the perch family with greenish scales on back, and silvery belly. The largest specimen caught weighed eight pounds. We distributed fish-hooks to the men as far as we had them; the others made rude hooks of bent wire. They tied these to pieces of string, baited with meat, and scattering themselves along the shore, with this rude tackle must have caught not less than 20 pounds each. They revelled in their abundance of "sumaki" (fish) on that memorable day! But the most interesting discovery was that of a school of about twenty hippopotami strolling about the bottom of the little crater lake, now and then rising to the surface to breathe. This little gem of a crater lake, baby sister to Lake Chala in the same region, was near a mile long, and varied from 50 to 150 yards wide. Measurements made from Thomson's map, place it in S. lat. $2^{\circ} 52'$, E. long. $37^{\circ} 53'$. Its elevation above sea-level is about 3000 feet. It reposes in the basin of a crater 100 feet below the rim; the crater wall consists of black lava of such uniform pattern in places as to suggest the handiwork of man. The lake was the last water we found along the dark streak we had seen from Useri. From the lake northward the supposed stream turned out to be a streak of black lava, and the hardy vegetation that grows among its crevices. But the stream undoubtedly flowed beneath the thick lava covering, and our lake had perhaps better be called a pool, or broad reach, of the subterranean river, which had thus revealed itself in the deeper depression of the crater. Finding its way from the crater beneath the lava again, it eventually emerged upon the surface of the lower ground towards the Tsavo, and joined that considerable stream in a volume equal to its own at that point.—Our observations among that interesting people, the Wa-Masai, were often such as to refute the impressions we carried with us from reading the books of our predecessors in that region. We had been led to understand for example, that it was a very dangerous thing to come into contact with a band of Masai warriors while they were engaged in eating. Such an intrusion, it had been written, was almost equivalent to a fight for life. One day a band of Ngiri Masai, on the war-path, camped within three hundred yards of our camp. We had by this time grown sceptical of the many ferocious qualities attributed to the El-Moran; had, in fact, conceived quite a liking for them and their bold, independent demeanour. They always acted like a lot of big, rollicking schoolboys out for a lark. Where we had been led to expect ferocious scowls, we were greeted with the jolliest laughter. On this occasion the warriors came into our camp and fraternised. In the afternoon my companion had gone out

shooting and I strolled down to the Masai camp to satisfy my curiosity. They knocked over a cow with a spear-thrust behind the ear, then opening the jugular vein with a small knife, one after another applied lip to the aperture and drank with great relish the warm blood. They then hacked the carcass to pieces and proceeded to roast the beef on wooden skewers, stuck in the ground round the fires. It was a strange sight to see them eat. A big chunk of beef being ready, several warriors would take possession of it and proceed to devour it with as much haste and as little ceremony as the same number of dogs. It was grab and hack, from hand to hand and mouth to mouth. Each warrior in turn seized it, stuck his splendid teeth into it, and with his spear slashed a piece off. The play of the big spears for carving off mouthfuls of meat looked so rapid and reckless that I expected every minute to see one of them slice off his own, or a comrade's nose. Later in the evening they brought roast beef into our camp to sell. Such as they did not dispose of to our porters they devoured in our presence, without reserve, in a similar manner. Other points about them, related by our predecessors, were that they never used snuff (a universal practice among the tribes of East Equatorial Africa), and that they objected to having vultures and marabou storks killed, becoming violently angry if one was shot. But these non-snuff-taking warriors were continually worrying our porters for pinches of snuff, and so far from regarding the vulture with reverence, they were always begging us to shoot them, that they might secure the feathers to stick in their hair.

M. Dauvergne's Recent Explorations along the Northern Side of the Hindu Kush.—Mr. E. Delmar Morgan sends us the following note:—I am indebted to a friend for further particulars* of M. Dauvergne's exploration along the northern foot of the Hindu-Kush last year. This traveller left Ladak and went due north to Kilian in Kashgarian territory. Thence he took a westerly direction, crossing twelve passes, each one between 12,500 and 14,000 feet, in order to reach the Zerafshan, or river of Yarkand. At Ak Wushid, he fell in with Colonel Petrof's party, and passed a day in their camp. Thence he continued his journey towards Sarikol and the Taghdumbash Pamir. He explored the whole valley of the Tung (concerning which, and its Aryan population some interesting facts were collected by the late Sir D. Forsyth's expedition) as far as the col of Koti Kandar. M. Dauvergne was able to rectify an error of our maps by ascertaining that the Lung is tributary of the Tashkurgan river (which it joins five miles above Langar) *not* of the Zerafshan. He describes this valley as very deep, hemmed in by precipitous mountains, and very difficult of access. Its climate is warm and it is highly cultivated. He remarks on the types of some of the inhabitants he saw as worthy to do honour to France. They are but

* *Vide* 'Proceedings,' *ante* p. 96.

little molested in their remote valley by their nominal lords the Chinese, they speak the Sarikoli language, and are governed by their begs; in religion they are Sūni Muhammadans. The Tung flows west and south-west, the Kandar mountains aligning its left bank, those of Kichik Tung, the right. M. Dauvergne crossed the Kotli-Kandar pass at an altitude of 16,350 feet and found a glacier near the summit. He then descended to the undulating hills of Mariom and the Sarikol Pamir, camping near Ab-i-Uschi (12,300 feet). He followed this stream down to Kharakh, observing that all the houses were surrounded by loop-holed, crenelated walls as a precaution against the predatory Kunjūtis, who infest this region. Having crossed the very difficult Ogriart-dawan pass, he entered the Tashkurgan valley and the Taghdumbash Pamir, watered by several streams flowing down the northern slopes of Mustagh, and uniting in the Tashkurgan river. From Tashkurgan he turned towards the S.S.E., and after two days' march reached the fort of Kurgan-i-Ghujadbbhai, at the confluence of the rivers Kunjirab and Kaarchunker. This fort, which is in ruins, is supposed to be the frontier of Kunjat. Ascending the valley of the Karachunkur, M. Dauvergne camped with the nomad Kirghizes of Chader-tash, Mintaka, Kirikh, and Kukthrup (13,960 feet). The aspect of all this region is that of a rolling Pamir similar to those of Kara-Kul, Alichur, and Great Pamir. Here he learned of Captain Grombchevsky, the Russian explorer, who had failed to cross the Hindu Kush in his endeavour to visit Chitral and Kafiristan, owing to the strict watch kept by the Afghan authorities at the passes. M. Dauvergne himself had great difficulty in making his way back into British territory, as the Afghans refused him permission to cross the Baroghil pass, which he describes as the second gate into India, and to avoid further detention he had to make the best of his way over the Ishkoman pass, which he found partly blocked by snow, and where he was separated from his caravan for a day, and the gorge of Karambar, finally reaching Gilghit and Kashmir territory. Among the geographical facts he draws attention to is that the sources of the true Oxus or Amu-daria, are situated near the pass of Wakijid-Kul (15,500), where three enormous glaciers on its south-western slope supply this river with its parent stream. He followed down its course for 70 miles, and is positive that this, and *not* the Gaz-Kul, is its source. From Lake Gaz-Kul, which he also explored, flows the Ak-su, later known as the Murghab, a river of far less volume than that just mentioned.

M. Bonvalot in Chinese Turkestan.—The latest news of M. Bonvalot, the French traveller, is contained in a letter, dated Tcharkalik, * November

* Chaklik (Prejevalsky's Chagalyk) is described by Mr. Carey as now a mere village, but with the ruins of an old wall still visible. The old town probably stood on the high road from Khotan to Chira. Prejevalsky also mentions a place which he calls Chaglyk Spring, while Mr. Carey's map places a Chigalik some distance to the north of

15th, and published in the *Journal des Débats*. After alluding to his difficulties with the Chinese officials at Karashahr and Kurla, the enterprising traveller goes on to describe the inhabitants of the Lob-Nor district. Their condition, he says, is miserable in the extreme; not a few of them representing the very lowest type of civilization, and living like beasts of prey. But besides the hunters and fishermen, there are a certain number of agriculturists. The art of husbandry was introduced into this region 70 or 80 years ago by strangers from Khotan, who taught men how to plough and reap, to plant fruit trees, and train the vine. At Chaklik, one of these colonists, Pulad by name, made the first canal. He died four years ago, leaving a son. Instead, however, of showing any gratitude toward their benefactors, the people of Lob tried to expel them from the lands they had brought under cultivation. Mr. A. D. Carey, we may note, made mention of these colonists from Khotan, in the paper read before our Society in November, 1887. "They are much smarter," he says, "and more energetic than the Lob people proper, and make long journeys into the mountains in search of gold. There is a standing feud between them and the inhabitants of Chaklik." M. Bonvalot was also told something about the Russian colony mentioned, by the late General Prejevalsky. According to the Russian traveller, these men were of the sect of "Old Believers," and first arrived at Lob-Nor in 1861.* M. Bonvalot heard the following account of them from an old native, a grey beard:—"Years ago, before I had a single white hair, six men calling themselves Urus came to the country, riding on horseback, armed with guns, and wearing tall sheepskin hats. After wandering about for some time, five of them built huts near the Tarim river, and set to work to hunt and fish; while the sixth, taking the best horse, rode away. After a time he returned with other horsemen; and presently a large band of these strangers arrived, many hundreds of men, women, and children. After staying some little time at a place called Ketmen-Kul,† they descended the river to Kara Buran;‡ the old men, women and children on rafts, and the younger men on horseback. In the neighbourhood of Kara Buran, they built themselves houses of wood. They used to cross themselves and pray on their knees before images. When we asked why they had left their own country, they answered that it was because of a war which their king had waged against the Feringhis. For two years they sojourned in the country, and then the

Chaklik; but the latter traveller found a settlement of immigrants from Khotan at Chaklik, which seems to support the above identification. Moreover, Mr. Dalgleish says Chaklik is the only place of any note in the Lob district. See 'Supplementary Papers B.G.S.,' vol. iii. p. 30.

* 'From Kulja to Lob-nor,' translated by E. Delmar Morgan, pp. 77 and 202.

† The Kutmet-kul of Mr. Delmar Morgan's earlier map; Kultokmit-kul in the map published with Mr. Carey's paper.

‡ A lake or marsh some 20 miles to the north of Chaklik.

Chinese drove them out. They divided themselves into two bands, one going towards Kurla, the other towards Turfan. Then came the war (i. e. between the Chinese and Yakub Beg.) After that we heard no more of them." Having recounted this story, M. Bonvalot concludes his letter with a promise to describe his travels more at length when he reaches the Chinese frontier. "We shall now endeavour," he says, "to cross Tibet and follow the Yang-tse-kiang from its sources."

Geographical Prizes to Training Colleges.—The Royal Geographical Society's prizes have been awarded this year by the examiners of the Education Department to the following students in Training Colleges, who have most distinguished themselves in the Geographical section of the Examination:—Male students (Scholarship 15*L*) G. J. S. Hollister, Cheltenham College; Prizes (Books) J. W. Kenyon, Cheltenham College, J. G. Anderson, Culham College, F. Williams, Chelsea College, R. H. Whitehead, Westminster College.—Female students (Scholarship 15*L*) K. B. Clague, Southlands College; Prizes (Books) Jane Benstead, Lincoln, E. Harris, Derby College, K. Morrison, Whitelands College, and A. Lay, Salisbury College (the last two equal).

Obituary.

Rev. George Butler, D.D.,* Canon of Winchester, formerly Vice-Principal of Cheltenham College, and then Headmaster of Liverpool College, died on the 14th of March last. He was born on the 11th of June, 1819.

In this brief obituary notice, especial regard must be shown to the valuable support given by Canon Butler to our Society, in its efforts more than 20 years ago, to improve the teaching of geography in public schools. Being himself a classical scholar of high rank, and a headmaster whose pupils attained a full measure of University success, his assertion that the liberal study of Geography was a help to the classical student and not a burden, backed by the example of his own school, could not fail to influence opinion. His pupils were among the earliest and most successful competitors for the prizes that were offered by our Society to the public schools. Year after year the words "Liverpool College" are attached to some of the names printed in our lists, of winners of the school medals and of honourable mention. Canon Butler's own son, who is now Senior Assistant Examiner to the Civil Service Commission, was one of our earliest gold medallists.

A man needs to be variously informed before he is qualified to become a good geographer, and Canon Butler was remarkably so. He ranked at Oxford among the very first classics of his time, and he bore a high and independent reputation for general ability. One of the foremost dignitaries of the Church told the present writer that he considered George Butler to be the most generally accomplished man he had known. Canon Butler had remarkable powers, both mental and physical. He inherited them from his father, Dr. Butler, afterwards Dean of Peterborough, the headmaster of Harrow during the earlier part of this century, and senior wrangler in Cambridge in

* By Francis Galton, F.R.S.

the year when the future Lord Chancellor Lyndhurst was second. He shared those powers with other brothers of an exceptionally gifted family.

In addition to his more serious qualities and pursuits, Canon Butler had a buoyant and almost boyish temperament, with a strong natural instinct for field sports, which made him a keen fisherman up to his last illness. He had also a passion for landscape painting. The staunchness of his attachment to old friends, together with the sympathy felt by a considerable political party with his efforts for social reform, in conjunction with those of his wife, but now widow, Mrs. Josephine Butler, cause his death to be widely felt.

REPORT OF THE EVENING MEETINGS, SESSION 1889-90.

Sixth Meeting, 24th February, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.C.S.I. &c. President, in the Chair.

ELECTIONS.—*Alfred Barber, Esq.; John Wolfe Barry, Esq.; Alfred Bertrand Esq.; Silas Mainville Borrowghs, Esq.; Clement H. L. Cazalet, Esq.; Maurice S. Evans, Esq.; Arthur Octavius Green, Esq.; Lewis D. Hall, Esq.; Augustus Allen Hayes, Esq.; Alfred R. Hollebone, Esq.; A. P. H. Hotz, Esq.; Ernest D. Löwy, Esq.; Lionel Löwy, Esq.; Rev. W. Morris; William Mayne Neill, Esq.; Capt. Charles Myles, Officer, Victoria (Australia) Field Artillery; Charles Boyd Robertson, Esq.; Colonel William Salmond, R.E.; Alexander Siemens, Esq.; William Alfred Stephens, Esq.; Thomas George Sweet, Esq.; George Templar Tickell, Esq.; Henry S. Wellcome, Esq.; Gustavus Andreas Witt, Esq.; The Right Hon. Lord Wolverton.*

The paper read was:—

Further explorations in the Solomon Islands. By Charles Morris Woodford, Esq.

The paper was illustrated by numerous lantern-slide views of the scenery and people, from Mr. Woodford's photographs.

Seventh Meeting, 10th March, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.C.S.I. &c. President, in the Chair.

PRESENTATION.—*Capt. A. E. Sandbach, R.E.*

ELECTIONS.—*Moubray Vernon Charrington, Esq.; A. L. Halkett Dawson, Esq., M.A.; David Evans, Esq.; Law Walker Gill, Esq.; Joseph John Gurney, Esq.; Gabriel Linda, Esq.; Herbert George Lousada, Esq.; R. A. Fuller Maitland, Esq.; James Medwin, Esq.; Alfred J. New, Esq.; Samuel J. Pipkin, Esq.; William Sandbach, Esq. (King's Own Regiment); Hon. J. St. Vincent Saumarez; Henry L'Estrange Saunders, Esq.; Andrew Simons, Esq.; Rev. Joseph Smoult Smalley; Rev. Frank Willcox; Maj.-General Edward Lloyd Wynne; Thomas Graham Young, Esq.*

The paper read was:—

On Lieut. H. B. Vaughan's recent journey in Eastern Persia. By Maj.-General Sir F. J. Goldsmid, K.C.S.I. Will appear in a subsequent Number of the 'Proceedings,' and Lieut. Wheeler's original paper with map will be published in 'Supplementary Papers,' vol. iii.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Berlin.—March 8th, 1890: BARON VON RICHTHOFEN in the Chair.—BISMARCK ARCHIPELAGO.—Count Joachim Pfeil spoke upon the physical features and people of the islands of the Bismarck Archipelago, east of New Guinea, making special reference to New Ireland. New Ireland is formed mainly by a mountain chain which stretches from north-west to south-east, presenting an abrupt slope towards New Britain, but a more gentle incline towards the Pacific. The extreme south-eastern portion of the island is the broadest and most elevated. The north-western half is composed exclusively of coral-reef; in the mountains in the middle of the island, chalks and sandstones lie in alternate strata, while the south-eastern part is highly volcanic. It is worthy of notice that the white cockatoo, which is found in such large numbers in New Guinea and New Britain, is not known in New Ireland; this is also the case with the cassowary, which in New Britain is so frequently met with. On neither of these islands do the birds of paradise, which abound in New Guinea, appear to be found. The sago-palms found growing in such abundance in the north-western parts of New Ireland are not yet known in New Britain. The inhabitants of the two islands differ very greatly. Those of the Gazelle Peninsula are for the most part a tall, powerful, muscular set of people, but with all their strength they are entirely deficient in that graceful appearance which characterises many negro peoples. Their figures are often plump, and the colour of their skin is that of a pure negro mixed with a tinge of red. Their hair is crisp, and always cleverly coated with a mixture of ochre, chalk, or clay. Their faces present a coarse, broad mouth, a flat nose, and very little expression. The New Irelanders are small and neatly built, their countenances are expressive, and their disposition lively and cunning. The hair is worn in frisures, which resemble an old Greek helmet. It would seem as if at one time an immigration from the Gazelle Peninsula to the middle part of New Ireland had taken place, which had inserted itself in the shape of a wedge among the aborigines of that locality. The people of this part of New Ireland repeatedly use an *h* where their kinsfolk of the Gazelle Peninsula make use of a *w*, e. g. *hahine*—*wawine*—woman; *hudu*—*wudu*—banana. Again, the former add an *s* to words which terminate with a vowel, e. g. *lamas*—*lama*—*coco*-nut; *tas*—*ta*—*sea*. In New Britain and in the central part of New Ireland there is the custom common to both of dividing the inhabitants of a village, as regards marriage, into two groups, *maramara* and *pikalaba*; marriages of individuals within one of these groups would be certainly punished with death for the woman, and for the man with a heavy penalty of cowries (*dewarra*). The children born in wedlock belong to the group of which the mother was a member. Both divisions regard a species of locust with special reverence. In the north-west of New Ireland, on the other hand, a young maiden is quite free to bestow her favour upon whom she pleases, and upon marriage becomes the property of her husband, who can punish with death any act of adultery. Similar differences of practice occur also with reference to the burial of the dead. In New Britain the body is buried in the house or thrown into the water. In the central part of New Ireland the same custom prevails, except that before being cast into the water, stones are fastened to the legs, and a bush is placed in the hands, so that the body sinks perpendicularly into the ocean. In the north-west of the island, on the other hand, the corpse is placed upon an erection of spears, and the thumbs and toes are bound together. Then the relatives begin the mourners' howl, and fasten on to the body small quantities of cowries, which are destroyed when the interment takes place. But the heir of the

dead man has to surrender just the same amount of cowries as has been sacrificed by the friends of the deceased. When the heir is unpopular in the village, a number of the inhabitants club together and sacrifice as many cowries as the whole inheritance is worth. The dead man's successor must then reimburse to them this expenditure, but the property itself is forfeited. The corpse is then taken down from the staging of spears, and placed in a canoe, in order that it may be buried in a spot, which is generally selected in proximity to the scene of some important event in the life of the deceased. A pile of logs is erected round an upright stake, and the body is burnt. The body of a chief is burnt upon a special wooden scaffold, and demands more time. The calcined bones are then collected by the heir and preserved as a memorial. Cannibalism is general throughout New Ireland, and the inhabitants are not ashamed to speak of it; in New Britain, especially in the Gazelle Peninsula, this practice is beginning to disappear under the influence of missions and of civilisation. The sagas and myths of the people of New Britain deal mostly with obscene matters, although every piece of obscenity is carefully covered up, and is described in euphemisms and circumlocutions.

RIVER PURUS.

A paper was read by Dr. P. Ehrenreich upon his journey up the Purus. On the conclusion of his exploration of the Araguay and of his travels through Central Brazil, Dr. Ehrenreich determined to explore one of the great tributaries of the Upper Amazons. He left Para on the 28th November, 1888, and reached Manaos on the 6th December. The extremely low level of the waters of the Rio Negro caused him to abandon his intention of proceeding up this river, and to turn his steps to the Purus. The latter river lies in its whole course entirely within the great depression of the Amazons, which is to be regarded as the filling up of a former sea-basin. The Madeira is the last affluent of the Amazons which in its middle course comes in contact with the spurs of the Central Brazilian table-land, and there forms those dangerous rapids, the compassing of which by a railway has not been successful, in spite of the enormous expenditure of capital and of human life, and notwithstanding very promising beginnings. All the mighty tributaries of the Amazons west of the Madeira and the Rio Negro present the same characteristics, viz. a course twisted into innumerable curvings, an uninterrupted navigability over many hundreds of miles, and low banks inundated during a great part of the year by high waters. The forest vegetation is remarkably luxuriant, and the principal plant of economic value, the *Siphonia elastica*, grows in the utmost profusion. Another characteristic feature of these rivers is the continual change in their course. The high water of the rainy season, exceeding by from 50 to 65 feet the low level in the dry season, underwashes the banks; the masses of soil thus detached are again deposited at the next bends of the river, and contribute in diverting the stream from its bed. In this way a labyrinthine system of canals arises, which accompanies the river along its whole course, the so-called "Igarapés." The old bends of the river, half or wholly shut off, form lagoons, which serve as mighty reservoirs and draw off immense quantities of water, so that the régime of high waters commences in the lower basin much later than in the upper part of the river. At the head waters of the river the water-level is wholly dependent upon the rainfall in the Cordilleras; it rises and falls very suddenly, so that it not unfrequently happens that the steamer is obliged to be set right about quickly on account of the falling waters, if, indeed, it does not become stranded for a long time. Twenty-five years ago the Purus was still as good as unknown. In the year 1862 the river was navigated for the first time by a small Government steamer, for a stretch of 800 miles. On board this steamer was

the botanist G. Wallis, who, in a canoe, followed the stream up as far as the embouchure of the Paning, and to whom we are indebted for the first information as to the flora and the Indian tribes in this region. The first actual exploration, however, was carried out by the indefatigable W. Chandless, who, in 1864-5, ascended not only the Purus proper, but also its great right-hand tributary, the Aquiry, or Acre, almost up to its source. The furthest points reached lay at an elevation above the sea of 1088 and 1010 feet respectively, and at a distance from its mouth of 1847 and 1866 miles respectively; the river has thus an uncommonly small fall. Since Chandless's visit the traffic along the river has increased enormously. In 1869 steam navigation was opened; the wonderful wealth of caoutchouc drew thither a fluctuating population, which is estimated at 50,000 souls, while in 1871 the population numbered barely 2000. Among the new-comers may be specially mentioned the Cearensians, who left their homes in consequence of the continuous droughts of recent years. The production of caoutchouc amounts, on an average of recent years, to about 2950 tons, worth about 900,000*l*. The most important district of the present time is that of the Rio Acre, which, during the period of high water, is navigable for steamers as far as Irariapé, and for small boats for about 125 miles further. The territory belongs nominally to Bolivia, but the Brazilians, as "beati possidentes," are continually advancing further into these regions. Agriculture is pursued only on the most moderate scale, and the few sugar-cane plantations distil "schnaps" almost exclusively. On the 25th December the traveller, after a monotonous voyage up the muddy yellow stream, which at Labrea is as broad as the Rhine, arrived at the chief town of the river basin, Comarca Purus, which was founded in 1871, and was raised to municipal dignity in 1881. Here he made the acquaintance of the chief official, Antonio Pereira Labre, a man of merit, who, since 1871, has been indefatigable in his efforts to discover a practicable route from the Purus to the Campo regions of Bolivia, which are so rich in cattle. He has been successful in proving the existence of extensive Campo tracts of country south of Labrea, which would afford an easy means of communication with S. Antonio below the Madeira rapids (107 miles) and with the station of Correnteza above the last rapids of the Beni (215 miles). Moreover, he has discovered a new route from the Rio Madre de Dios, which up to 1862, was wrongly regarded as the head waters of the Purus, to the Rio Acre (175 miles). The chief obstacle to a commercial route in this direction lies in the fact that the Rio Acre is navigable for larger vessels only during four months of the year, and that during the régime of the high waters, the overland journey from there to the Beni is not free from difficulties. It is, however, beyond all doubt that in view of the importance of supplying these rich caoutchouc regions with Bolivian cattle, a permanent and commodious means of communication with Bolivia will sooner or later be established. The most unhealthy, fever-producing months in the lower valley of the Purus are April and May. The traveller proceeded from Labrea to the mouth of the Sepatiny, where there is a large indiarubber station; but the fearful insect pests, and the low-lying ground, sodden through and through in every direction, scarcely rendered it possible to leave the house. The traveller set out from there for the terminus of subsidised navigation, the station of Hytanaham, where the high river banks allow of excursions being made into the country around. From here, at the beginning of March, the return journey was commenced. In spite of the cheap steamer rates, living is dearer in these regions than in Goyaz, where goods have to be conveyed 375 miles overland. A fowl costs about 10*s*., an ox 15*l*. to 20*l*. During the dry season of the year fishing contributes to the food supply, and in October turtles are caught in great numbers and kept in tanks, and killed as required. Every barração or caoutchouc settlement employs Indians hunters, who, during the wet season, especially when there are no fish, are unremitting in the chase and bring home

anything in the shape of booty so long as it is eatable. Under such circumstances it is difficult to understand why no one has thought it worth while to practise agriculture on a larger scale, as it would certainly within a short time yield great profits. The insect pest on the Purus is terrible. Against the mosquitoes at night tolerable protection is afforded by the mosquito nets, but in the daytime one is left exposed to the attacks of myriads of, "borrochados" or "pium," that species of *Trombidium* so notorious and widely distributed on the banks of rivers throughout the whole of Brazil. To ward off the attacks of this pest forms the principal business of the day. The only means of escape is that which the Indians avail themselves of, viz. not to live upon the river, but in the heart of the shady forest of *terra firma*.—With regard to the Indians, the study of whom was the chief object of the journey, the Pammarys, the Jamamadis, and the Ipurinas belong to Dr. von den Steinen's "Nu-Aroak" group, whose immigration into Central Brazil from the north was so completely demonstrated by the second Xingu expedition. The river Purus appears to have been their principal line of extension south of the Amazons, thus bringing into connection the Nu races of Bolivia and of Matto Grosso, with their racial relations north of the Solimões. The tribes of the Madeira belong to quite different families. Some of the latter, like the Caripunas, and the cannibal Araras or Jumas, extend their excursions as far as the middle Purus. The Pammarys are pure watermen. They live only on the river banks or in floating settlements in the lagoons. Almost their whole life is spent in their canoes, and they are conspicuous by their peculiar skin, which is covered with black and white spots, and causes many individuals to look just as if they were dappled. This skin affection, which is found to exist among many other tribes of the western Amazons, is very mysterious. Being industrious collectors of caoutchouc and copaiva, they have already provided themselves with many European articles of commerce. Ethnologically they present little that is interesting. They have fallen hopeless victims to alcoholism. The Jamamadis living on the western bank between 7° and 9° S. lat., on the other hand, make their homes in the forest; they are without a knowledge of navigation; are clever agriculturists; they avoid as far as possible trade with the settlers, and very seldom leave their dense forests. They are still an uncorrupted, hospitable, frank, natural people. Their principal weapon is the well-known blowpipe, discharging poisoned arrows. The most important nation on the Purus are the Ipurinas or Cangiti, who dwell in numerous hordes, under different names, in the region of the head-waters of the Purus and Rio Acre. They are a proud, warlike race, of vindictive disposition, cunning, and treacherous. They are still partly anthropophagous. Domestic animals are rarely kept; tobacco is taken as snuff; poisoned weapons are generally used. In the region of the sources of the Rio Acre other Indian races, of great interest to ethnologists, appear to dwell, possessing richly carved huts for ceremonies, stone figures, and idols. The efforts of English missionaries, who commenced work among the Ipurinas at the beginning of 1870, are completely thrown away. The caoutchouc trade, with its reckless gains, which secures from the Indian as cheaply as possible the valuable products of nature, and presses upon him in exchange worthless articles and pernicious spirits, exercises a most disastrous effect on the Indians; nevertheless, the Indian element might become of the highest importance to the immense but thinly-peopled Province of the Amazons, if only a judicious and conscientious treatment were adopted as the means of bringing the aborigines within the bounds of civilisation.

Society of Commercial Geography, Berlin.—January 31st, 1890: the President, Dr. JANNASCH, in the Chair.—**EAST AFRICAN TRADE-ROUTES.**—Paul Reichard, the well-known African traveller, spoke on "Trade and Trade-routes between German East Africa and the interior." The Arab slave and ivory dealers

kept first mostly to Zanzibar and the coast places. After the ivory had begun to get scarce, the ivory hunters were forced to go farther inland, being followed by the traders, and thus the important place Tabora was founded. The influence of England made the importation of slaves on the Island of Zanzibar, where the clove plantations required a great many, more difficult, and therefore many plantations had to be abandoned and many of the Arab owners got poor. The financial ruin caused many to leave Zanzibar, where the debtors' prison awaited them, to get out of reach of the Indian creditors, who had advanced money at a high rate of interest. They all went to Tabora to trade in ivory, either with their own capital or with money borrowed at 400 per cent. interest of the Banians. Many got rich; others became indebted to their richer countrymen in Tabora, and had in consequence to leave the place. In that way Ujiji and Nyangwe, and other settlements were founded, while Tabora remained the head-place of Arab dominion in East Central Africa. The Arabs had to pay a duty of about 30 per cent. to the Wagogo, and could do nothing to lessen this burden by force. First, they were dependent on the plantations of the Wagogo for the support of their caravans; and secondly, Ugogo would, if its people were annihilated, be taken possession of either by the Masai from the north, or by the Wachi from the south, both tribes even more warlike and difficult to deal with than the Wagogo. It is necessary, therefore, for German interests to make Tabora the centre of German trade, especially as the best carriers, the Wanyamwezi, who live around Tabora, are also a very industrious agricultural people. They travel not from necessity, but because they are not allowed at home to do what they like with their property, it being considered the property of the heirs. The *tsetse-fly* is not so much to be feared as generally believed—it is not worse than any ordinary gadfly; but to build regular roads would become quite as expensive as a railway. The importance of the large Central African lakes is very much overrated, as they stretch in a narrow strip from south to north, while all goods have to be transported from west to east. A railway will have to be made, and will be constructed much cheaper than the Congo railway. Altogether, East Africa is a country well worth having, and will largely repay all the present outlay.

—Dr. Jannasch made afterwards some remarks on the new German enterprise in East Africa. The country best situated for trade with the most densely populated, and therefore the richest parts of the world, is England, and after England is Germany. There are, speaking generally, three great centres of population in the world—first Europe, then the East Coast of America, and lastly Eastern Asia. The Portuguese, and later the Dutch, were not able to maintain their maritime dominion, or to get hold of the interior well-populated but rich countries of the East. England was the first which succeeded in the task, having fortified her position in a quiet, methodical way by means of a long line of fortresses, docks, &c., beginning with Jersey, and next in succession Gibraltar, Malta, Cyprus, Aden, India, Singapore, to Hong Kong in the north, and to Melbourne, Sydney, and Auckland in the south. But if these places are of the first importance for English interests, in the second place they are of not much less importance for the preponderance of all European culture in the midst of the 1000 millions of Asiatics, and English enterprise is of great assistance to the traders of all Europe. Quite in contrast to the exclusiveness of the Portuguese, Spaniards, and Dutch, Englishmen have opened their transoceanic harbours to the trade of all nations under the same conditions as their own. The *mare liberum* has become true only since England became the first maritime power. Germany owes England very much; before we had a navy the only protection for German vessels in the Far East were English men-of-war. It has become fashionable lately to speak too much of English selfishness; but what picture would the eastern hemisphere show, if it had been still ruled by the clerical-aristocratic influence of

Spain, France, or Portugal? But, on the other side, we may learn from England how to advance our own interests. Tens of thousands of young Englishmen leave annually their native isles to go abroad in the interests of single firms, companies, &c.; every one of them aims at advancing, next to his own interests, the interests of his country. Just so acts every English expedition for scientific or missionary purposes; while in Germany, till very lately, it was considered derogatory in any scientific traveller or missionary if he strove to advance practical interests as well as his own speciality. Referring to the different steamboat routes, Dr. Jannasch stated that in the trade to the western hemisphere private enterprise has created eight different lines, while to the east it was necessary that the Government should take the matter in hand and give subsidies to lines of fast steamers. In the same way it was also necessary for the Government to give a large subsidy to the new German line to East Africa, as a private company could not otherwise compete with the foreign lines which receive large subsidies; and it was necessary that all German colonial undertakings should be supported by national lines of steamers, independent of those of other nations.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

EUROPE.

Berg, A.—*Bidrag til Kundskab om Færøerne. Nykjøbing paa Sjælland, 1889: sm. 8vo., pp. 122.* [Presented by the Author.]

Betham-Edwards, M.—*The Roof of France, or the Causses of the Lozère.* London, R. Bentley & Son, 1889: 8vo., pp. xvi. and 327. Price 12s.

This volume is descriptive of two visits to the Causses in the interesting but little-frequented department of the Lozère—the Roof of France. These Causses consist of lofty tablelands of limestone, which at one time were no doubt continuous, but are now cleft asunder, forming picturesque gorges and magnificent defiles. The general character of the plateaux of the Causses is an arid waste, contrasting greatly with the fertile valleys below. They are sparsely inhabited by a race of people having a peculiar language, a characteristic physique, and primitive customs. The authoress gives a graphic account of the places visited, the most interesting perhaps of which were the Cañon of the Tarn and the newly-discovered dolomite city of Montpellier-le-Vieux. Altogether the volume may be taken as a guide to this particular region of Central France.

Coolidge, W. A. B., Duhamel, H., and Perrin, F.—*Guide du Haut-Dauphiné. Supplément.* Grenoble, Breynat & Co., 1890: 12mo., pp. xi. and 90. [Presented by W. A. B. Coolidge, Esq.]

This is a supplement to the little guide-book to the Dauphiny Alps by the above authors, published in 1887, and noticed in the 'Proceedings' for that year at p. 710.

[**Cora, Guido.**] *Balcanica Penisola* (dal 'Supplemento alla 6ª edizione della Enciclopedia Italiana.' Torino, Unione Tipografico-Editrice Torinese, 1889: vol. ii°, 17ª dispensa). Folio. [Presented by the Author.]

[**Murray's Handbooks.**]—*Handbook for England and Wales; alphabetically arranged for the use of Travellers.* Second edition. London, John Murray, 1890: post 8vo., pp. 478. Price 12s.

An enlarged and coloured map, in two sheets, has been added to this edition.

[—] Handbook to the Mediterranean: its Cities, Coasts, and Islands. By Lieut.-Col. Sir R. Lambert Playfair, K.C.M.G. Third edition. 2 parts. London, John Murray, 1890: post 8vo., pp. 560.

This edition contains an additional number of maps and plans.

Tozer, [Rev.] Henry Fanshawe.—The Islands of the Ægean. Oxford, Clarendon Press, 1890: 8vo., pp. xii. and 362. Price 8s. 6d. [Presented by the Publishers.]

This volume is the result of three visits made by Mr. Tozer to the Ægean, the first in 1874. His main object in publishing the volume has been to give general impressions and to indicate the objects of greatest interest. From a geographical point of view, Mr. Tozer points out, the islands of the Ægean have a peculiar interest, because the group which they form is so typical that the name of Archipelago has become a descriptive one. Among the islands visited by the author were Delos, Rheneia, Tenos, Crete, Naxos, Ios, and Sikinos; Santorin, Antiparos, and Paros; Lesbos, Chios, Samos; Patmos, Rhodes, Lemnos, Thasos, and Samothrace. Thus it will be seen that Mr. Tozer has covered a considerable area, and his copious notes cannot fail to be of service to others who may follow his example. While naturally devoting much attention to the historical and antiquarian aspect of the islands, the author gives a fair amount, of space to their geography and to existing conditions. There are a general map and several small maps in the text.

ASIA.

Blumentritt, Fernando.—Breve Diccionario Etnográfico de Filipinas. Manila, 1889: 12mo., pp. 16.

Contains brief notices of places in the Philippines.

[Borneo.]—Handbook of British North Borneo. Compiled from Reports of the Governor and Officers of the Residential Staff in Borneo, and other sources of information of an authentic nature. With an appendix of documents, trade returns, &c., showing the progress and development of the Company's territory to the latest time. London, Clowes & Sons, 1890: 8vo., pp. 184. [Presented by the B. N. Borneo Company.]

The many excellent illustrations and maps in this volume give it a special value. It contains a very full account of the modern history of North Borneo; its geography, population, meteorology, trade and products, minerals, agriculture, government, European life. Each subject is treated in considerable detail, and for any one studying the geography of Borneo, the book is to be commended.

Butler, G. G., and Fletcher-Vane, F. P.—The Sea Route to Siberia, followed by a Brief Account of the Natural Resources of the Country. Sm. folio, pp. 31, maps. [Presented by H. N. Sullivan, Esq.]

A useful summary of information relating to Siberia.

Grierson, George A.—The Modern Vernacular Literature of Hindustani. Calcutta, Published by the Asiatic Society, 1889: 8vo., pp. xxx., 170, and xxxv., plates.

India.—Tenth Tour of his Excellency the Right Honorable Lord Connemara, G.C.I.E. Calcutta, Darjeeling, Allahabad, Simla, Quetta, Kurrachee, and Bombay. [Madras, 1889]: folio, pp. 14, map.

[—] Eleventh do.—Coconada, Rajamundry, Ellore, Bezwada, Singareni, and Hyderabad. Christmas, 1889. [Madras, 1890]: folio, pp. 16, map.

These interesting reports are by Mr. J. D. Rees, who is a member of his Excellency's staff.

Leclercq, Jules.—Les Monuments de Samarcande. Bruxelles, 1890: 8vo., pp. 24. [Presented by the Author.]

Modigliani, Elio.—Un Viaggio a Nias. Milan, 1890: pp. 726, with 195 woodcuts, 26 plates, and 4 maps. Price 10 lire. [Presented by the Author.]

The island of Nias lies north of the equator, about 30 miles distant from the west coast of Sumatra. The area according to the careful calculation of Signor Modigliani is 4576 square kilometres, or 1766 English square miles; the area usually given is 1594 square miles.

This island, concerning which most of our knowledge is derived from the Dutch traveller Rosenberg, was visited by Signor Modigliani in 1885, and he remained there a year, studying every branch of its natural history and ethnology. The results of his travels are contained in his book, but before treating of these he devotes 75 pages to an historical sketch of Nias from the earliest times down to the present, one chapter referring to the Dutch dominion over the island and the unhappy wars waged with its natives to put a stop to the slave trade.

The author was accompanied by a troop of five collectors—four Javanese and an Italian, with whom he set off from Sumatra in a Dutch Government schooner, carrying rice and dried fish for the garrison of Malay soldiers stationed at Gunung Sitoli, the chief port and residence of the *controleur*, as the Dutch representative on the island of Nias is called. Having presented his letters of recommendation to this functionary, he installed himself and his men in one of the native houses, and prepared for his explorations into the interior. In one of these he visited Mount Sabegno, near the summit of which is a cave or grotto, and descending into this he secured a few objects of zoological interest for his collection. Sitoli itself is not inhabited by the Nias natives, but is a colony of Malays and Chinese flourishing under the Dutch flag. Having completed his preparations, M. Modigliani set sail for Bawa Lowaláni, in the south of the island, notwithstanding the representations made to him by the authorities of the dangers he would meet with. Declining all Government assistance, he sailed thither in a Malayan bark of four tons burden, which he chartered for the purpose, and assuming the pacific character of a Malayan coco-nut merchant, entered at once into relations with the natives. He was favourably received by the chief of Bawa Lowaláni, with whom gifts were interchanged—on the part of the chief, a pouch to contain *sirih*, a compound of various things used in chewing; and on the part of the traveller, Javanese leaf tobacco, all the inhabitants, both men and women, being passionately fond of its use. Amicable relations having thus been established, difficulties disappeared and the work of collecting was satisfactorily pursued. The inhabitants of these Nias villages are constantly making war on their neighbours. Their houses are skilfully put together, and are raised four metres above the ground on a solid substructure of posts. Some say this is to lessen the effects of the frequent shocks of earthquake, others that it is to avoid the damp with which the soil is saturated for several months during the rainy season. Near the villages are the baths where men and women refresh themselves during the heat of the day. But, owing to the continuous state of warfare in which they live, the women when they visit the baths are invariably escorted by a troop of warriors, for otherwise they might be attacked by the enemy.

The Nias of the south differ essentially from those of the north. They are taller and more robust, their hair is more curly, and their cheek-bones more prominent. All their movements betoken a fierceness and irritability of character quite foreign to the milder inhabitant of the north. These differences and the origin of this race are discussed in chap. xxiii., the last in the book. The natives of Nias worship spirits represented by idols, believe in the miraculous properties of talismans, amulets, &c., and when one of the author's collectors fell ill, offered him the services of their village sorcerer. Of the medicinal properties of the various plants growing around them they appear to have but little knowledge; for instance, they understand nothing of the astringent properties of the tamarind in cases of diarrhoea, while for wounds and fractures of the limbs they consult certain persons in their village whose only title to be regarded as authorities arises from the fact of their having been born feet foremost.

The author's arrival at Bawa Lowaláni soon became known in the neighbourhood, and many were the invitations he received from various villages.

He decided upon accepting that brought him by a deputation from Hili Dgiõno, a rich village to the west of Bawa Lowaláni, and here he collected further information on the habits of the people and their system of head-hunting. The ghastly trophies of this chase adorn their council halls and take a conspicuous part in all their ceremonies. Returning to Bawa Lowaláni the author embarked on his little vessel and sailed further along the south coast, landing at Sendrecheási, near the head of Luaha Gundre bay. He found the people in this village had benefited by the Dutch occupation of Luaha Gundre in 1856, having adopted a more settled and peaceful mode of life, and discontinued some of their barbarous practices. These beneficent influences had not, however, penetrated beyond the coast, the other villages being in a state of barbarism. While staying at Sendrecheási, Signor Modigliani witnessed a funeral ceremony, and this leads to an interesting digression in his book on funeral rites as practised in the north and south of the island. At another village he visited afterwards he saw the stone throne occupied by the chiefs on state occasions, and he speaks of the honour paid to these seats by the natives, and of the symbolical meaning the designs on them are intended to convey. The Nacco group of islets off the west coast of Nias were also visited by our author, who describes their inviting aspect and the wealth of vegetation found there, presenting the appearance of vast gardens of the tallest coco-nut palms, intermingled with plantations of rice and sweet potatoes, all this verdure overlying a subsoil of red coral. In 1861 a severe earthquake produced great changes in this group, and necessitated alterations in the Government charts; accordingly fresh surveys were undertaken in 1880 by Captain Wolterbeck Muller, of the Dutch navy. It would be well if the English Admiralty also amended their charts, for according to the latest of these, two islets of Sendrongon are shown, whereas the author only saw one, and did not hear of the existence of another. From Nacco he returned to Nias, landing this time on its west coast, near Cape Serombu. Hence he made a land journey to the south, and finally embarked for Gunung Sitoli. His book will not fail to excite interest in an island and people so little known as Nias, and may possibly lead to more strenuous efforts to introduce the benefits of civilisation where slavery and base degraded superstitions have so long prevailed. The maps and illustrations, many of these from photographs by the author, are good.—[E. D. M.]

Sherriff, William.—Report on the Northern Shan States, 1889: folio, pp. 17 and x., map and illustration. [Presented by the Author.]

AFRICA.

[Africa].—Possedimenti e Protettorati Europei in Africa, 1889. Raccolta di Notizie geografiche, storiche e militari sulle regioni costiere Africane. Roma, 1889: 8vo., pp. viii. and 179, maps. Price 2.50 lire.

A useful summary of geographical and other information on the European Protectorates in Africa.

Africa.—No. 1 (1890). Correspondence respecting the Action of Portugal in regard to the Delagoa Bay Railway. [C.—5903.] London, Eyre & Spottiswoode, 1890: folio, pp. iv. and 74. Price 8d.

— No. 2 (1890). Correspondence respecting the Action of Portugal in Mashonaland and in the Districts of the Shiré and Lake Nyassa. [C.—5904.] London, Eyre & Spottiswoode, 1890: folio, pp. xi. and 231. Price 1s. 11½d.

Ashbee, H. S.—A Bibliography of Tunisia from the earliest times to the end of 1888, including Utica and Carthage, the Punic Wars, the Roman Occupation, the Arab Conquest, the Expeditions of Louis IX. and Charles V., and the French Protectorate. With a map. London, Dulau & Co., 1889: large 8vo., pp. 144. [Presented by the Author.]

This work is divided into two parts, the first of which originally appeared in the work entitled 'Travels in Tunisia,' published in 1837, and noticed in the

'Proceedings' for 1888, at p. 107; the second part comprises many books and articles formerly omitted, and brings the subject pretty well up to date. The index, covering both parts, is a useful feature. The map illustrates the author's routes in Tunisia.

Borelli, Jules.—*Divisions, subdivisions, langues et races des régions Amhara, Oromo et Sidama.* [Paris.] 4to., pp. 68. [Presented by the Author.]
Of geographical and ethnological interest.

[British South Africa.]—The British South Africa Company. General information of the Country, and Press Notices. 1889: sm. 4to., map. [Presented by the Company.]

Mainly consists of a collection of extracts from various papers and magazines, with reference to Matabeleland, Bechuanaland, and other territories of the British South Africa Company.

Brown, A. Samler.—*Madeira and the Canary Islands.* Second edition. London, Low & Co., 1890: 12mo., pp. 130. Price 2s. 6d. [Presented by the Publishers.]

This little volume is intended as a guide both for invalids and tourists to Madeira and the Canary Islands. It contains in a compact form much practical information for both classes of travellers, including accommodation, distances, times, and expenses, based on the author's personal experience. Each island is separately treated, special attention being given to the various excursions to the chief points of interest in the islands. There are also hints as to outfit, an historical section, tables of steamship routes, and fares, the whole being illustrated with nine maps.

Carvalho, Henrique Augusto Dias de.—*O Lubuco. Algumas observações sobre o Livro do Sr. Latrobe Bateman, intitulado "The First Ascent of the Kasai."* (With the English Translation.) Lisboa, 1889: folio, pp. 57 and 59. [Presented by the Author.]

An attempted refutation of certain statements regarding the action of the Portuguese in Central Africa, contained in the work entitled "The First Ascent of the Kasai," by Mr. C. S. Latrobe Bateman.

[Mr. Stanley's Expedition.]—Africa, No. 4 (1890). Correspondence respecting Mr. Stanley's Expedition for the Relief of Emin Pasha [C.—5906]. London, Eyre & Spottiswoode, 1890: folio, pp. 17. Price 2½d.

Whitehouse, Cope.—*The Raiyān Mæris.* New York, Clark and Zugalla, 1890: 8vo., pp. 52, maps. [Presented by the Author.]

Young, [Sir] Frederick [K.C.M.G.]—*A Winter Tour in South Africa.* (Reprinted . . . from the Proceedings of the Royal Colonial Institute, with large additions, Illustrations, and a Map.) London, E. A. Petherick & Co., 1890: 8vo., pp. xii. and 173. Price 7s. 6d. [Presented by the Author.]

AMERICA.

[Buenos Aires.]—*Censo General de Poblacion, Edificacion, Comercio é Industrias de la Ciudad de Buenos Aires, Capital Federal de la República Argentina. Levantado en los dias 17 de Agosto, 15 y 30 de Setiembre de 1887 bajo la administracion del Dr. Don Antonio F. Crespo y compilado por una comision compuesta de los Señores Francisco Latzina, Manuel C. Chueco y Alberto B. Martinez, Dr. Don Norberto Perez.* Tomo segundo. Buenos Aires, 1889: imp. 8vo., pp. 620.

Contains a number of illustrations, &c., illustrating the topography of the city.

Camara, Antonio Alves.—Ensaio sobre as construcções navaes indigenas do Brasil. Rio de Janeiro, 1888: large 8vo., pp. 209. [Presented by the Author.]

Chapin, Fred. H.—Mountaineering in Colorado. The Peaks about Estes Park, Boston Appalachian Mountain Club, 1889. Price 2 dollars. [Presented by the Club.]

This dainty volume is a narrative of the wanderings in the Rocky Mountains surrounding Estes Park of an American, bitten with the love of mountain-tops. The narrative is short and clear, and not too personal, and together with the many and admirable illustrations, taken from original photographs, gives the reader in a short time a capital general idea of the physical features of the range. It is obvious that, as in parts of the Pyrenees, the highest summits are comparatively tame in form, and that much of the most striking scenery lies below or near the timber line. One or two snowbeds on the shady side of the peaks succeed in growing into glacierhood, and one has a very respectable Bergschrund, to which full honour is done in a page illustration. Glaciers in the Rockies, like palm-trees on the Riviera, receive all the honour due to rarities. Mr. Chapin, however, furnishes fresh evidence of their former great extent.

The author succeeded in photographing not only the mountains, but their inhabitants, the big horns. A catalogue of the flora of Estes Park is printed as an appendix.

Fazio, Lorenzo.—Memoria descriptiva de la Provincia de Santiago del Estero, Buenos Aires, 1889: large 8vo., pp. 639, plans and plates. [Presented by the Argentine Geographical Institute.]

Heilprin, Angelo.—The Bermuda Islands: A Contribution to the Physical History and Zoology of the Somers Archipelago, with an examination of the structure of Coral Reefs. Researches undertaken under the auspices of the Academy of Natural Sciences of Philadelphia. Philadelphia, 1889: 8vo., 1 p. [viii.] and 231. Price 15s.

The main purpose of Dr. Heilprin's visit to the Bermudas was the study of coral reefs, and his volume may be regarded as an important contribution to the physical geography and geology of the islands. Much of the space is also devoted to the results of investigation into the natural history of the Bermudas. Dr. Heilprin's observations confirm those made by the *Challenger* expedition as to the eolian or wind-drift character of the Bermuda Islands; this, he states, is everywhere apparent. There are several illustrations, exhibiting the special features of the islands.

Moreno, J. L.—Nociones de Geografía de Bolivia, aprobadas y adoptadas por el Consejo Universitario y el H. Consejo Municipal de Chuquisaca. Quinta edicion. Sucre, Imp. de "La Industria," 1889: 8vo., pp. 56.

Medina, J. T.—Ensayo acerca de una Mapoteca Chilena ó sea de una Colección de los títulos de los Mapas, Planos y Vistas relativos á Chile arreglados cronológicamente. Con una Introducción Histórica acerca de la geografía y cartografía del país. Santiago de Chile, 1889: 12mo., pp. cxxviii. and 254.

Wallace, Alfred Russell [LL.D.]—A Narrative of Travels on the Amazon and Rio Negro, with an Account of the Native Tribes, and Observations on the Climate, Geology, and Natural History of the Amazon Valley. Second edition. London, &c., Ward, Lock & Co., 1889: 12mo., pp. xiv. and 363. Price 2s. [Presented by the Publishers.]

This is one of the latest productions of the Minerva Library of Famous Books. It consists of a reprint of the original work—first published in 1853—with a few additional notes and certain omissions. The usual Biographical Introduction is given by the Editor, Mr. G. T. Bettany, and the volume is illustrated with woodcuts, representing Amazonian scenery, a map, and a portrait of Mr. Wallace.

ARCTIC.

Clutterbuck, Walter J.—The Skipper in Arctic Seas. London, Longmans & Co., 1890: sm. 8vo., pp. viii. and 271, map and illustrations. Price 10s. 6d. [Presented by the Publishers.]

Incidents of a sporting trip to Spitzbergen during the summer of 1888.

Simpson, Edward.—Report of Ice and Ice Movements in Bering Sea and the Arctic Basin. Washington, U.S. Hydrographic Office, 1890: 8vo., pp. 25, map. [Presented by Capt. H. F. Picking, U.S.N., Hydrographer.]

AUSTRALIA.

[**Australia.**]—The Australian Handbook (incorporating New Zealand, Fiji, and New Guinea). Shippers' and Importers' Directory and Business Guide for 1890. London, &c., Gordon and Gotch, 1890: large 8vo., pp. 571, maps and illustrations.

With this edition is presented a pamphlet entitled "Early Struggles of the Australian Press," by James Bonwick, F.R.G.S.

Giles, Ernest.—Australia Twice Traversed. The Romance of Exploration, being a Narrative compiled from the Journals of five Exploring Expeditions into and through Central South Australia, and Western Australia, from 1871 to 1876. London, Sampson Low & Co., 1889: 2 vols.; vol. i., pp. lix. and 320; vol. ii., pp. x. and 363. Price 30s. [Presented by the Author.]

Mr. Giles, who received the Gold Medal of the R.G.S. in 1880, is known as one of the most indefatigable and successful of Australian explorers. His first journey across the continent, from South Australia to Western Australia, was described in the 'Journal R.G.S.' for 1876. His numerous other journeys have been referred to in the 'Proceedings' from time to time. Official records of Mr. Giles's enterprises have also been issued, but, like most official records, they are known to only a few. Mr. Giles has therefore done well to collect the records of his expeditions into one work, which is well printed and well furnished with maps and illustrations. The author has, moreover, taken advantage of the opportunity to complete his narratives by filling in details that have not hitherto been published. In an Introduction, Mr. Giles gives a sketch of Australian explorations up to the date of the expeditions conducted by himself.

His first expedition, in 1872, covered the region to the west and north-west of Chambers's Pillar, from the Ehrenberg Mountains south to Lake Amadeus. During the second expedition, 1873-4, Mr. Giles explored the Musgrave ranges, and much of the country to the south of Lake Amadeus, including the Petermann, Tomkinson, and Rawlinson ranges, the expedition reaching as far as 125° 40' E. long., at two points about 100 miles distant. After a preliminary survey of the Coast region between Fowler's Bay and Eucla, Mr. Giles started on his third expedition from Fowler's Bay, in March 1875, and by Youldeh proceeded eastward, skirting the north end of Lake Torrens, to Sir Thomas Elder's station at Beltana, his purpose being to organise his great expedition across Western Australia to Perth. This expedition started from Beltana on May 6th, 1875, and proceeding southwards to Port Augusta, at the head of Spencer Gulf, struck a north-westerly direction to the 30th parallel of S. latitude. At about 132° E. long., Tietkens and Young struck north to beyond 28° S. lat., returning with the usual tale of scrub and desert. The sufferings of the party as they passed through the Great Victoria Desert are graphically described by Mr. Giles, and his minute records of the wretched nature of the country passed through are of great geographical and economical value. Perth was reached in November. Mr. Giles started again in January 1876, to make his way back to Beltana. This time he struck sharply north-east to about 24° S. lat., and made towards Lake Amadeus; thence south-east, partly over the old ground, to Beltana, which was reached in six months,

the results, so far as the nature of the country passed through is concerned, being much the same as they were found to be farther south.

Thus, it is evident that Mr. Giles has covered an extensive area in his travels in Australia, and opened up much new ground. His contributions to the geography of the continent are of solid value. He is, however, it must be said, somewhat too diffuse in telling the story of his work.

Lumholtz, Carl.—Among Cannibals: An Account of Four Years' Travels in Australia, and of Camp Life with the Aborigines of Queensland. London, John Murray, 1889: 8vo., pp. xx. and 395. Price 24s.

Mr. Lumholtz is first of all a naturalist, and his book belongs to the same class as those of Mr. A. R. Wallace, Mr. Bates, and Mr. Moseley. He went out to Australia in 1880, partly at the expense of the University of Christiania, with the object of making collections for the zoological and zootomical museums of the University, and of instituting researches into the customs and anthropology of the little-known native tribes which inhabit that continent. Mr. Lumholtz's journeys in Australia lasted for four years. After spending some time in South Australia, Victoria, and N. S. Wales, he went on in 1881 to the station of Gracemere in Western Queensland. From hence he made his first extensive journey of 800 miles into the interior as far as the Diamantina river. The narrative of this journey, and of his subsequent stay in the Mackay district, occupies comparatively little space, though his observations on the natural history and the people are of interest. Mr. Lumholtz devotes most of his book to a detailed account of his wanderings in the region inland from Rockingham Bay, in the valley of the Herbert river, and inland in the Valley of the Lagoons. Here Mr. Lumholtz was in a comparatively new region. He made friends with the natives, and lived as one of themselves. The risks were great, but in this way he succeeded in collecting an amount of valuable information as to the character and habits of the natives which would otherwise have been unattainable. He saw very clear evidences of cannibalism among the natives. His natural history collections were abundant, and many of them of great scientific interest. Among other things he discovered four new mammals, including the tree kangaroo (*Dendrolagus lumholtzii*) and three opossums. His geographical observations are also of much value, and his sketches, in the Appendix, of the Geology, Flora, and Fauna of Australia, will be useful for reference. The book abounds with points of interest in various departments of science, and is full of suggestion. Naturally he was much interested in the people among whom he sojourned so long, and his remarks on the geographical causes of the backward state of the Australian natives deserve attention. There are numerous excellent illustrations, and two maps.

New Guinea.—Further Correspondence respecting New Guinea. (In continuation of [C.—4584] August 1885.) : [C.—5883.] London, Eyre & Spottiswoode, 1890: folio, pp. xii. and 330, maps. Price 4s. 3d.

This volume contains among other things the following documents of geographical interest:—Report on British New Guinea, from data and notes by the late Sir Peter Scratchley, by G. Seymour Fort; Report of a visit to the coast of New Guinea west of the Fly River (by John Douglas); Reports from Mr. Hugh Milman and Mr. R. V. Cholmondeley of a visit to the Fly River; Reports on the survey of the Granville township lands, by Mr. Cuthbertson; Report by Mr. Strode Hall on an exploring expedition to the Maicassar River; Reports of visits to certain islands of the D'Entrecasteaux group and of the Louisiade Archipelago, by Sir William Macgregor, including Rossel, St. Aignan's, Joannet, Normanby, Ferguson, Goodenough, Goulvain, and Welle Islands, &c.

— Despatch reporting Tour of Inspection made by His Honour the Administrator of British New Guinea, extending from Manu Manu on the coast of the Possession to the Owen Stanley Range in the Interior. 1889: folio, pp. 12.

The chief points in connection with Sir William Macgregor's expedition have already been noted in the 'Proceedings.'

[**New South Wales.**—Results of Rain, River, and Evaporation Observations made in New South Wales, during 1888: H. C. Russell, B.A., F.R.S., Government Astronomer for New South Wales. Sydney, Charles Potter, 1889: 8vo., pp. 144, map and diagrams. [Price 3s. 6d.]

OCEANIA.

Woodford, Charles Morris.—A Naturalist among the Head-hunters; being an account of three visits to the Solomon Islands in the years 1884, 1887, and 1888. London, G. Philip & Son, 1890: 8vo., pp. xii. and 249. Price 8s. 6d. [Presented by the Author.]

Mr. Woodford's name must be well known to the readers of the 'Proceedings.' He has on two occasions given the results of his explorations in the Solomon Islands ('Proc. R.G.S.', 1888, p. 351), the last occasion only a few weeks ago. The information contained in these papers is embodied in this volume. But Mr. Woodford has added much more concerning his own work in the islands, and has introduced a very useful summary of our knowledge of the islands before his visits. He belongs to the best type of naturalist explorers. He lived on good terms with the natives, and was able to study their ways and learn their folk-lore. The book, therefore, abounds with ethnological information, while, as might be expected, natural history occupies a prominent place. One of the most important features of the book is its wealth of illustrations, all carefully reproduced from excellent photographs. There are two maps, one of the Solomon Islands and another of the South-western Pacific. The book abounds with incidents of travel and of Mr. Woodford's intercourse with the natives, all of the most instructive character. His remarks on the labour question deserve attention. In the appendices there are vocabularies of five languages, with remarks upon the same, and an interesting paper on the migrations of the Polynesian race.

GENERAL.

Besant, Walter.—Captain Cook. London, Macmillan & Co., 1890: 8vo., pp. vi. and 191. Price 2s. 6d. [Presented by the Publishers.] †

As might have been expected, Mr. Besant has written a most readable volume on the story of Captain Cook's life. He has given special care to the details of Cook's youth, and reproduces with graphic effect incidents which may have happened. On the whole, the main points of Cook's great career are well brought out. The volume forms one in Macmillan & Co.'s "Men of Action" series.

[**Brown, Robert.**—Our Earth and its Story; a Popular Treatise on Physical Geography. Edited by Robert Brown, Ph.D., F.L.S. [Vol. III.] London, &c., Cassell & Co., 1889: 4to., pp. vii. and 376. Price 9s. [Presented by the Publishers.]

The previous volumes of this work were noticed in the 'Proceedings' for 1888 at p. 318, and 1889 at p. 320. The present volume, completing the work, mainly deals with the geographical distribution of animals, and of man; it also treats in detail of the physics of the sea, including its depth, character of the bottom, colour, saltness, temperature, waves and currents, &c.; the subject of the distribution of climate is also largely discussed. The volume is illustrated throughout with coloured plates, maps, and woodcuts, and contains a general index. The whole work is a good popular treatise on the phenomena of the globe.

Weissbuch. Fünfter Theil, Sechster Theil, Siebenter Theil, Berlin, 1889: imp. 8vo., pp. (Part V.) xii. and 95; (Part VI.) vi. and 106; (Part VII.) vi. and 84, map.

These Parts deal with Samoa, and with German interests in East Africa, and in the Niger region.

NEW MAPS.

(By J. COLES, *Map Ourator* R.G.S.)

THE WORLD.

The World.—Verteilung des Areales der Continente nach Zonen gleichen Küstenabstandes. Entworfen und gezeichnet von Dr. Carl E. M. Rohrbach. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 6. Justus Perthes, Gotha. (*Dulau.*)

ARCTIC REGIONS.

Spitzbergen.—Ost-Spitzbergen und die König Karl's Inseln, gezeichnet von Dr. Willy Küenthal. Mercator's Projection, Central Scale 1:1,000,000, or 13·6 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 5. Justus Perthes, Gotha. (*Dulau.*)

EUROPE.

Alpen.—Geologische Übersichtskarte der —, entworfen von Dr. Franz Nöb (topographische Grundlage: V. von Haardt's Übersichtskarte der Alpen). Wien 1890. Ausgeführt in Ed. Hölzel's geographischem Institute in Wien. Scale 1:1,000,000, or 13·6 geographical miles to an inch. 2 sheets. (*Dulau.*)

This map is based on the surveys of the Imperial Geological Society of Vienna, the Royal Hungarian Geological Society of Buda-Pesth, the Royal Bavarian Mining Society, the Geological Commission of the Swiss Physical Science Society, the Geological Society of France, and the School of Mines of Paris; in addition to which the researches of many distinguished geologists have been used in its compilation. The above will show that the best available material has been used in the construction of this map; the geological colouring is remarkably good, and it is accompanied by a pamphlet containing explanatory letterpress.

Europe.—Carte spéciale des chemins de fer de l' —, publiée d'après les documents officiels de la librairie Chaix. Scale 1:2,400,000, or 32·8 geographical miles to an inch. Paris, Chaix. 4 sheets. (*Dulau.*)

Preussen.—Geologische Karte der Provinz —. Scale 1:100,000, or 1·3 geographical miles to an inch. Sect. 22, Wormditt. Berlin, Schropp. Price 3s. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued during the month of February 1890.

6-inch—County Maps:—

ENGLAND AND WALES: Shropshire: 52 S.E., 1s. Wiltshire: 64, 65, 70, 74, 2s. 6d. each.

25-inch—Parish Maps:—

ENGLAND AND WALES: Anglesey: XIV. 4, 8s. Cardiganshire: XVIII. 8 and 12 (as one sheet), 5s.; XX. 2, 4s.; XX. 5, 3s.; XX. 10, 12, 16, 4s. each; XXIV. 1, 5s.; XXIV. 3, 5, 11, 12, 15, 16, XXIX. 16, XXX. 11, XXXVII. 4, XXXVIII. 6, 11, 15, 16, 4s. each. Carmarthenshire: IV. 16, XII. 8, 12, XIII. 13, XXI. 12, XXII. 1, 5, 4s. each; XXVIII. 6, 10, 14, 15, XXIX. 1, XXXVI. 3, 6, 7, 8, 11, 12, LIII. 2, 4s. each. Carnarvonshire: V. 2, 9, VII. 5, XI. 16, XIII. 4, XIV. 1, 11, 13, 4s. each; XIV. 15, 3s.; XV. 4, 8s.; XVII. 5, XVIII. 4, XIX. 13, XXIV. 5, 11, 12 and 16 (as one sheet), 4s. each; XXX. 7, 3s.; XXX. 10, 4s. Cornwall: LXXXII. 10, 12, 4s. each; 14, 5s.; LXXXVII. 1, 2, 5, 12, 14, 15, LXXXIX. 2, 4s. each. Devonshire: I. 13, IV. 7, 8, 4s. each; VII. 8, 10, XI. 10, 14, 15, 3s. each; XIII. 5, 8, 4s. each; XV. 8, XVI. 1 and 5 (as one sheet), 6, 10, 14, 15, 3s. each; XXII. 7, 10, 11, 12, XXIII. 11, 12, 13, 4s. each; XXIII. 15, 3s.; XXIII. 16, XXIV. 3, 7, 13, 4s. each; XXIV. 15, 5s.; XXV. 1, 14, 15, 16, XXV. 2, 3, XXXVI. 5, 11, XXXVII. 10, XLIV. 4, 10, 12, XLV. 1, 2, 4s. each; XLV. 3, 5s.; XLV. 8, 9, 10, 11, 12, 13, 16, XLVI. 7, XLVIII. 4, 6, 8, 12, 16, LVIII. 4, LIX. 4, LXVII. 5, LXVIII. 7, 4s. each; LXX. 4, 5s.; LXX. 7, 14, LXXII. 6, 10, 14, 15, LXXX. 3, 4s. each; LXXX. 7, 15, 5s. each; LXXXI. 10, LXXXII. 7, 11, 4s. each; LXXXIII. 3, 5s.; LXXXIII. 10, LXXXIV. 6, 4s. each; LXXXIV. 7, 5s.; XCII. 8, 10, 11, 12, 4s. each; XCII. 13, XCIII. 3, 3s. each; XCIII. 9, 5s.; XCIII. 12, 13, 4s. each; XCIV. 2, 5s.; XCV. 1, 2, CII. 2, 4s. each; CII. 4, 5s.; CII. 5, 6, 7, 10, 12, 13, 14, 15, CII. 7, CX. 1, 2, 5, 6, 9, 13, CXVI. 1, 5 4s. each; CXVI. 6, 5s.; CXVI. 11, 4s.; CXXVIII. 13, 5s. Dorsetshire: VIII. 15, XXVII. 8, 16, XXXVIII. 1, 14, XLIII. 12, 15, XLIV. 11, 4s. each; XLIV. 13, 5s.; L. 6, LI. 5, 4s. each. Lincolnshire: XXII. 3, CVI. 7, 4s. each. Merionethshire: XV. 8, 4s. Pembrokeshire:

III. 14, 15, VII. 1, 8, 12, VIIA. 13, XII. 11, 14, XIII. 5, 4s. each; XIII. 9, XVIII. 4, 3s. each; XVIII. 10, 11, XIX. 2, 5, XXIV. 2, 9, 13, 15, 16, XXVII. 16, XXVIII. 13, 14, XXX. 1, 2, 5, 9, 13 and 14 (as one sheet), XXXVI. 1 and 2 (as one sheet), 5, XLI. 5, 10, 4s. each; XLI. 11, 5s. **Somersetshire:** XXXIII. 6, 3s.; XXXIV. 11, 16, 4s. each; XLIV. 16, XLVI. 1, 3s. each; XLVI. 7, 4s.; XLVI. 12, 13, 3s. each; XLVI. 14, 4s.; LVI. 5, 7, 3s. each; LVI. 8, 4s.; LVI. 11, 3s.; LVII. 3, 4s.; LVII. 4, 3s.; LVII. 5, 4s.; LVII. 6, 3s.; LVII. 8, 9, 4s. each; LVII. 10, 3s.; LVII. 13, 14, 16, LXVII. 9 and 13 (as one sheet), LXVII. 10, 4s. each; LXX. 11, LXXVIII. 7, 5s. each. **Staffordshire:** LXXII. 3, 11s. 6d. **Warwickshire:** XIII. 3, 11s. 6d.

Town Plans—10-feet scale:—

ENGLAND AND WALES: Castleford (Yorkshire), CCKXXIV. 7, 13, 14, 18, 21, 22, 23; CCKXXIV. 11, 1, 2, 3. Castleford is now complete in 9 sheets, 2s. 6d. each. Leigh (Lancashire), CII. 3, 21, 22, 23; CII. 7, 1, 2, 3, 4, 6, 7, 8, 9. Leigh is now complete in 11 sheets, 2s. 6d. each.

(*Stanford, Agent.*)

AFRICA.

Abessinien.—Kulturzonen von —. Entworfen und gezeichnet von Dr. K. Dove. Scale 1:5,000,000, or 66·6 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 97, Taf. 1. Justus Perthes, Gotha, 1890. (*Dulau.*)

Witwatersrandt Gold Fields.—Troye's Map of the —. With the latest information. Published by Mendelssohn & Scott, Standard Office, Johannesburg, S.A.R., January 1890. Scale 1:91,250, or 1·25 geographical miles to an inch. With a Geological Section from Pretoria through Johannesburg to Roodepoort South of Klip River, over 50 miles, by Jones Beta, 1889.

This map exhibits the present state of the claims on the Witwatersrandt Gold Fields. It also contains notes on the extent of the claims of the mining companies, number of stamps in work or on order, capital invested, and the amount of reserve. At the foot of the map is given a geological section from Pretoria through Johannesburg to Roodepoort south of Klip River.

AMERICA.

Brazil.—Exploração dos Rios Itapetininga e Paranapanema pelo Engenheiro Theodoro F. Sampaio. Relatório apresentado ao Illm. e Exm. Sr. Dr. Pedro Vicente de Azevedo, Presidente da Provincia, sobre os estudos effectuados em 1886 por ordem do Illm. e Exm. Sr. Conselheiro João Alfredo Corrêa de Oliveira, então Presidente da Provincia. Pelos Engenheiros Theodoro Fernandes Sampaio 1º Ajudante, Francisco de Paula Oliveira Geologo. J. F. Washington de Aguiar, Conductor. Rio de Janeiro, Imprensa Nacional, 1889.

The results of this survey are contained on twenty-five maps drawn on the natural scale of 1:50,000. There is also a general map of the rivers Itapetininga and Paranapanema on the scale of 1:1,000,000, and a longitudinal section on the vertical scale of 1:12,500, with a horizontal scale of 1:2,500,000. The soundings are given in metres; on some sheets the general depth of the section is indicated in a note, in others it is given in figures on the river, but in some sections they are entirely omitted; and this is explained in notes in which it is stated that, owing to natural difficulties, such as rapids, it was found impossible to measure the depth of the water. Throughout the survey, plans of rapids and falls are given on inset maps, on an enlarged scale, together with sections of the river and its affluents. The survey shows that the only portion of the Paranapanema navigable for canoes of sufficient size to carry cargo is from its junction with the Parana to Anhumas, a distance of 150 geographical miles. Above this point, although the deepest channel is indicated by dotted lines, the river is so full of sandbanks and rapids, that it is quite useless for the purposes of navigation. Observations for latitude appear to have been taken at eight points, but the longitude of only one of these has been fixed.

The report which accompanies the maps contains a history of the operations of the survey party under the command of Senhor Sampaio. Leaving the city of São Paulo on 11th April, 1886, they travelled via Bacatava and Tatuhy to Itapetininga, a place about three geographical miles from the river of the same name. Having constructed canoes and flat-bottomed boats, the party

were ready to commence work on May 14th, but, owing to the country people being afraid of the rapids, great difficulty was experienced in obtaining the services of a sufficient number of canoe-men, and thus several days were lost, and it was not until May 22nd that the expedition made a fair start. The descent of the river was found to be exceedingly difficult until São Sebastião was reached, a distance of about 150 miles from their starting-point, from which place the navigation was comparatively easy, and on August 6th the party reached the Parana, having explored the Paranapanema from the vicinity of its source to its mouth. After a rest of three days the return journey was commenced, which was made by river as far as the small settlement of Anhumas, where they left their canoes and travelled overland to Botucatu, and finally arrived at Rio Janeiro on September 27th; the exploration having occupied rather more than four months.

The report contains valuable information as to the topographical features of the country traversed, and an enlarged edition of it is promised, in which Senhor Sampaio intends to embody additional information with regard to the agricultural capacity of the river valley, the products of the soil, and the possible means of communication between the São Paulo centres of trade, and the lands in the valley of the river Paraguay. The report is also to contain information concerning the various tribes of Indians who live in the neighbourhood, and a vocabulary of nearly 400 words and phrases, in the Cayua language, which has been compiled by Senhor Sampaio during the exploration.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in January and February 1890.

No.		Inches.	
1267	m =	1·0	England, south coast:—Approaches to Plymouth, 2s. 6d.
1352	m =	4·3	France, north coast:—Dunkerque road, 2s. 6d.
433	m =	5·0	France, north coast:—Cape D'Alprech to Ambleteuse, including Boulogne, 2s. 6d.
181	m =	4·8	Sicily, east coast:—Port Augusta, 3s.
1367	m =	3·0	Mediterranean, Greece:—Corinth bay and isthmus, 2s. 6d.
234	m =	5·9	Mediterranean, Suez canal:—Port Said, 1s. 6d.
1246	m =	0·9	North America, east coast:—Machias Seal island to Goldsborough bay, 2s. 6d.
1274	m =	0·1	Gulf of Mexico:—Tortugas cays to cape San Blas, 2s. 6d.
1393	{ m = m =	{ 5·0 2·0	South America, west coast:—Port Bermejo, Caracas river, 1s. 6d.
1235	m =	0·8	
1394	{ m = m =	{ 5·0 4·0	Malay peninsula, east coast:—Entrance to Kuantan river. Entrance to Pahang river. 1s.
1124	m =	0·5	
1069	m =	6·0	Australia, east coast:—Port Jackson, 3s. 6d.
1385	{ m = m =	{ 4·0 1·0	South Pacific:—Tonga or Friendly islands: Nukua-lofa anchorage. Eua island. 2s. 6d.
2353	
			Cape Sidmouth to cape Grenville:—Plan added, Night island anchorage.

(J. D. Potter, Agent.)

CHARTS CANCELLED.

No.		Cancelled by	No.
438	Boulogne	New plan, Cape D'Alprech to Ambleteuse, including Boulogne ..	438
181	Port Augusta	New plan, Port Augusta	181
234	Port Said	New plan, Port Said	234
2799	Plan of Caracas river on this sheet	New plan, Caracas river on	1393
2041	Plan of Pahang river on this chart	New plan, Pahang river on	1394
1069	Port Jackson	New plan, Port Jackson	1069
1969	Chusan archipelago, north sheet.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1346. England, west coast:—Firth of Solway. 1610. England, east coast:—North Foreland to Orfordness. 2114. Baltic entrance:—The Kattegat. 2116. Baltic entrance:—Great and Little Belts. 2117. Baltic, Germany:—Kiel bay. 160. Italy, west coast:—Civita Vecchia to Policastro. 2491. North America, east coast:—Approaches to New York. 2818. North America, east coast:—Hampton roads and Elizabeth river. 2431. North America, west coast:—Port Simpson to Cross sound. 40. India, west coast:—Karachi harbour. 2062. China, south coast:—Tong-King gulf. 2388. Russian Tartary:—Sea of Okhotak. 1125. Australia, east coast:—Port Newry. 2124. New Guinea, south coast:—Bramble haven to Rosel island. 1079. Tasmania.

(*J. D. Potter, Agent.*)

Danish Charts.—Nr. 149, Farvandet Sydfor Fyn. 1889. Rettet til 1890.—No. 150, Nordsøen. Horns Rev. med Omgivelser. 1890.—No. 151, Kattegat. Iseffjord. 1:20,000. 1890.—No. 152, Østersøen. Grönsund. 1890. Udgivet af det kongelige Søkaart-Archiv, Kjöbenhavn. (*Dulau.*)

United States Charts.—No. 1186, Harbour of San Juan del Norte, or Greytown. From a Survey in 1888 by Ensign W. J. Maxwell, U.S.N., of the Nicaragua Canal Construction Company. Price 1s. 1d.—Pilot Chart of the North Atlantic Ocean. March 1890. Published at the Hydrographic Office, Navy Department, Washington, D.C. Henry F. Pickering, Captain U.S.N., Hydrographer.

ATLASES.

Bartholomew, John, F.R.G.S.—The Pocket Atlas of the World, by John Bartholomew, F.R.G.S. Revised and enlarged edition. With Index and Statistical Notes. London, John Walker & Co., 1890.

The original of this little Atlas was noticed in the 'Proceedings,' July 1886. In the present edition a copious index has been added, and the number of maps increased from fifty-four to sixty-three.

Hachette et Cie.—Atlas de Géographie Moderne, édité par Hachette et Cie. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, diagrammes, etc. Par F. Schrader, F. Prudent, et E. Anthoine. Paris, Librairie Hachette et Cie., 1890. 10^e Livraison. Price 10d. (*Dulau.*)

Sheet 28 is a map of the Austro-Hungarian Empire. It is clearly drawn, and the hill-shading is effective. The explanatory notes on the back of the sheet have been written by M. Léon Rousset. Sheet 63 contains the West India Islands, Central America, and South America north of the twentieth degree of south latitude. On the back of the sheet M. D. Kaltbruner gives some useful notes, and statistics with reference to the populations, physical

features, productions, &c., of Colombia, Venezuela, Guiana, Ecuador, Peru, and Bolivia. Sheet 64 is a map of the southern half of South America, and being drawn on the same scale as the map on sheet 63, forms with it a very convenient map of South America. The notes accompanying the maps are, as usual, illustrated by plans, maps, and diagrams.

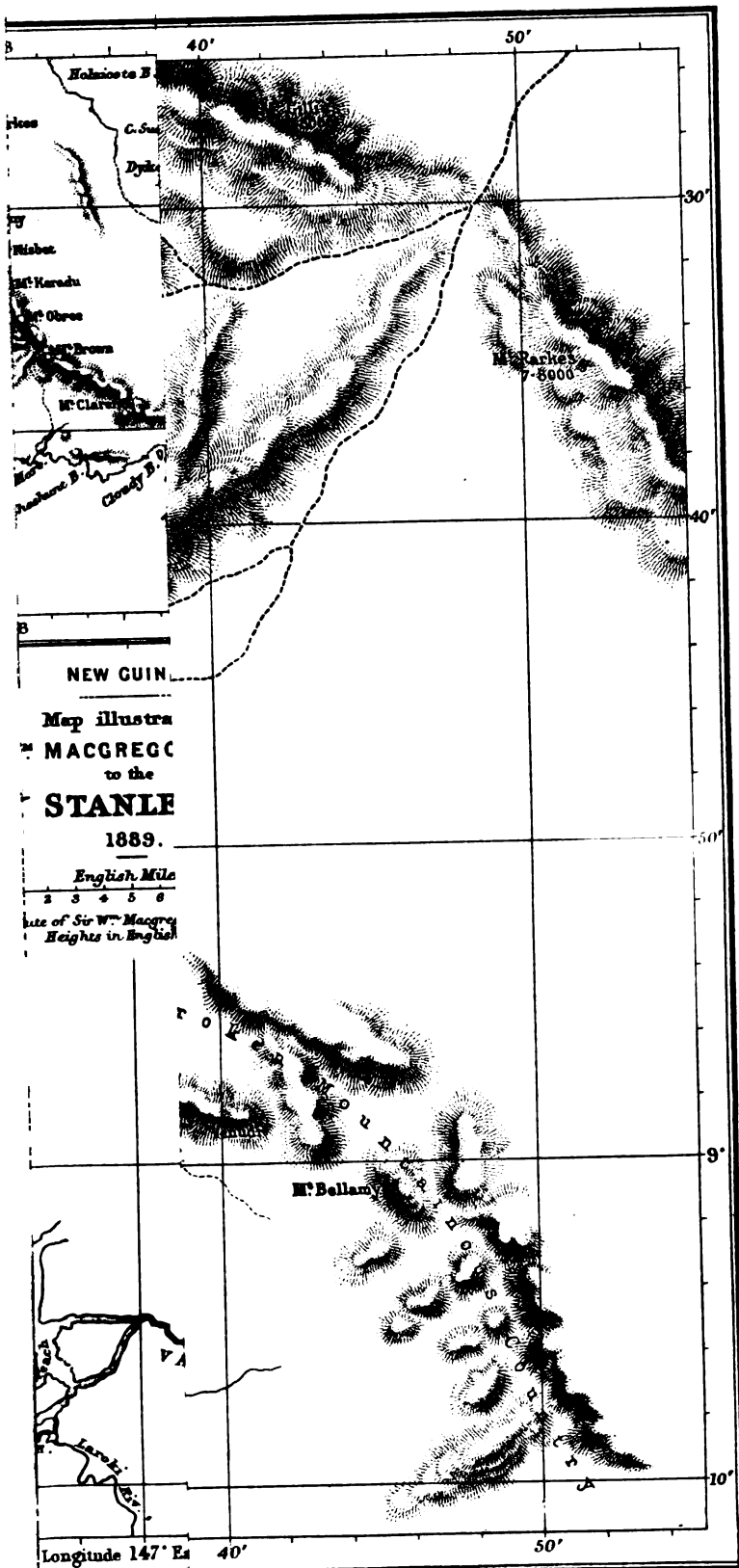
Schweiz.—Topographischer Atlas der —, im Masstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868, durch das eidg. topogr. Bureau gemäss den Direktionen von Oberst Siegfried veröffentlicht. Scales 1 : 50,000 and 1 : 25,000. XXXIV. Lieferung :—No. 202, Rothenburg ; 208, Weggis ; 247, Schännis ; 249, Bilten ; 357, Säles ; 359, Vaulruz ; 363, Charmey ; 438, Lausanne ; 438 bis, Ouchy ; 464, Vevey ; 466, Bouveret ; 501, Simplon.—XXXV. Lieferung :—No. 183, Sursee ; 185, Buttisholz ; 238, Schwendi ; 240, Säntis ; 243, Lachen ; 245, Einsiedeln ; 324, Estavayer ; 326, Lully ; 369, Hohmatt ; 371, Trub ; 402, Vättis ; Châtel St. Denis. Price 12s. each part. (*Dulau.*)

Stieler's Hand-Atlas.—Neue Lieferungs-Ausgabe von —, 95 Karten in Kupferdruck und Handkolorit, herausgegeben von Prof. Dr. Herm. Berghaus, Carl Vogel und Herm. Habenicht. Erscheint in 32 Lieferungen (jede mit 3 Karten, die letzte mit 2 Karten und Titel). Zwanzigste (20), Lieferung. Inhalt. No. 70, Afrika, Blatt 5 in 1 : 10,000,000, von R. Lüddecke. No. 72, Australien, Übersicht in 1 : 10,000,000 von A. Petermann. No. 81, West Indien, Blatt 3 in 1 : 7,500,090 von A. Petermann. Gotha, Justus Perthes, 1890. Price 1s. 6d. (*Dulau.*)

The map of South Africa contained on sheet 70 forms part of the new large map of Africa which is being published in the present edition of this atlas. All boundaries and means of communication are carefully laid down. It has been necessary, owing to want of space, to give the west coast from Cape Town to Nova Redonda on an inset. No. 72 is an excellent map of Australia, with insets, on an enlarged scale, of Sydney and Port Jackson, and Melbourne and Port Phillip. No. 81 forms part of the four-sheet map of the West Indies and Central America. It contains the Republics of Mexico and Guatemala, and an inset map of the country between Vera Cruz and the City of Mexico. All of these maps are fine specimens of cartography.

PHOTOGRAPHS.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.









MEDAL PRESENTED TO M^r. STANLEY
BY THE ROYAL GEOGRAPHICAL SOCIETY

Designed by Miss Elinor Hallé.

PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Search and Travel in the Caucasus.

By DOUGLAS W. FRESHFIELD, HON. SEC. R.G.S.

(Read at the Evening Meeting, February 10th, 1890.)

Map, p. 312.

TWENTY-TWO years ago, in 1868, with two friends—the late Mr. A. W. Moore, C.B., and Mr. Comyns Tucker—I made a four months' journey in the Caucasus, in the course of which we climbed for the first time the only two peaks of the chain that were then known to fame in Western Europe—Kasbek and Elbruz.* Travel in the mountains was at that time difficult, and some of the most attractive districts were still unsafe. In 1875 Mr. Craufurd Grove published his 'Frosty Caucasus,' a very lively and interesting account of the first ascent of what has since proved to be slightly the higher of the two cones of Elbruz and of a tour through the heart of the mountains, made in the previous year by himself, my companion Mr. Moore, Mr. Horace Walker, and Mr. F. Gardiner, all members of the Alpine Club.

Wars and rumours of war intervened, and it was not until 1886 that English mountaineers again looked eastward to the confines of Europe and the "star-neighbouring summits" of the Caucasus. In that year Mr. Clinton Dent, since the President, and Mr. W. F. Donkin, the Hon. Secretary of the Alpine Club, made a short onslaught on the snows and climbed one of the peaks of the Central Group, named Gestola, 15,945 feet in height.† In the following year I went back to the Caucasus with M. de Déchy, a Hungarian gentleman, who had previously made three journeys in the range, climbed Elbruz and a fine peak near the Mamisson Pass, and taken a large number of excellent photographs of the scenery and people. We crossed together two high passes over the main chain, and I climbed several summits, amongst them Tetnuld (*circa* 16,500 feet), a beautiful peak which lifts its silver horn above the

* 'Travels in the Central Caucasus and Bashan.' Longmans, 1869.

† 'Alpine Journal,' vol. xiii. pp. 220 and 242.

forest glades of Suanetia, and has been called "the Jungfrau" of the Caucasus.*

These journeys showed that the mountains could be reached in a week from London, with a choice of four easy and attractive routes, viâ St. Petersburg and Moscow; Berlin, Kiev, Rostov; Berlin, Odessa, the Crimean Coast and Novorossisk; or Vienna, Constantinople and Batum. It was natural that, the next season, more explorers and lovers of high mountains should turn their steps to the new playground which had at last been proved to be accessible to Long Vacation travellers. Thither accordingly went, in three separate parties, Mr. Mummery, a most enterprising mountaineer; Mr. H. W. Holder, Mr. H. Woolley, and Mr. Cockin; and lastly, Dent and Donkin, taking with them a young friend, Mr. Harry Fox, of Wellington, well known in the west country as an athlete and in the Alps as a climber.

I have written of "The Central Group." It may be useful to remind readers of its exact position and character. Elbruz and Kasbek stand some 120 miles apart, the former due north of the easternmost bay of the Black Sea, on the edge of the Scythian Steppe, the latter in the centre of the isthmus overhanging the Dariel road. About midway between these ancient volcanoes the Caucasus culminates in grandeur, in extent of glaciers, and (setting aside Elbruz) in height, in a cluster of magnificent granite peaks and ridges, enclosing great firths of ice which roll gently into the northern valleys, or pour down southwards in frozen cataracts till they touch the forests of Suanetia, where they end at an average elevation of 7000 feet. The snow-level varies between 9500 and 11,000 feet, according to the nature of the soil, the snowfall, and the exposure. Of the peaks, two exceed 17,000 feet, and five 16,000 feet, while another is higher than Mt. Blanc. The longest glacier, the Bezingi Glacier, is 10 miles in length—longer than any glacier in the Alps except the Aletsch.

Naltshik is a post town, the seat of a *Nachalnik* or District Governor, near the base of the wooded foot-hills and on the edge of the steppe, some 20 miles' drive from the Ciscaucasian Railway. Balkar and Bezingi are the collective names of the hamlets of the Tartar communities inhabiting the two valleys at the northern base of the central group. All the upper valleys north of the chain between Elbruz and the Uruch, between the Karatchai and Ossetia, are occupied by this people, who speak Turkish, and claim to be kinsmen of the Turks who took Constantinople. Before Russia penetrated the Caucasus they lived very much to themselves, protected on the north by the narrow defiles and tangled forests of the outer range of limestone heights, secured on the south from the Suanetians by the glaciers of the main chain and passes 11,000 to 12,000 feet in height, over which cattle-lifting forays were nevertheless conducted by those bold robbers. A Suanetian ballad

* 'Proceedings R.G.S.,' New Series, vol. x. pp. 325 and 677.

records a battle on one of these passes (the Thuber), in which an avalanche overwhelmed the combatants in common destruction; and old bones and arms, recently thrown up at the foot of the glacier, are cited by the natives, who are quite alive to glacier motion, as proofs of the truth of the tradition. Thus naturally secured, the Tartar villages stood in little need of further protection—in historical times at least. Yet old caverns in the face of the cliffs, the approach to which is fortified, seem to show that the inhabitants had “once upon a time” occasion to seek a temporary refuge. Stone towers, moreover, are found at the base of the glaciers and at the head of the gorges, both above and below the pastoral basins in which the villages cluster. The houses are rough stone huts of one story, with rude porticoes supported on timber columns, and flat grass-grown roofs, a wattled hole in which serves as chimney; the mosques are large low rooms, without architectural adornment or minarets, though the voice of the Muezzin may be heard calling from some platform the hours of prayer. The tombstones are rough blocks, or, in the case of men of distinction, tall slabs, sometimes covered with inscriptions, sometimes engraved with representations of the horse and accoutrements of the dead man. At Chegem, in the heart of the district, tombs of a different character, high rectangular edifices with sloping or semi-domed roofs, are found, which are attributed by the people to the Ossetes, whose territory they assert they have here occupied. They possess large flocks and herds, cultivate much barley, and brew a substitute for beer. Their field-work seems limited to collecting brushwood for fuel, for which purpose they employ innumerable donkeys. They hire Suanetians to cut their large hay-crop, while they themselves enjoy life and society after the manner of the country. Keen sportsmen, they are even keener conversationalists. In summer they spend much time in visiting, three days’ ride being held quite within “calling” distance.

In olden days they were ruled in a mild patriarchal manner by village chiefs, whose authority was more or less hereditary, and whose policy was directed by travelled Mollahs, who in turn got their ideas direct from Stamboul or Mecca. Stamboul was their world’s centre; thither went adventurous youths, in the hope of ending life as pashas, and possibly adventurous young women—not averse to becoming pashas’ wives. Now these avenues for ambition are closed; orders have to be taken from Naltshik or Vladikavkaz, and the native appointed Starshina by the government is a rival authority to the former tribal chief.

In appearance the men vary greatly, doubtless owing to mixture with neighbouring races. There are many tall and many red-haired individuals among them, and not a few aquiline noses. Their costume consists of the usual long Caucasian frock-coat, with cartridge pouches, worn over a calico shirt and loose trousers, and a low sheepskin bonnet, sometimes replaced—on occasions when an Englishman would dispense with his silk hat—by a felt Ossete wideawake. On their feet they

wear skin sandals stuffed with hay. Their want of better foot-gear prevents them, fine climbers and good walkers as they are, from taking part in any difficult mountaineering. They can carry goods to a bivouac, or take part in ascents of Elbruz; but an icefall, or a steep snowslope, is always too much for them. Their women, so far as a stranger sees them—and their shyness is soon relaxed—are comely, and a few are really good-looking. They wear on their heads, when in full dress, wonderful beehive-shaped ornaments, which are represented in Mr. Woolley's photographs of the Urusbieh family.*

The result of the summer's work of 1888, as known in England by the middle of September, was that *all* the great peaks of the Central Group had been climbed, with one exception.† That exception was the keen snow-crest, lifted high against the sky on a broad rock-pedestal, which is seen foremost of the central group by travellers on the railway between the Caucasian Baths and Vladikavkaz, and which all official and general maps previous to 1889 had called Dychtau, and assigned a height of 16,923 feet.‡

Mr. Dent had been obliged by temporary ill-health to return to England, but his companions, Donkin and Fox, with their two Alpine guides, were still in the Caucasus, and known to be bent on attempting the ascent of this noble peak. One day, at the end of the month, Dent

* Baron Ungern Sternberg, I am glad to learn, is preparing a monograph on this people, whom he calls the "Tauli."

.. † The very highest points of Janga and Mishirgi Tau are still virgin. Mr. Cockin's accuracy is shown by his having observed that his peak of Janga (the E.) was lower than the W. peak. By M. Jukoff's measurements it is only 7 feet lower!

‡ Tau is pronounced Taou. The height has been reduced by the new survey to 16,880 feet. M. Jukoff, one of the surveyors employed on the new survey, proposes to reverse the names of Dychtau and Koshtantau. The practical inconvenience of the proposal ought to be decisive against it, and it has in truth little to recommend it.

The facts, as I have ascertained them in conversation with M. Jukoff and by local inquiry, are as follows:—Names are given not to *peaks* but to *crests* by the natives. Thus the crest surrounding the Kashtin or Koshtan glen is called Koshtantau (see map); the crest surrounding the Dychnu, Dychtau. If you ask a man in Dumala what the range at the head of the valley is called, he replies Koshtantau, because he gets to the Koshtansu when he crosses it. Similarly, on the Bezingi Glacier, a native will tell you the range to the east, from Shkara to Dychtau inclusive, between him and the Dychnu Glacier, is Dychtau.

It follows that the Dychtau of the maps might more or less legitimately be called either Dychtau or Koshtantau, and that the Koshtantau of maps is improperly so called. But it would be equally improper if it were called, as M. Jukoff suggests, Dychtau, for it is not at all on the watershed of the Dychnu Glacier. M. Jukoff's proposal, therefore, would only lead to substituting one breach of local usage for another; and in order to do this, all atlases, as well as the literature of the Caucasus for the last quarter of a century, since the publication of the five-verst map, would be confused and obscured.

Considering that in the Alps local usage has been altered and modified in the cases even of Mont Blanc and Monte Rosa, there seems no sufficient reason for attempting to conform to it at the cost of such dire confusion in the Caucasus. In two seasons the Tartars will know the peaks by the names mountaineers call them. They are beginning to do so already.

brought me in London a telegram from Naltshik to the effect that Rieger, the German serving as dragoman to the mountaineers, had come down from Balkar to report that he had not heard or seen anything of his employers for three weeks. The inference that a fatal accident had happened was only too clear to both of us.

The first question to arise was, "Should we go out at once?" It was decided reluctantly that so late in the year it would be useless, since, by the middle of October, the region where search would, in all probability, have to be made, would be closed for such a purpose. What could be done below the snow-line, moreover, was being done by the Russian officials and an Englishman, Mr. Phillipps Wolley, who knew the country and the officials well, and had generously given up his own sporting-tour in order to lend what help he could in the search.

Native evidence showed that the two mountaineers, with their Swiss guides, Kaspar Streich and Johann Fischer of Meiringen, had, in the last days of August, started from a camp at the head of a side-glen of the Bezingi Valley, known as Dumala, to ascend the Ulluauz Glacier, which falls from the northern slopes of Dychtau. Fox had written thence to their interpreter Rieger, who with the luggage had been sent to Balkar, to expect them in two or three days at Karaoul, a pasturage at the head of the Cherek Valley, south-east of Dychtau, in a position, relatively to the mountains, which may be shortly explained to those familiar with the Pennine Alps by comparing it to Mattmark in the Saas Valley—Dychtau taking the place of the Dom, Balkar of Saas, the Bezingi Valley answering to that of St. Niklaus, and Dumala to the glen leading to the Täsch Alp.

The autumn search, though carried out with all the energy and perseverance possible for men who were themselves without mountaineering knowledge, and had none but native hunters to help them, was unsuccessful. A further search, made, in consequence of a personal order of the Czar, by a levy of the native population, was equally fruitless. The snows fell—had fallen, indeed, before the first search could be undertaken—and the climbers' fate remained involved in doubt and obscurity, at least in the public mind. Dent and I knew that our friends had died on the mountains—we felt it to be so certain, that it was recorded as a fact on a memorial brass in Eton College Chapel. But in face of the theories prevalent in the Caucasus, and adopted by men in authority and with presumably the best means of judging of the state of the country, others could not reasonably be called on to share our conviction. Conjecture was accordingly rife, and it took a particularly painful form. Russians do not understand the use of the rope in climbing. The simultaneous loss of four men by an accident seemed therefore improbable to the minds of the Caucasian officials. The hypothesis of violence was consequently resorted to, and the people of the mountains were held, in high quarters, to be under very grave suspicion, and to be amenable to

retributive measures. Less responsible critics, who did not accurately appreciate the local orography, at first suggested that the travellers had crossed into Suanetia, and been there waylaid and murdered. We gave no credence whatever to these suggestions. But even for us, who, from better acquaintance with the country and its people, were able to dismiss such crude imaginings, there were many matters of deep interest left open. How, or where, within several square miles, our countrymen had died; whether after or before climbing the great peak; whether on its cliffs, or among the icefalls that cloak, or under the avalanches that sweep its sides; what relics of their last bivouac might be recovered; how far the snows had given them a natural burial—these were all questions which seemed to call for an answer.

The obvious leaders of a search-party were Mr. Clinton Dent, who had been with the lost mountaineers until forced to leave them, and myself. Myself, first, for old friendship's sake; next because I knew, as no one else in England or in Russia knew, the high mountains about the scene of the accident; and finally because I was able, by the assistance of the Council of the Royal Geographical Society, to obtain leave for an old friend of Mr. Fox's, Captain C. H. Powell, of the Indian army, an excellent Russian scholar, to place his services as interpreter at the disposal of the search-party. We owed very much to Captain Powell for the great ability and patience which he showed in all the needful communications with Russian officials and village notables, and his knowledge of Russian added in many respects to the interest of the journey.

Mr. Hermann Woolley, our other companion, had been one of the explorers and photographers of the Caucasian Mountains in 1888. Indeed he and his friends on the day of the accident were within six miles—as the eagle flies—of the fatal spot. Yet so separated were they by icy ridges—the fact is significant of the character of the chain—that they heard nothing of what had happened until after their return to England. He brought with him two guides from the Bernese Oberland. Dent and I had with us Kaspar Maurer, of Meiringen, who had travelled in the Himalaya, and a young brother of Fischer, one of the lost guides—by profession a schoolmaster—who joined us as a volunteer.

I must next set out as concisely as possible the material we had to direct us in the search. Before the party left England I had verbally, and also in writing, given suggestions to Fox for exploring the range of Dychttau. I had recommended an attack on the northern ridge of the mountain. This was made, but, owing to uncertain weather and a late start, the party only reached its western base. I had also pointed out that, failing success in that direction, a very interesting and beautiful pass could certainly be forced over the eastern ridge, and that from the glacier south of this spur, flowing towards the Cherek, Dychttau might be again examined, adding, “any attempt on this side, however, will be

a serious undertaking." Mr. Woolley has since justified my suggestion, by successfully climbing, and that without meeting with any extraordinary difficulty, the peak by the route thus indicated, which Moore and I had first examined twenty-two years before.*

Fox's instructions, written from the camp in Dumala from which the climbers sent back their tent, to his German servant and interpreter, Rieger, to meet him at Karaoul, in three days, showed that they had my suggestions in mind; while the very singular prospective entry made in the Diary Fox left behind with the tent, gave us full insight into the details of their plans.

I print here the record of the last three days written up in this Diary. It seems to me to give in the simplest form a very true picture of the character of mountaineering in the Caucasus.

"*Sunday, August 26th.*—Up 5.30 a.m. Fine morning, but windy and cold, and not promising for the night. Determined to start for high bivouac. Spent long time cooking meat for two days. Rhododendron wood for fire. Heavy loads. Streich has no faith in cooking soups. Determined to take up two faggots of wood. Left tent 9.45. Went up moraine on left bank of glacier to foot of ice-fall. Very long moraine. Halt for photograph. Charming gîtes by stream between moraine and mountain. Little stream with grassy dells. No wood though. Lovely camping ground at foot of icefall. Large cave at top of icefall used by bouquetin. Saw two come out of it on our return. Flowers on moraine very beautiful, especially asters, small dark blue gentians, and London pride. Saw two or three kinds of gnaphalia, but no edelweiss. Halt on moraine for two photos. 10.40 to 11.5. Halt, grass valley at end of moraine, 11.40 to 11.55. From there we topped the ice-fall by grass banks and moraine on left bank. We halted under cavern for lunch from 1.35 to 2.25 p.m., and then pushed on to upper névé always on the left bank. Snow came on thick, with thunder and lightning. Looked out for shelter. Found at last a Schrund; rock one side, snow and icicles the other; got out of storm. Guides lit fire outside under rock and cooked soup. Very cold and damp; our hopes of ascending Dychtau from this side had been dissipated. The obvious way up was raked with overhanging séracs, from which there was no escape.† Two ways only presented themselves (1) to mount high snow-pass east of mountain, and ascend from the other side of what seemed all snow; (2) to climb col west of mountain, and get on to north route from there.‡ We chose the latter, as the east col was a very long business. Fischer searched for sleeping place and found a cleft—the rocks sloped upwards. A poor

* See 'Alpine Journal,' vol. xv.

† This obviously refers to the short north-eastern buttress which projects between the northern and eastern ridges, and divides the two upper bays of the Ulluaux Glacier.

‡ These are the passes now known respectively as (1) the Ulluaux Pass, (2) the Mishirgi Pass. The second pass is in fact N. not W. of the peak.

hole, but affording shelter from snow and wind somewhat. The top was so narrow that one could only just squeeze oneself inside, below it widened out a little. The angle was about 30°. We managed to rake down about a ton of rock and loose stones, with which the crack was filled, and made a sort of platform at the base where Streich and Donkin lay. I hollowed out a seat above and made a footstool of my ice-axe below. We curled ourselves in our sleeping bags, and tried to be thankful for shelter. Everything was wet and clammy, and a slow drip came over my knees. Position had to be changed every ten minutes, each change sending down a handful of pebbles on Donkin's head. The wind was boisterous. Gusts of snow pattered in, and whistled on the sleeping bags. I was just dozing off when I was awoke by a handful of stones from above, which clattered about my ears, followed by a large rock which I had thought secure. It came bang on my head, and made me see a thousand stars, so that for a moment the hole seemed full of light. In endeavouring to move it on one side, I shifted the ice-axe, and sent a wheelbarrow of stones down on poor Donkin's head. His patience and endurance can only be likened to that of Job. I had to get down and share the platform. Fischer was already ensconced in another crack outside, so that room was found. The guides were pretty wretched, and had long abandoned all hopes of a mend in the weather. I reminded them of previous experiences, but gloomy thoughts prevailed. The stones were hard to lie on, but by this time we were fairly accustomed to hard beds.

Monday, 27th.—Drowsiness came over us all in the morning. I was first to wake and see blue sky. Got Streich up. Alas! it was very late, 5.45 a.m., and the morning perfect. We got down, cooked chocolate, and ate it in silence, and started off at 6.15. (three hours too late). Twenty minutes took us across the snowfield to foot of col, and we arrived at top of it, 8.20. A lot of fresh snow had fallen, making step-cutting difficult. It is a steep little pass. We mounted by rocks on right. At the top a beautiful view greeted us. We had made a new pass from Dumala Glacier to Mishirgi Glacier. At our feet was the latter; at its head the high buttress of rock leading to snow and rock north arête of Dychtau. Beyond this a pass leading from head of Mishirgi Glacier to foot of Shkara. Beyond this the splendid precipices of Koshtantau. Shkara itself was well seen over the pass between Koshtantau and Dychtau.* These latter practically met at this col, though there seemed to be a fine rock peak on ridge west of Dychtau before it descended to col. The arête, which we hoped to gain easily, was cut off by the buttress of rock which led to the corniced col we had seen from the Dumala Glacier. The final arête would go anywhere, but would prove a long business. The obvious way was to climb the rock

* This gap leads to the Khrumkoll Glacier. This view has been photographed by Signor Sella.

E. ridge.

N. ridge.

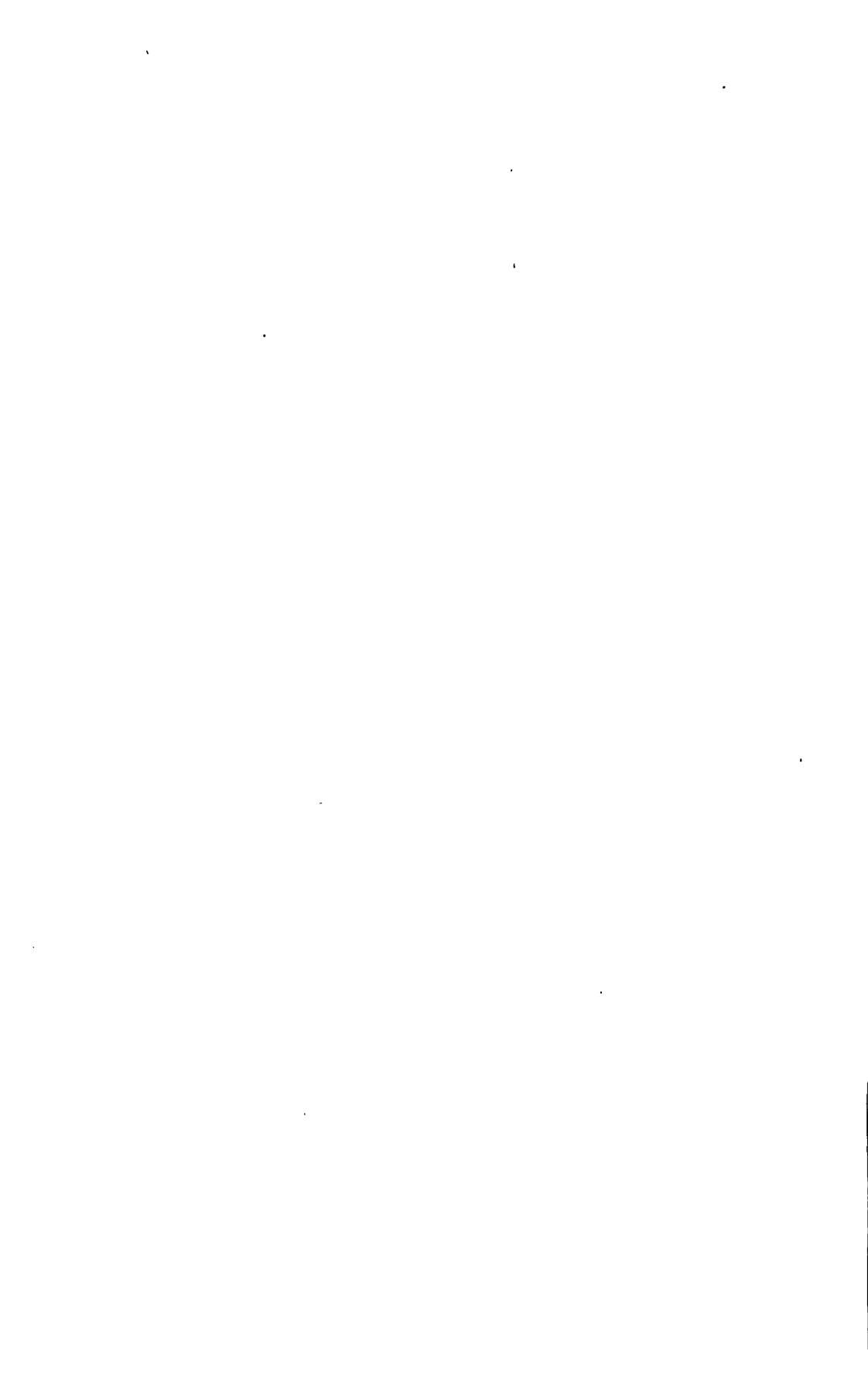
Mishirgi Pass.



V. SHIJA PHOT.

DYCHTAU and the MISHIRGI PASS

From above the Ullnauz Glacier.



buttress which I was sure would go. It was certainly plastered with fresh snow but nowhere very difficult. Streich's plan was to descend some 200 or 300 feet on to the Mishirgi Glacier, and mount thence to the arête by a long rock rib. He stuck to his opinion, and we had to give in. Had breakfast hurriedly, but unfortunately did not take a photograph, and so missed a splendid and most valuable view, for when we returned it was lost in cloud. We left the col at 9.10. The descent took a long time and there was much step-cutting. We then tried the rib, and found the rocks, as we had expected, quite smooth. We cut up between them and forced our way up slowly, the fresh snow making everything most difficult, but at 11.40 had made little progress; and as it was obvious we had not time to make our peak that day (the arête alone would take at least four hours), and as clouds were gathering, we reluctantly ordered a return. The col was reached at 1.15. p.m., and then we finished our stock of provisions, built a cairn and took a third photo. Our gîte of the previous night was reached at 4.5, the descent being somewhat troublesome with the snow softened by the day's sun. Packed up and off at 4.30. I got in with Fischer at 6.25, and got a pot of tea ready. Donkin's foot hurt him and he followed slowly. A hot and strong soup, made by that excellent Streich, and we turned in.

"*Tuesday, 28th.* A beautiful night. All slept like tops. At 4, heavy rain woke us up as it pattered on the tent, but we dozed off again. At 5.30 I woke up and read 'Midsummer's Night Dream' till about 7.30, when the sun came out. We had a glorious tub in our little stream, and hung all our things out to dry, for we had descended last night in a thick wetting rain. The man was sent off for milk and cheese. Our Bezingi host's son, who had spent the night up here, entered into a long conversation with me about our plans, and I hope understood them thoroughly. *Weather permitting, we hope to start again to-morrow very early, and take three or four days' provisions. Make the Dumala-Dych-su pass* the first day, and camp near its head. Climb Dych-tau, if possible from the south side, the next, and descend to the Dych-su Glacier. Thence to Karaoul.* The man meanwhile to go round to Balkar with a note to Rieger to send him up to Karaoul.† It depends on weather; at present it is fine, but, as usual, clouds are rolling up, and I fear we shall have rain before night. Guides are busying themselves nailing boots, drying clothes, cooking meat, &c. Donkin is practising with a revolver at imaginary enemies (11.30). The day has passed very peacefully. The man has gone for milk and cheese with a rouble note (much too high pay, but we do not want to be stinted.) I have written up my notes.

* Fox knew no separate name for the Tutuin Glacier, and treated it as appurtenant to the Dychnsu. An exact knowledge of the south and east sides of Dychtau was only obtained last year.

† See 'Alpine Journal,' vol. xiv. pp. 100 and 102.

Donkin has worked out boiling-point observations.* We have read much Shakespeare. Gathered wood for to-morrow. Streich and I have had a good bake of bread. He would not believe in baking-powder until he saw its effects. The best bread we have eaten since leaving Batoum. Feasted largely off it. Weather looks bad. Clouds down on to glacier (8 p.m.), will soon be over our camp. Hope for best. There is no understanding Caucasian meteorology."

Thus the Diary ends. It has been suggested that the party spent the next day in camp,† but the suggestion rests entirely on a statement of the native mentioned in the Diary, transmitted through Russian channels. As that statement is shown by the Diary to be wrong as to the day and time of the climbers' return, it can hardly be regarded as of much weight as to their departure. It is unlikely, if the weather was fair, that they would have rested another day in camp; and we know from Mr. Holder that the storm clouds passed away, and that the next two days were fine, except that on the afternoon of the 29th mists interfered with any examination of the higher ridges—a fact of some significance in considering the climbers' subsequent movements.

As to the position of the "Dumala-Dychsu pass," which the climbers meant to cross, no reasonable doubt can exist in any mountaineer's mind. I had myself pointed it out to Fox, and marked it on photographs, tracings from which were found at the bivouac. It is visible from the meadow at the foot of the Ullauz Glacier, where their camp was pitched. There is no other gap which could possibly answer, among mountain-climbers at least, to Fox's description "the high snow-pass east of Dychtau."

The results of the search made by the Surveyor M. Jukoff and Mr. Phillipps Wolley, so far as they went, confirmed the inferences we drew from this documentary evidence. The searchers found tracks in the loose ground on the left bank of the Ullauz Glacier. Its upper snowfields and ridges they were unable to reach.

There was only one piece of evidence which it was hard to make fit in with the rest. The Starshina (headman) of Bezingi had reported to the Government that his hunters had found the travellers' foot-marks on the snow, and traced them over a pass leading out of his district into that of Balkar, and this statement had been embodied in a report published in the Vladikavkaz newspaper. What the assertion was worth, and to what motives it may fairly be attributed, will, I think be clearly shown hereafter.

It followed, to the best of our judgment, that we ought to look for traces of the lost party at the head of an unknown glacier, now called the Tutuin, the torrent from which joins the Cherek, or Balkar, river.

* Preserved in Donkin's notebook. Bashil Pass, 13,080 feet; bivouac opposite Dych-tau, 12,209 feet; Mishirgi Pass, 13,600 feet. This is the last entry.

† 'Alpine Journal,' vol. xiv. p. 102. The native is made to say that the party returned at 10 a.m. on the 28th, whereas the Diary fixes the day and hour as 6.25 p.m. on the 27th.

There, if they carried out their plans, they ought to have bivouacked on the night after they left their tent at Dumala.

The base chosen for our search was therefore Karaoul, a pasturage at the head of the Cherek valley, four hours above the villages of Balkar, and two long days' ride from Naltshik, where a bridge over the great tributary of the Cherek, the Dychnu (here some two miles from its parent ice) gave, in the old days, a convenient opportunity to set a guard against cattle-lifters from the south side of the chain. This guard is now represented by one or two amiable old Tartars, who live in a stone hut, the only permanent habitation within many miles, and are happy to provide milk to parties temporarily residing in their neighbourhood.

Karaoul had been visited by me in 1868, by my friend Mr. Moore and his companions in 1874, and by M. de Déchy. We reached it last summer from Vladikavkaz by the Mamisson road, the Uruch valley, and the Stule-vsek, a pass of 10,868 feet, over which horses can be got after midsummer with some difficulty. It is three days' ride from Kotlarevsky, the nearest station on the Ciscaucasian Railway, and four from Vladikavkaz by the direct track taken by my party in 1868.

Karaoul (5560 feet) was our home for nearly a week. Our camp was pitched at the mouth of a fine gorge in a cup in the mountains. Grey granite screes scantily draped with azalea bushes and birches, or green flowery grass, sloped down on all sides with extreme steepness, enclosing in their midst an open meadow, a mile perhaps in length by half a mile in breadth. Our tents were erected on the little triangle of land above the junction of the two roaring torrents, the Cherek and Dychnu, side by side with those of M. Bogdanoff of the Russian Survey—six in all.

Three vistas opened in the mountain circle. First, south-west of us, a granite gorge, the mouth of which was not 100 yards off. Its upper crags bent forward in great beaks and noses, and a snow-peak shone high at its head. This was the gorge of the Dychnu, leading to the great glacier which flows from the northern and eastern slopes of Shkara (17,038 feet) and Koruldash or Ailama (14,854 feet). To the east rose a splendid snow-peak (Giuliuch 14,678 feet), the corner of the granitic range north of the Uruch—one of the many ranges that stand to confute the old belief that the Caucasus is a narrow single ridge. On the north, the deep defile of the Cherek led down to Balkar, and at its angle a white patch of boulders showed where the Tutuin-su rolls down the pale granites of Dychnu, and indicated for us the entrance to the Valley of Search. Like Zermatt, Karaoul lies too much under the hills for beauty, and the traveller views it with different eyes on his first arrival, and when he knows all that lies at hand, the ring of glorious snowpeaks and glaciers that will rise into view as soon as he leaves his resting-place. The Riffel Alp of the Cherek is a level-topped

spur south of Karaoul. It is wooded with birch and fir, hazel and alder, rhododendron and azalea. On one side it looks straight up the Dychnu Glacier, which flows down in singularly graceful curves, marked by the lines of its medial moraines, from the splendid peak of Shkara; on the other the broad Agashtan Glacier descends from the main chain in gentle slopes until it ends in a tapering snout within a few hundred yards of the travellers' standpoint. This is the ice-stream which overhangs the Mineral Spring* on the road to the Pasi-mta and Stule-vsek. Its meltings escape from its side in several waterfalls, leaving the snout dry, but with a deep water-cut gorge beneath it to show that it has not always been so.

In front of our little camp passed from time to time large parties of natives in single file, Mingrelians of the south side, who had come across to mow the hay-harvest on the northern steppe, and were now returning home over the old glacier pass, still called the Pasi-Mta, a Caucasian St. Theodul, which leads down to Gebi at the source of the ancient Phasis. Picturesque processions they made, as the men marched by in single file at a quick, swinging step, like that of the Italian Bersaglieri, with their scythes over their shoulders, clad in parti-coloured shirts, and head-pieces made up of bashliks of every colour, tied in all possible forms. Presently a party of Tartars from Balkar would arrive on horseback, men of a sturdier build, headed by a quaint fussy little mollah in a white turban, who made us the most polite Oriental speeches, and presented us with a tender lamb or half of an exceedingly tough mountain goat. Then a moving mass of brushwood, a Caucasian Birnam Wood, would advance towards us, exhibiting on near approach, twinkling feet and ears, and resolving itself finally into a party of donkeys carrying down fuel for the lower villages. Next a Cossack from Naltshik might be seen riding up the river bank, bringing, in the folds of his brown coat, our letters—forwarded by the courtesy of Colonel Viruboff, the Nachalik—and perhaps, on the saddle behind, some large loaves, a welcome change from the thin native cakes, which disagreed most disastrously with our Swiss followers. Last, at dusk, one night, came to the tent-door our Ossete horseman, Alexander (whom we had just paid and sent home, as we thought), wringing his hands and bewailing the loss of his horses. Powell was prepared to write one of his admirable despatches to the Balkarian Starshina to proclaim the larceny. But we waited; and just when it became convenient for him to do so, Alexander found his horses, which, I believe, he had hidden away in order to enjoy a few days more in our camp, where he was treated—or rather treated himself—as an honoured guest.

After a day's rest we were ready for our work; all but Kauffmann,

* See 'Central Caucasus,' p. 414. The glacier has retreated considerably in the last twenty years.

one of Woolley's guides, who was ill, and incapable of any exertion.* Dent did not like to leave the sick man until his symptoms were more determined. He remained therefore in camp, while Woolley with two guides undertook to reconnoitre the entrance to the Tutuin valley; for M. Bogdanoff the surveyor had not then heard of any path or access to it. I, knowing most of the mountains, and therefore best able to piece in any new additions to our knowledge, undertook to climb, with Captain Powell and the schoolmaster Fischer, as high as time and weather allowed on the spur east of the Cherek valley that forms part of the sky-line of the basin of Karaoul.

We made a late start. The slopes faced south and were exceptionally steep and monotonous. The sun beat full on us, the mountain tops were for the most part veiled in white clouds; but the freshness of the breeze that played beneath the sunshine invigorated us to persevere, and gave some hope that perseverance might be rewarded. At last the tedious slope was broken by a rocky spur crowned by one of M. Bogdanoff's stonemen. The keen upright ridges of the great peaks began to pierce the shining billows of cloud. The "silver spearhead" set so high against the heaven opposite us I knew well—it was Dychtau itself.

Captain Powell sat down to sketch. The hillside had become steeper and wilder, we could climb instead of trudge. Disregarding the cries of a Tartar shepherd who was feeding his flock on the highest herbage, Fischer and I moved rapidly, incited by the keen air of 10,000 feet. We gained a rocky crest overlooking the defile of the Cherek and the entrance to the Tutuin valley. We followed it to the highest of a family of M. Bogdanoff's stonemen, on an eminence of about 11,500 feet, or 6000 feet above our camp. The clouds were by this time parting and sinking from the circle of peaks; the whole basin of the Dychasu Glacier was in view. Its moraines flowed towards us in beautifully curving lines from the base of the great chain. The Agashtan Glacier poured in a broad gentle stream from the watershed between us and the Skenes Skali, spreading out its lower skirts among green alps and wooded knolls, or draping the cliffs above the Cherek with an icy fringe. Koruldash was conspicuous on the left by its white Capuchin's hood. Shkara—that majestic mountain—shot up in a vast white wedge against the upper blue. Beyond it the mists were melting from Janga and Gestola. But the peak that caught first and held last our gaze was Dychtau. It was the nearest and also the most remarkable in form. It shows on this side a broad white crest, the lines of which meet in a fine point. Its pure upper snows rest on a broad pedestal of ridges of light-coloured granite, mountains themselves 15,000 feet in height. My companion

* Of the travellers and guides this year in the Caucasus, two travellers and two guides suffered severely with dysenteric symptoms, while Fischer has since lost the sight of one eye, apparently from after results of snowblindness on a constitution weakened by exposure. Alpine peasants generally make but poor travellers, though to this rule there have been brilliant exceptions.

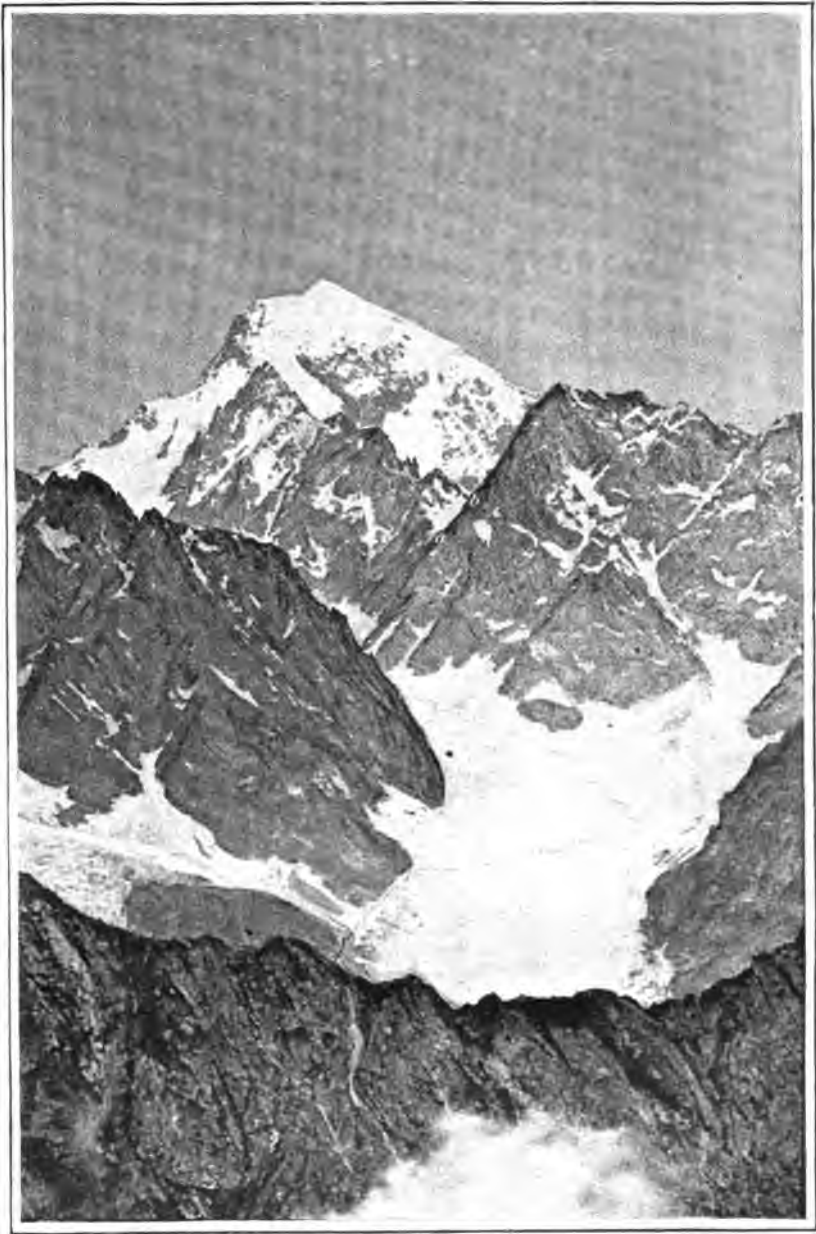
looked with brimming eyes on the scene of his brother's death, exclaiming as he looked, "What a mountain! I am glad they rest on so noble a peak."

From the peak itself a splintered crest descends towards the Cherek, bending northwards as it trends away from the summit. This, the Koshtan Crest of M. Jukoff's map, separates the Ullnauz and Tutuin valleys. The gap by which we believed the climbers to have crossed was in view, defended on this side by precipitous, but not inaccessible, crags. At their base lay a long snow-basin, its floor, some 12,500 feet in height, filled with the gently sloping névé of a glacier which poured over in an icefall, terribly torn, and about 3000 feet in vertical height, into the Tutuin valley. From our viewpoint it was difficult to feel any certainty as to whether this icefall was passable, or how far the very steep slopes on its right bank—on its left were precipices—would prove of service. Subject to this doubt—only to be resolved on the spot—our route was clear. The lower part of the Tutuin valley was hidden, but we noted that it bifurcated near its entrance and that the northern glen fell from an extensive glacier plateau lying under the Koshtan crest. Still farther north, and altogether separated by miles of waste from the Tutuin and the supposed pass, we looked on steep slopes of broken rock and snow-patches, forming the sides of the Kashtin or Koshtan glen, a name which has acquired, by a series of blunders, a very undue prominence in local topography. My reconnaissance had been fully successful. I had obtained that general, distant panorama of the ground about Dychtau, which was essential if we were to avoid subsequent blunders and misdirected wanderings.*

It was warm on the lee side of the crest, where the fine-weather east wind did not reach us, and we sat long watching the magical effects of mist and mountain, and light and shadow, as the sun sank westwards. The atmosphere of the Caucasus has more depth of transparency, more lucidity, than that of the Alps: like that of the Cumberland Lakes, it seems to refine the forms and soften the harshnesses of the mountains, while it adds to their apparent height. It must have been six o'clock before we started down by a more direct ridge; and I never was in greater danger of a tumble than for the first twenty minutes. It was impossible not to have one's eyes fixed constantly on the upper air, watching glory-coated mists as they whirled up suddenly from the valley, to be caught in the swift breeze and shredded into a thousand fragments, which danced in prismatic colours before the great peaks, hid them for a moment, and then left the deep blue of heaven as pure as before.

Suddenly these visions ceased, we plunged into the cloud-roof that arched the lower world, and ran—the slopes were so steep that we could hardly stop when we had once started running—down to the great meadow, over 5000 feet below, in less than an hour. On our return

* See Illustration.



H. WOOLLEY PHOT.

DYCHTAU from above KARAOUL

a. Bivouac. — *b.* Ulluzuz Pass.

The N.-E. buttress is seen over the E. ridge. Mr. H. Woolley's route leads up the snowslope between the E. and S. ridges.

The faint line shows the route through the icefall of the Tutuin Glacier.

we found that our companions had got back before us. Woolley had entered the vale of the Tutuin, and seen a glacier to which he had found a way over grass-slopes so precipitous and slippery, that he thought we might have to rope to pass them. This glacier proved next day to be the wrong glacier, that of the northern glen, the Chertui; but Woolley's work had been none the less serviceable, as he had found also a fair path up the main Tutuin-su.

All had been arranged for a very early start next day (the 28th July), and we had closed our tent-curtains, when Captain Powell was summoned down to the Surveyor's quarters, and a note addressed to me from Baron Ungern Sternberg, a geologist on the staff of the Governor of the Caucasus, was handed to him. It was dated from "the Cherek Valley" and was in the following terms. I abridge:—

"I have crossed to-day, with my Tyrolese guide, the pass from Ullnauz to Balkar. There is no second pass. The descent is very difficult. There are three stonemen on the crest, which, as my native guides tell me the pass is not used by their people, I believe to have been built by Fox and Donkin."

My first impression on reading the Baron's letter was to believe that he had crossed the Ullnauz Pass. For it seemed strange (since he had with him an Alpine guide) that he should deny the possibility of any pass nearer Dychtau than his own, unless he had crossed this notable gap. But on second thoughts such an interpretation seemed untenable. It was not credible that a mountaineer of no great experience should have got through the séracs I had just seen, and not have particularly referred to them. Hence I argued, the Baron must have crossed the chain farther north. Granted this, however, the stonemen he described remained to be accounted for. The Baron was camped not far off, the Cossack who had brought the letter said "across the first bridge." We rashly took this to mean the Tutuin-su bridge. I offered to start at dawn, and interview the Baron, leaving the rest of the party to catch me up.

Before sunrise I was off on horseback alone under a cloudless sky. In an hour and a quarter I had reached the roaring Tutuin-su, and led my horse down the steep pitch beyond it. I rode on for 20 minutes, to a spot whence I could look far down the valley, but no tent was in sight. I resolved to return and wait for my companions. On their arrival, Powell and I rode on, pressing what pace we dared out of our horses, on a path which in many places was little better than a broken staircase. After a long hour's ride, we saw a bridge over the Cherek, and beyond it, on a level meadow, a light silk tent.

Baron Ungern Sternberg received us with all the hospitality possible under the circumstances. He reported to us that he had crossed from the foot of the Ullnauz Glacier into the Koshtan Glen, that he was confident that he had discovered Fox and Donkin's pass, and that since, though

difficult, it was not a dangerous pass for such skilful climbers, he was confirmed in the belief held, he stated, by Colonel Viruboff, the Nachalnik of the Naltshik district, that our countrymen had been the victims of foul play. He reported various petty tales to the disadvantage of Rieger, their interpreter. He told a story of how a native had been found with a wound which might have been inflicted by an ice-axe. The suspected man had proved an alibi, but alibis were easily proved in the Caucasus, and the old chief of Bezingi felt convinced that murder had been committed—though, of course, after the travellers had left the particular district he was responsible for. He had averred it, even with tears in his eyes.

Nothing of all this carried weight in my mind. I pointed out to the Baron that we had in Fox's Diary explicit instructions where to search; that I had myself shown Fox, as I was then showing him, by means of M. de Déchy's photographs, the position where I believed a route to lie. The Baron confidently denied the possibility of passage at the spot I indicated on the map and photographs. He had, he said, spent three days on the Ulluaux Glacier, and was certain no such pass could be made. I could only reply that the point was one for an expert's opinion, and that my experience convinced me that I was not in any risk of being mistaken.

There remained the question of the stonemen found, and the footmarks alleged to have been seen by the second search party, the previous autumn, on the Baron's Pass. Fortunately a Bezingi Tartar, a member of that search party, was present. He was questioned through Powell, "Can you say who built the stonemen?" "No; our searchers, or surveyors, may have built them." "Were the footmarks found those of nailed boots like mine?" "I cannot say; *our Starshina told us* they were the tracks of the Englishmen." The one puzzling point in the evidence seemed now in a fair way to be cleared up. The native search-parties of the previous autumn (subsequent to M. Jukoff's) had not gone on the right track at all; they had wandered off to a hunters' pass to the Koshtan Glen, and the footsteps they saw—if they really saw any except those on the Ulluaux Glacier—were not our friends', but those of the Surveyor's party. The Starshina, having been ordered to search till he found something, had made haste to find footmarks *leading out of his district*. M. Jukoff subsequently informed us that his men had built stonemen at the spot in question.*

* Baron Ungern Sternberg's pass and the stonemen are, I believe, shown on S. Sella's Panorama of the Ulluaux Glacier. Baron Ungern Sternberg has informed me by letter that he is still of opinion that the footmarks and stonemen are attributable to the lost party, but that he now believes that they proceeded from his pass along the crest to the bivouac discovered by us. I can only say that if Fox's Diary is evidence, or Dent's and my own experience as mountaineers is worth anything, this theory is not worth argument: and I shall spend no space upon it. I am confirmed in this course by the fact that Baron Ungern Sternberg has not favoured me as yet (April 20th) with a

Captain Powell and I rode back in noontide heat up the grand defile of the Cherek. Stiff as tent-poles we dismounted from our Tartar saddles to force our sinews into a new form of activity. For the first half hour it was troublesome enough. Some 800 feet up the hill we found our heavily laden comrades, the sick man's place taken by a sturdy young Cossack who was carrying more than his fair share of our sleeping goods. The stream from the Chertui Glacier was soon left far below. A donkey-track, much used by natives collecting brush-wood, zigzagged steeply up amongst beautiful birch-trees and mossy crags, which completely concealed all that lay above. Beyond a brow it went down steeply to the foaming torrent. A few hundred yards of gentle ascent beside the tumbling water, and we looked into a long level upland glen closed by a rocky barrier, hung with snow and ice, at the foot of which the snout of a large glacier pushed forward its grey lines of moraine among the bright hues of the grass and flowers. Flowers covered everything. Our path was buried in them. Dense beds of cream rhododendron in full bloom clothed the lower slopes, the river banks were painted blue and white and yellow with blossom—gentians and forget-me-nots, daisy-like pyrethrums, primulas, and many other less familiar blooms. The ground below the glacier was so densely carpeted that walking was made very difficult by the complete concealment of the uneven surface. Over the head of the icefall gleamed the white crest of Dychtau, the granite towers and two great obelisks on its eastern ridge thrown up against the crowning snows. We struck up on to the old moraine and walked along its edge. The ice had resumed its advance, and was wrinkling up the loose ground before it in all directions. The top of the moraine presently grew too narrow and broken to serve conveniently as a path, and we left it, where a little plain (or slope so gentle that amongst these vast mountains it might be held a plain) spread out on our left, seamed by the water-courses from a small glacier high above. The icefall of the great glacier was now full in view opposite us, a superb pile of frozen ruin. The lower part was clearly impassable, and so were the rocks on its left, but on our side there was no difficulty in climbing up steep grassy crags to at least half the height of the fall. At the very base of these slopes we found two deserted Koshes or shepherds' quarters—one under the moraine, the other 500 yards off under the hill side. Each consisted of a low wall built round a pen or pound; the first was floored with manure and partially inundated by the meltings of an adjacent snowbed, the second and more eligible was a thicket of gigantic broad-leaved weeds wet with recent rains—about as convenient quarters as a rhubarb-bed in an English kitchen-garden. We laid low the weeds with our iceaxes until

copy of the article in which, as he informs me, he has set forth his view, or with copies of the official documents which he cites as giving excuse for his former belief in a crime having been committed.

they were reduced to the form of a carpet; then our sleeping bags were spread, and a fire lighted with wood "conveyed" from the first Kosh—for we were above the tree-level. We enjoyed the fire until dark, when we got into our bags and pretended to be comfortable. In truth the ground was lumpy, and the air began to tingle sharply enough with frost to make us bury our heads in the flannel. When I woke the mountain outlines were black as blots round a heaven alive with light, and over the crooked granite teeth of the cliffs beyond the glacier the morning star was swimming up slowly on the front of the dawn. I watched it, wondering vaguely what the day would bring forth, until the pale lemon light grew stronger on the horizon and touched the tops of the eastward peaks. Then I played the odious part of an alarm. Two of the guides had found a hole in the rock only accessible by a narrow funnel. Stones had to be heaved into it in order to arouse them. Fischer had sought solitude somewhere, and was hidden (like one of Doyle's elves) among the gigantic vegetables. The Cossack, however, was within reach, and was prompt in creating a cheerful fire.

It was broad day (5 a.m.), and there was not a cloud in the sky when we set out. The first hour's climb up to the glacier was steep but easy, and there was little moraine to cross. We ascended the slippery slopes of avalanche snow, fallen in spring from the cliffs on our left, for some distance before we plunged into the heart of the icefall. First we found a way through a narrow gate between frozen blocks, then we picked our path under a row of icecliffs, among the fragments which, from time to time, had tumbled over. Hurrying past these dangerous neighbours, we mounted once more between deep trenches where the iceaxe had often to do its work. One vast far-stretching chasm, or rather network of branching vaults, seemed to sever us effectually from the corridor under the opposite rocks by which we hoped to turn the final line of ice-towers. But it was bridged, and this obstacle crossed, we felt certainty of success in reaching the upper snowfield. We entered the trough under the further cliffs, drank some water which trickled from them, and found near at hand magnificent primulas growing solitary in the frozen waste at a height of about 12,000 feet. A little more step-cutting in hard ice, raked once or twice a season by falling séracs, landed us in safety on the smooth fields of névé. Close beside us rose a stupendous mass of blocks and towers of opaque ice, like polar icebergs, on the edge of the frozen cataract. But straight in front an even-floored, gently sloping broad white corridor stretched into the secret heart of the mountains—so secret that even the surveyors had missed it altogether. On all sides pale grey granite cliffs, or the steepest ice, overhung the untrodden snows. At the head of the glacier a steep ridge seamed by two precipitous gullies closed the view. Only to their right (as we looked) was there any semblance of possible exit by a practicable snowslope in this direction, and that exit

led to the summit of Dychtau. Behind us, however, easy slopes trended back to a comparatively low ridge. I recognised it as a false Col leading to the Chertui Glacier.

"Where are we going then; up those ice-couloirs?" asked our Swiss, impressed by the scale of these virgin solitudes, distrustful of my local knowledge, and despondent as to the chances of any discovery in so vast a field of search. I could only assure my companions that to me our route was as clear as that to the Strahleck might be to them, that behind the next buttress of the northern range we should see a pass, and be able to climb to it up steep rocks. We were now approaching the spot where it was reasonable to begin to look for traces of the lost party, if they had fulfilled Fox's intention and "attempted Dychtau from the south side of the pass." But the few possible sites bore no signs of a bivouac.

We tramped steadily up the snow banks in the blazing sunshine, until, about 10.30 a.m., we stood opposite and under the gap I had seen and sketched twenty-two years before, as well as on the previous day. It was high above us, 1200 to 1400 feet, in an inward bend of the range on our right hand. A broad sheet of snow swept down from it, a narrower white tongue ran up more than halfway. The rib of rocks separating the two snow troughs supplied an obviously serviceable, if steep, ladder. Maurer, indeed, suggested some rocks more to our right, but they had no claim to be preferred. We crossed a half-open fosse or *Bergschrund*,* kicked a few steps in the snow above it, and then grappled with the rocks. They were precipitous, and had to be climbed with hands and knees; but they would not be reckoned difficult among men accustomed to Alpine work. That is to say, there was good handhold wherever footing was scanty. This was fortunate, for we could now see that the snow on our left lay very loosely on hard ice, and a broad stream of water was flashing down its centre, so powerful are the rays of a Caucasian sun even at 13,000 feet.

The crags beside the glacier having yielded us no traces, we felt that the next step was to go to the pass itself, where we might look for a stoneman, and possibly a record. But we were fully occupied with the practical details of climbing and in no immediate expectation of any discovery, when about noon the leader, at the rope's end, suddenly stopped short, and gasped out, "Herr Gott! the sleeping place!"

Before our eyes rose a low wall of large loose stones built in the form of a semicircle with its convex side to the precipice below, and enclosing a shelf on the face of the cliffs, some six feet across in either direction, and partially overhung and sheltered by a projecting eave of rock. In a moment we were all overlooking the wall. The first object to catch my eyes was a black stewpan, half-full of water, in which a metal drinking-

* A *Bergschrund* is the term in the Swiss Alps for the moat which runs along the base of the upper ridges, and marks the division between the snow plastered to their cliffs and the névé which is moving downwards to feed a glacier.

cup floated. A revolver in its case hung under the rocks. The space inside the wall and between it and the overhanging crag was filled with snow and ice to a depth of several feet. The hard-frozen surface was broken here and there by projecting portions of rucksacks and sleeping bags. The bags were not empty. A momentary shudder passed through more than one mind, "How are they filled?" But a second glance showed us that there was no terrible discovery to be feared, terrible because it would have meant a lingering fate to our friends. Everything was there—most things at least—except themselves. That they were lost we had long known; yet this sudden discovery of their personal belongings, just as they had left them eleven months before, the consciousness that we stood on their last halting-place, sent a fresh thrill through every heart. Even in the common haunts of men familiar relics move us. How much more so when found in solitudes, which have seen no previous human visitors except those whom they hide somewhere in their icy caverns. Surrounded by so many memorials of the missing, so many objects that spoke of individual traits of character and habit, it was difficult to believe in the catastrophe. It almost seemed natural to expect that our friends might at any moment be seen coming quickly over the crags to regain the bivouac where all still lay exactly as when they quitted it for their last climb.

After the first keen moments of discovery, the necessary work of digging out relics and searching for records was set about in earnest. It was no light task, for on this sunward shelf the snow had often melted and frozen again. The bags were embedded in hard ice mixed with stones, against which our axes often rang ineffectually. The little camp hung like an eagle's nest, on the edge of a cliff of about 1000 feet. Any object, such as the still well-stocked meat bag, thrown over its wall fell vertically for some fifty feet into the lesser snow gully, and then slid swiftly to the level snows far below. Space allowed only three men to work at once inside the wall; outside it no step could be taken without the greatest caution, and Powell found with difficulty a tiny ledge, whence he could safely sketch the eyrie.*

Woolley and I, with one guide, went on to the pass, still some 300 feet above us. The ascent took us more than half an hour. The first part was hard climbing, up an icy chimney, and then along a rib of rock, steep and narrow. From its top we turned to our left across a broad frozen slope, the head of the great couloir, or snow-trough. There the snow covered ice, but was sufficiently adhesive for safety at

* Captain Powell's sketch has been reproduced in the 'Alpine Journal,' No. 107. It gives a most correct impression of the spot. The shelf of rocks by which we ascended was invisible from where he sat. The crack above, and to the right of the bivouac, is that by which Mr. Woolley and I climbed on to the pass. The only liberty taken has been in the foreground. Captain Powell actually sat on the little bracket of crag directly below the crack, or chimney.

W. ridge.

E. ridge over S. ridge.



H. WOOLLEY PHOT.

DYCHTAU and the KHRUMKOLL GLACIER

From the Dychsu Glacier.

a. Gap leading to Mishirgi Glacier. — b. Gap leading to Tutuin Glacier with E. ridge beyond it.

the moderate angle at which the part we had to cross lay. With due precaution we traversed it to the pass, a ridge broken by crags, on one of which we could see a small pile of stones. As the crest fell under our eyes we looked over it, first to the flashing lines of the rivers in the distant steppe, next on the meadow of Dumala, the last camping-ground of Donkin and Fox. The Baron had had little reason for his incredulity; there was no serious difficulty for mountaineers with a rope in the descent on that side. Broad crevassed slopes fell towards the snowbasin which feeds the south-eastern branch of the Ulluaux Glacier. Across this basin the great peak and its precipices were full in view. The summit still rose 2500 feet overhead, and another 1000 above the snow plain of the Ulluaux—the height, that is, of Mont Blanc above the Grand Plateau. Its face was a pile of rocks and ice-cliffs and steep slopes, seamed by gaping chasms, one so large and so blue that Mr. Woolley was able subsequently to recognise it through a field-glass from one of the stations on the Ciscaucasian Railway, a distance of at least 50 miles. We descended a few yards on the farther side of the pass, and carefully examined the eastern ridge; on the north it is so sheeted with ice as to be perfectly unassailable, and no man in his senses would attempt to traverse it. The crest itself between us and Dychtau was broken by high towers or thin Aiguilles, and equally impracticable. It was obvious that mountaineers longing to get at the smooth upper snows from the ridge we stood on must make their attempt, if at all, by the ledges and gullies on the Tutuin, or southern, side. They would not touch the crest till beyond the great tower. There it was corniced, but at this spot, where the eastern ridge abuts on the southern, there is, as Mr. Woolley subsequently proved, space to spare, and no one need, and no experienced climber would, run any risk of falling. Close to the top of Dychtau a crevasse runs round the peak, and above this on the south lies a bank of small loose rocks, on which a stoneman would most certainly have been built by successful climbers; but a powerful telescope established the absence of any sign of a cairn or stoneman—and here again Mr. Woolley made assurance doubly sure by his subsequent ascent.

We carefully pulled to pieces the little stoneman on the pass, but found no record within it. We then rebuilt it, and inserted a memorandum of our visit. The scene we looked on as we lingered on the rocks beside it was strangely beautiful and impressive. The silence of the upper snows was broken only by the constant ring of the axes and the voices of our comrades rising clearly through the thin air as they still laboured in their task of seeking all that might be found under the icy coverlet. Their figures were thrown out on the edge of the crags against the surface of the Tutuin snow-fields, as those of sailors on a masthead against the sea when seen from some high cliff. The day was cloudless, the air crystalline, space was for a moment annihilated, or seen in a scale in which we each seemed to stand, not six feet, but

14,000 feet high! The many passes and heights of the central ridge of the Caucasus lay literally at our feet. We looked over them and past the clustered peaks and vast snow reservoirs of the Adai Choch group to innumerable indefinite distances, amongst which I recognised the horn of Shoda, green heights of Radsha, blue mountains of Achalzieh, opalescent Armenian ranges fading into a saffron sky on which hung far-off amber cloudlets which possibly marked the position of Ararat. All was distinct as a mapman's model, yet wonderful and beautiful as a poet's dream—as the landscapes of Shelley's 'Prometheus.' The splendour of nature on this day of days seemed not out of harmony with the sadness of our personal errand. It affected the mind as a solemn and sympathetic music. While I gazed, four white butterflies fluttered about the little monument, and again fluttered off into immeasurable space. A Greek would have read a symbol in the incident.

Our eyes might wander for a moment, but our thoughts soon returned to our immediate errand. Sitting on the rocks beside the melancholy little stoneman, the story of the catastrophe seemed to unfold itself. The mountaineers, all heavily laden, travellers as well as guides, had reached about noon the crest of the range at the point where we stood. They had given up all thoughts of an attack on the great peak from the side of the Ulluauz, and, following the suggestion made in my notes, and the intention so clearly expressed in Fox's Diary, meant to go down to the Tutuin snow-field, and "climb Dychtau from the south side." As they descended, the southern cliffs of the ridge they were on came partially into view. For a short distance these were practicable, beyond they became more formidable, but, owing to foreshortening, how formidable must still have remained for them a matter of speculation. Afternoon clouds probably played about the crests and obscured their features. They saw frozen gullies which might be cut across, ledges that might lead far. A month later in the year the broad sheets of ice, which now would have rendered such an attempt too obviously hazardous, had probably in great part disappeared under the sun of August. They had in their minds the smooth upper snows, that pleasant ridge which, once the great towers passed, leads in continuous curves to the crowning peak. They had never examined from any distant vantage-point the full breadth and height and formidable nature of the crest that separated them from the last tower. Its passage, they persuaded themselves, was worth the attempt, a *mauvais pas* to be faced and surmounted. The alternative was to descend many hundred feet to the Tutuin névé, to lose all this height for the morrow, to carry down the wraps and provisions they had laboriously raised so far. They may naturally have been biassed by the fact that they had tried a similar descent from the Mishirgi Pass, two days before, and the result had been failure. They had, of course, never seen the broad snow-slope which runs up from the head of the Tutuin Glacier. It was altogether

concealed by the buttresses close at hand. It was easiest at the moment to stay where they were; and the moment weighs, particularly with guides and heavily-laden men.

The ledge was found, and the fatal decision made. The loads were laid down, and all went cheerfully to work. Fox doubtless set the guides to wall-building, and laboured hard at it himself; Donkin looked to the fire, adjusted his camera, made his boiling-point observations, unpacked and repacked some of his instruments, meeting the occasion, after his manner, by nice adaptations of homely articles to purposes for which they were never intended. Thus we discovered some delicate instruments done up in the neatest possible parcel in a sock and glove, and all tied together with a bootlace. The red flames of the little fire (we found remnants of firewood) shone for a short time on the icicle-hung rocks, and then the mountaineers rolled themselves close together in their wraps.

Their start next morning was certainly not a hurried one. All loose objects were carefully stowed inside the sacks—except a revolver which was left hanging on the rocks. We may infer from their leaving it thus partially exposed that they saw little risk of bad weather before their return. They roped and started, Donkin as usual carrying his light camera on his own shoulders. They cut across the great trough. But here our evidence ends and conjecture begins. The fresh snow mentioned in Fox's Diary may have added to the danger of shelves and ridges difficult at all times. Somewhere the snow slipped with them, or—but what use speculating how the end came? It is enough to know that it must have been swift, common, painless; that anything that falls on those cliffs falls far, and that in all likelihood the blue ice-vault at the crags' foot gave to the climbers an immediate and a sufficient tomb. The whole of the ground under the cliffs was carefully searched with strong glasses by us, and ten days later Mr. Woolley and his guides passed twice along it in his successful ascent of Dychotau, when he made certain that the peak had not been climbed—that the accident, therefore, happened on the ascent, or in returning after an unsuccessful attempt.

There were only two ways in which our search could have been pushed farther; by attempting to follow the climbers' probable track across the cliffs, or by conveying an army of diggers to the upper snowfields.

The first, *in the condition in which the rocks were at the time of our visit*, would have been highly dangerous. I emphasise these words because in the Caucasus, even more than in the Alps, conditions change from year to year, and from month to month, and I would not be thought to impute to our friends any intentional rashness. A full month later in the year the crags may well have been far less ice-coated, and, therefore, less obviously dangerous. In some snowless year a passage

may be found across these cliffs; after the experience of the Alps, it would be rash to call any cliff impossible. But they lie off the proper line of ascent to Dychtau, the broad snowslope at the head of the Tutuin Glacier, which was attacked by Mr. Woolley; * and their passage could, I think, hardly lead to any further result than the possible recovery of Donkin's camera—if he left it behind in some niche, a supposition which to those who know his habits best, seems not very likely.

As to the second idea—even if we could have got a regiment of diggers to the spot (which was impossible) their work would almost certainly have been thrown away. A large sleeping bag which we left at the foot of the cliff had entirely disappeared ten days later—under some fresh fall, or by sliding into the Bergschrund—when Woolley returned to the Tutuin Glacier. What chance would there have been of finding anything buried under a winter's fall, and the accumulations of eleven months?

We had learnt all we came to ascertain—in what way and, within a very few hundred yards, where our friends met their deaths and lie buried. To disinter them was far from being in our plans or wishes. We were well satisfied to leave the mountaineers in their high tomb, warded by the frosty walls and watched only by the stars, with the brightest peak of the Caucasus for their perpetual monument.

Though within cry, it took us 40 minutes to regain our companions, for we had to move carefully on the steep rocks. Some few relics were collected, sufficient to satisfy friends, and to prove to the natives and officials what we had discovered—the revolver with all its barrels loaded, some notes and sketches made by Fox, an instrument or two, these were the principal objects brought down. We carried away a self-cooking soup-tin, and on a match being put to the spirits of wine they burnt up at once, and the contents proved unspoilt. One or two objects, accidentally dropped, fell directly to our tracks on the névé, 1000 feet below. Soon after three p.m. we followed, leaving behind us in its solitude, the loftiest and surely the wildest human habitation in Europe.†

I have written in vain if I have not made it clear that this part of the range is, from its steepness and its crevassed glaciers, inaccessible to all but mountaineers, and that this gap, we call a pass, has never been reached but by the lost party and ourselves, and is never likely to be visited by native hunters, unless led. Yet it is a pass that will always be recognised as such by men familiar with the passes made of late years in the Alps. There is but one way to it, and that is straight and narrow. These were our chief advantages in the search: we

* See 'Alpine Journal,' vol. xv.

† The height of the bivouac was circà 14,000 feet; the cabin on the Aiguille de Gouter, on Mont Blanc (where I once spent a night of fierce storm with Donkin), is 12,530 feet; the upper Matterhorn cabin, on the Italian side, about 13,500 feet.

recognised easily from previous experiences the direction in which to look; and that point determined, our field of search was comparatively limited.

As far as the top of the icefall all went smoothly, there our leader missed for a moment the morning's track. A little further one of the snow-bridges over a crevasse had fallen since we passed, and several flying leaps were called for. But we suffered no check of any consequence; nothing but what in another mood we might have laughed over, and by dusk we were again in our Kosh. Early next day we returned down the valley of flowers to Karaoul.*

After our discovery of the bivouac, I made a subsidiary exploration of the Upper Mishirgi (or Kundium Mishirgi as M. Jukoff has named the eastern branch of that glacier), which enables me to explain the topography of the first attempt on Dychtau, the miscarriage of which was so unfortunate. It may be most convenient to describe it here. Accident on this occasion deprived me of my companions. After leaving Karaoul we had had three days of desperately dull weather. The northern valleys were smothered in wet mists. On the fourth morning we were camped hard by the foot of the Bexingi Glacier, and the clouds were lying lower than ever, when, through a sudden break, the white wall of Janga shone out, backed by blue so pure that I succeeded in convincing myself that all might be clear on the heights. I had not faith enough in my own conviction, however, to persuade others, and the consequence was that I started alone with Fischer. When we got to the foot of the Mishirgi Glacier we almost gave up hope. But yet another window was opened in heaven. We plodded on up a flowery dell beside the glacier. Then we came on a piece of moraine: gigantic unstable boulders, which gave severe exercise to eyes and limbs. Weary of gymnastics in the dark, we struck out on to the ice and tramped doggedly up the glacier. There was a rapid lightening and a twinkling in the mist; then the fog settled down again so thickly that for a few minutes I quite lost sight of, and had to shout for, my companion. And then, in one moment, the vapours parted, and we almost held our breaths while the sheer height of Koshtantau, 8000 feet of snow cliffs, burst suddenly, in all its glory, upon us. Not only Koshtantau but the whole circle, the bare cliffs of Missess Tau—a Caucasian Lo Besso, the triple head of Mishirgi Tau, the great buttresses and icy crest of Ullauz Bashi, the granitic ridges which Ukiu dominates. It was a sight never to be forgotten, one of those transcendent moments when nature surpasses even the utmost imaginations of our dreams.

* During the three days of our absence no cloud had crossed the sky or touched a mountain peak. Such weather is rare in the Caucasus, and only prevails when a north-east wind is blowing. I enjoyed, however, 10 days of it in 1887. The atmosphere at such times is often marvellously clear; I saw the crevasses in the high glaciers west of the Kluchor Pass clearly from the deck of a Black Sea steamer off Ochem-chiri (forty miles off). But there is more colour in Caucasian skies than in Alpine. And after several clear days a thin transparent haze (the dust of the steppe?) softens without hiding the outlines of the great peaks, and gilds their snows.

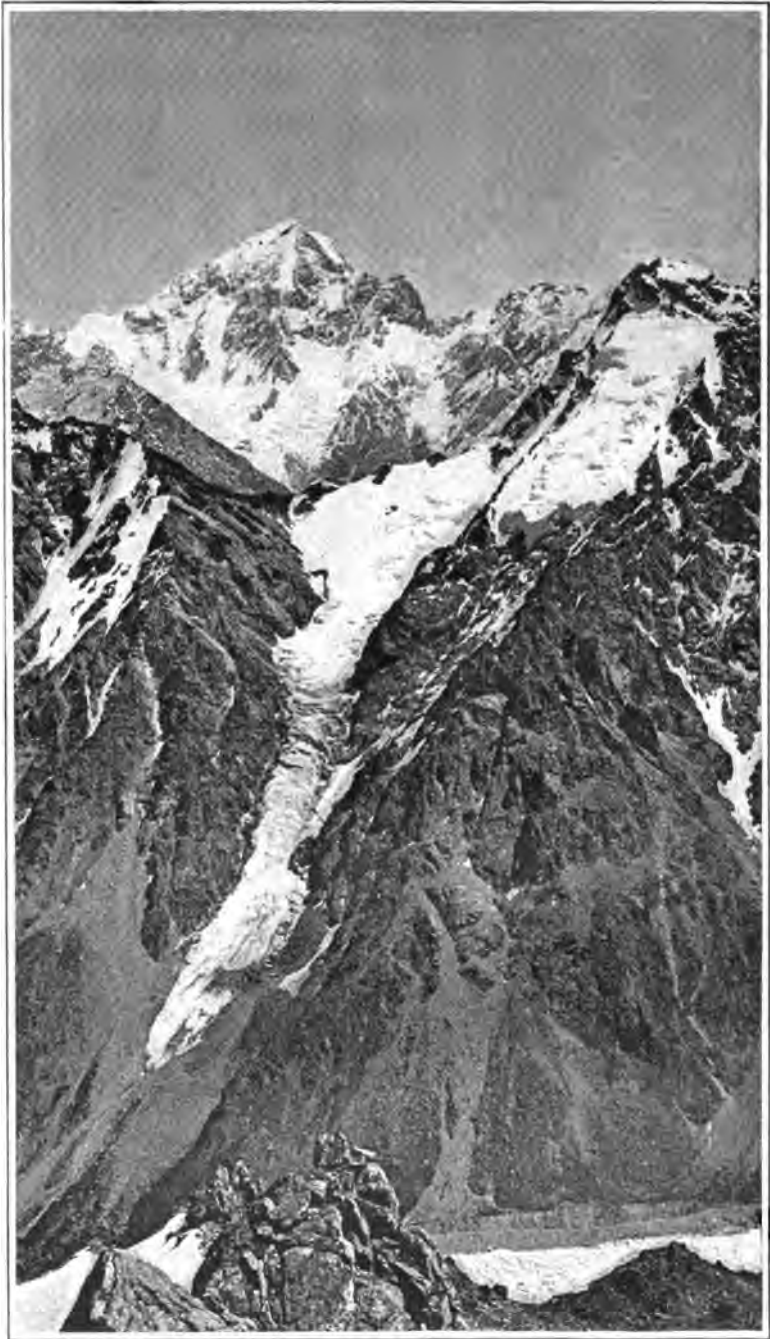
The mists and the valleys were below, we were above in an unsullied world of blue and white. But what we had come to see still remained hidden. We were almost at the junction of the upper glaciers, but we could not yet look into the upper basin of the Kundium Mishirgi. I had no doubt what to do next. Looking at the time at our disposal, we should obviously see most by pushing up between the tracks of the avalanches that fall from the cliffs of Koshtantau. As we hurried up the steep banks of riven snow, first a great crag and a broken crest, then the peak of Dychtau, and its long northern ridge came into view. One of the illustrations shows the general features of this side of the peak. It is a precipitous broad rockpeak, such as the Weisshorn from Zinal, but on a much larger scale. Its northern ridge looks, and I do not doubt that it is, practicable. The problem is, the proper access to it. This is apparently either by forcing the rocktower close to the Mishirgi Pass that guards the lower end of the ridge, as was proposed by Fox, or by cutting or treading steps up the snowslope from the Kundium Mishirgi, and striking the ridge where it grows steep. The first may, or may not, be possible—Fox thought it was; the second, if the snow is found in fair condition, would certainly be practicable, and might prove easy. It might also in different conditions, like most Caucasian slopes, be dangerous, but this would be an exceptional state. Our friends' guides seem to have taken a middle course, and wasted time on the smooth rocks on the left of the snow slope. Anyhow, however, they were too late in the day to have succeeded.

The relics we had brought down from the bivouac were sufficient to satisfy all men of the results of the search. Henceforth, on our arrival in any mountain village the following scene was repeated. The chief received us at the guest-house, and, the customary compliments paid, inquired as to the results of our journey. What we had done was shortly explained in Russian by Captain Powell to the chief, then the village was summoned and the story repeated more at length, and at the proper moment the articles found, the bags and revolver, shown. This exhibition invariably drew forth a deep exclamation of sympathetic interest from the assembly, who followed the tale, as translated to them in Turkish by their chief, with the closest attention. At the end a more or less formal, but evidently heart-felt, speech would be made to us to this effect :—

“We are deeply grieved by the loss of your countrymen, whom we knew and loved as brave men. We were also grieved that they should have been lost in our country, and that thus a most unjust suspicion should have been cast on our good name. You have never believed, you tell us, in this charge made against us, and you have come from far to remove the suspicion and its consequences from us, and we thank you from the bottom of our hearts. No one but Englishmen could have gone where Donkin and Fox perished, and where you have been. We know

N. ridge.

W. ridge.



Beziagi Gl.

V. SELLA PHOT.

DYCHTAU from the SALUINAN CHIRAN

Seen over the gap N. of Koshtantau.

and admire English energy, and every Englishman will be welcome among our people. Your friends will always be doubly welcome," and then the speaker concluded in the traditional forms of Oriental courtesy, "We are brothers, and all we have is at your disposal."

There can be no doubt that a heavy burden of suspicion was taken off the shoulders of the Turkish mountaineers who live between Elbruz and Ossetia by our discovery. They are, as far as I know them, a race with many good qualities, though it must be admitted that they have some unamiable traits, which are the first to strike a stranger. They are hard dealers in business matters, and great arguers with—so long as they are at home—no sense of time. But once on the road they improve wonderfully; they walk splendidly, wherever a man in leather sandals stuffed with hay can walk; they have a great respect for feats of activity, and soon make friends with English mountaineers. Their traditions are hospitable, and their goodwill once won is long retained. A little boy of 14 will do the honours of his Kosh, bring out milk and cream in lordly bowls, and decline payment afterwards with a grace rare, to say the least, in the Alps. One of my old Elbruz porters of twenty-one years before almost fell on my neck last summer as I entered Urusbieh, enquiring at once, and most warmly, after my old companions as "that good man Moore," and "the little Gospodin who was such a fine walker" (C. C. Tucker). I trust that we may never hear of this race, so well suited to the highlands they inhabit, being driven, through misunderstanding with local officials on minor questions of administration, to seek another home outside Russia. They are not disaffected to their rulers, and their departure could be brought about only through deplorable mismanagement on the part of subordinates. It will be a serious blow to Russian interests in the Caucasus, and even throughout Asia, should it appear that her administration has lost the art of making its yoke easy and its service attractive to Mahomedans who have never raised a finger against it.

In conclusion, I must acknowledge our obligations to the Russian Ambassador in London, to General Dondukoff Korsakoff, and to the officials at Vladikavkaz, for such assistance as was rendered to us in carrying out the chief object of our journey. Very special thanks are due to Messrs. Jukoff and Bogdanoff, of the Caucasian Survey, who received us in their mountain camps as if we had been old friends. Moreover, acting under the liberal instructions of their chief, General Shdanoff, they at the time and since have spared no pains to place at our disposal any topographical information which they thought might be useful to us, or to the Geographical Society. It has been almost entirely through the labours of these surveyors, that the diagram of the central group shown when this paper was read (a portion of which is reproduced) was constructed. With the help of Mr. H. Woolley's photographs and bearings, I have added some details in the higher

névés, particularly round Dychtau and Shkara, where they lie in positions often inaccessible, and even invisible, to any but trained mountaineers. No wilder piece of country, perhaps, on the face of the globe has ever been mapped. The Russian surveyors have done excellent work, which may, I trust, not be without influence as an example to our own in Sikkim and elsewhere.

M. Jukoff has also been kind enough to send me a beautifully executed MS. map of the north side of the chain (5 versts to the inch) from the Stule-vsek to Elbruz, based on the new survey, and in particular on M. Goloviesky's admirable survey of the glaciers of Elbruz, with copies of which I have also been favoured. With this material I hope before long to produce further maps with topographical notes. Everyone, who, knowing something of mountain cartography, inspects the productions of the Caucasian Survey, cannot fail to be struck by the rapid and progressive advance in accuracy and graphic delineation shown in its recent work, as well as by the promptitude with which the officers have adopted the methods of the mountain surveys of Western Europe. Thus in the last sheets sent me, even the positions of the "moulins" in the great glaciers are shown. The hypsometry of the chain is also being worked out in great detail. The following are among the most recent determinations for the summits above 15,000 feet:—Koshtantau, 17,053; Shkara, 17,036; Dychtau, 16,880; Janga, 16,660; Mishirgi Tau, 16,408; Katuintau, 16,297; Gestola, 15,947; Ulluauz Bashi, 15,351; Malatau, 14,952; Tiktingen, 15,134.

Under 15,000 feet the following peaks may be added:—Koruldash (or Ailama), 14,854; Saluinan Bashi, 14,700; Ukiu, 14,266.

For the two peaks of Ushba the heights of 15,409 and 15,405 feet respectively have been obtained, the southern summit being credited with an advantage of four feet, which the next snowstorm may rob it of.*

Before the question of precedence as between Koshtantau and Shkara can be considered finally determined, it is, I think, essential that fresh observations should be made from the south side. Mr. Cockin, who climbed both peaks, and took a careful observation from Shkara with a level, found that peak to be the higher. It must be remembered that in not a few cases in the Alps, the first surveyor's measurements of the heights have been largely modified in a direction pointed out by climbers. It is not easy for an observer close to the base of a peak to make certain that he measures the true summit of a long comb such as Shkara.

For the illustrations I am indebted to Signor V. Sella, of whose photographic work I have spoken elsewhere, and to my companion Mr. Hermann Woolley, to whom Mr. Clinton Dent and I, in common with all the friends of the lost climbers, are under obligations more numerous and deep than we can easily express, or he would care to have recorded.

* M. Jukoff, however, sends 15,609 feet as the height of Ushba, which seems more probable. I shall doubtless soon hear whether the 4 or 6 is an error.

Mr. Woolley has read to the Alpine Club a full account of his successful ascent of Dychtau, a feat of perseverance and endurance accomplished under great difficulties, ten days after the conclusion of the search. But he has not yet given to the public, except in the map in this number, the results of his thorough exploration of the Dychsu and Khrumkoll glaciers, or of his ascent of the beautiful peak of Koruldash, situated east of Shkara in the main chain. His excellent photographs, as well as the whole collection of Signor V. Sella, have been presented to the Society, and may at any time be inspected in the map-room by those who wish to improve their acquaintance with the noble scenery and interesting people of the Central Caucasus.

In the preceding pages it has not been my object to enter into questions of topography, except in so far as they might help to illustrate the particular story I had to tell. Geography has its human element. It would lose much if the records of Search Expeditions were removed from its shelves. But in its humble way, our journey last year was in many directions far from barren of geographical results. Some of these I have indicated already in the 'Proceedings': others may be better set in order elsewhere. I have already occupied enough space here for the present.

But a reader asks—and other readers may repeat the question—"Can you draw no lesson for explorers of strange mountains from so sad a loss?" It is very far from my wish to moralise. Yet, in view of the fact that mountain travel is yearly growing more popular among English races in distant parts of the world, in New Zealand, and on the Pacific Coast—and also of the certainty that the high snows of the Himalaya cannot much longer escape adequate exploration—it may be my duty to give what answer I can here to a natural enquiry. I shall base my answer, however, rather on my recent experience as a whole than on the late catastrophe.

The first advice I would give to all who adventure among the peaks, passes, and glaciers of unexplored ranges is—Carefully reconnoitre your mountains from a distant and, if possible, a high station before attempting any doubtful expedition. The oldest mountaineers, and, still more, the best Alpine guides are liable to be misled by the aspect of a mountain seen from its own spurs. From such a stand-point neither the scale of the whole nor the relative proportion of the parts can be properly appreciated, rockfaces are fore-shortened, the angle of slopes is diminished, weak places suitable for attack lie concealed, while a wrong line of ascent may easily be entered on because some difficulty of the moment is avoided by adopting it.

If Alpine guides are of the party, the traveller who employs them, while profiting to the full by their almost indispensable technical skill and endurance, must see that they make proper allowance for an altered scale and changed circumstances, and do not assume too readily that snow

mountains all the world over can be safely climbed on the same terms as the peaks of Zermatt and Grindelwald in their present tamed and chained condition.

For instance, in the Caucasus, where the difficulties if not greater are more frequent, for ascents of peaks approaching 17,000 feet, very early starts are essential; there are certain rockfaces (friable schists) which must not be ventured on after the sun has loosened their batteries; it may be foolhardy, though easy at the moment, to climb a snowslope which the sun, or an afternoon shower, may render impossible of descent a few hours later. I desire to insist particularly on this last point—the far more uncertain, and therefore more treacherous, nature of Caucasian snow, in certain seasons at least. In certain seasons, I say; for much that was snow in the Caucasus in 1887 was ice, or snow on ice, in 1889.

It is desirable also that the guides selected to take part in distant expeditions should be men who have had experience in parts of the Alps far from their own homes, where the mountains have been new to them, and the facilities less than those now generally found near Alpine centres. A "first-class" guide, who has never been beyond the Bernese Oberland, is likely to prove pitifully helpless as a traveller.

Above all, I would advise explorers not to attempt difficult glacier expeditions without previous training under men who have learnt the art of mountaineering, and can read from long experience the signs of the mountains.* On the other hand the reports of natives as to what is impossible and dangerous, or to where previous explorers have been or have not been, above the snow-level, are to be received with the utmost caution, and as a rule are best altogether disregarded. Those who accept them run great risk of being misled, and of lowering their own credit to the level of their credulity. Thus Mr. Cockin's ascent of the north peak of Ushba meets with no belief whatever in the Caucasus; and some Russian who claims to have climbed Kasbek last year, the first of his nation to do so, has had the courage to describe his ascent to the Geographical Society of Tiflis, not as the first Russian, but as the first *authentic* ascent of the mountain!

* A "Whymper" tent of Willesden (waterproof) canvas, seven feet square, a "Tuckett" sleeping bag, and "self-cooking soup tins" are aids to exploration of the value of which I can speak from repeated experience. We used the 'Kola Biscuits' made at Marseilles, which have been referred to recently in the newspapers, and found them serviceable. A sufficient store of snow spectacles and boot nails is essential. The former are much appreciated as presents. See Silver's Catalogue for further details.

GEOGRAPHICAL NOTES.

The Stanley Medal of the Royal Geographical Society.—Having regard to the fact that Mr. Stanley had already received one of the Royal Medals of the Society, the Council determined that the most suitable manner of putting on record their sense of the skill and energy shown in his last journey across Africa, and of the importance of the geographical results obtained in the linking of the old Equatorial Province of Egypt and the territories of the Congo State, the discovery of a new source of the Nile, the restoration to their true place in maps of the legendary snow-capped Mountains of the Moon, and the enlargement of the Victoria Nyanza by a new bay, would be to strike a special medal for Mr. Stanley and his European officers. Acting on the advice of the officials of the Medal Department of the British Museum, the designing of the medal was entrusted to Miss E. Hallé, whose medals of Herr Joachim and Cardinal Newman are well known. As a reproduction of the two sides of the medal is placed as a frontispiece to the present number, it is needless to describe at length its character. The head of Mr. Stanley has been modelled from Prof. Herkomer's portrait and numerous photographs taken before his departure. The design on the obverse shows a female figure, the Africa of classical tradition, wearing on her head a helmet in the design of an elephant's head, and pouring from urns the two great rivers Mr. Stanley has done so much to throw light on. A lake, a great mountain, and a tropical forest form an appropriate background. The gold of the medal to be presented to Mr. Stanley has been supplied to the Council by Mr. Pritchard Morgan, M.P., who has liberally presented it from his Welsh mines. Bronze copies of the medal will be presented to each of the European officers connected with the expedition. For Mr. Stanley's coloured followers a silver star has been designed, which will bear in the centre the monogram of the R.G.S., and the words, "Emin Relief Expedition 1887-89."—We have received from Mr. H. A. Grueber, of the Department of Coins and Medals of the British Museum, the following letter on the subject of the medal:—"British Museum, 19th April, 1890. I have much pleasure in giving you my opinion of Miss Hallé's medal of Stanley. I consider it one of the best medals of modern times. The head on the obverse is well and carefully modelled, the amount of relief being exactly suitable for a medal of such a diameter. The reverse is also admirably designed, and the subject most suitable. The figure of Africa is well placed, and the whole scene of the lake, with the forest and mountain beyond, whilst giving one a picture, yet is not too pictorial. Each part of the scene is carefully delineated, and yet not at all crowded. This opinion I have formed of Miss Hallé's medal is shared by all my colleagues here.—H. A. GRUEBER."

The Royal Medals and other Awards of the year 1890.—The annual awards were decided at the Council meeting of April 14th, as follows:—The Royal Medals for the encouragement of geographical science and discovery were unanimously voted—the VICTORIA MEDAL to EMIN PASHA, in recognition of the great services rendered by him to geography and the allied sciences, by his explorations and researches in the countries bordering the Upper Nile, during his twelve years' administration of the Equatorial Province of Egypt; the FOUNDER'S MEDAL to Lieut. F. E. YOUNGHUSBAND, for his journey across Central Asia in 1886–87 from Manchuria and Peking, viâ Hami and Kashgar, and over the Mustagh to Kashmir and India. The minor awards were decided as follows:—The MURCHISON GRANT to Signor VITTORIO SELLA, in consideration of his recent journey in the Caucasus and the advance made in our knowledge of the physical characteristics and the topography of the chain by his series of panoramic photographs; the CUTHBERT PEEK GRANT to Mr. E. C. HORE, for his observations on the physical geography of Lake Tanganyika, made during his many years' residence; and the GILL MEMORIAL to Mr. C. M. WOODFORD, for his three expeditions to the Solomon Islands and the important additions made by him to our topographical knowledge and the natural history of the islands. The three Honorary Corresponding Members chosen were:—Prof. Davidson, San Francisco, California; Dr. Junker, Leipzig; and Senhor J. B. Santa Anna Nery, Rio Janeiro.

Emin Pasha.—The award of the Royal Medal was telegraphed to Emin Pasha at Zanzibar, March 27th, in these words: "Royal Medal awarded to you; come and receive it at Annual Meeting, June 16th." To which he replied on the 17th April, "Humblest thanks for never expected honour. Reward for future, not for past work. If able shall come. Letter follows.—EMIN."

The Navigability of the Lomami Tributary of the Congo.—The Governor-General of the Congo State, M. Janssen, in the course of a journey of inspection made in November last, ascended the northern Lomami (Grenfell's Boloko) up to 4° 27' S. lat., the limit of navigation, thus apparently reaching a higher point than M. Delcommune. This voyage shows that a good waterway exists up to the latitude of Nyangwe, and that this great trade centre can be reached much more easily and quickly from the Lomami than from Stanley Falls. A station was established by the Governor at Bana Kamba, under 4° lat., whence a connection with Lieutenant Le Marinel's station on the Sankuru is to be made.

The Opening-up of the Cameroons District.—Lieutenant Morgen, the successor of Captain Kund, unfortunately incapacitated by illness, in the leadership of the German expedition into the interior of the Cameroons region, has been successful in opening up the direct route from the Jeundo station to the coast along the Sannaga river, thus removing the obstacle to trade with the interior. Captain Kund had taken this same

route in 1888, but was unable, owing to the smallness of his party, to overcome the resistance of the Bakokos. Within a period of two months Lieutenant Morgen has marched from the Batanga coast to the Jeundo station, and from there to the Cameroons.

Ascent of Clarence Peak, Fernando Po.—Our Associate, Lieutenant Rogozinski, the explorer of the Cameroons, sends us an account of an ascent he made with his wife (the Polish novelist, Hajota), in January last, of Clarence Peak, on the island of Fernando Po. He was provided, in addition to his own surveying instruments, with a mercurial barometer by the kindness of the Spanish governor, and had an opportunity of comparing it for several days before the ascent with other barometers on board a Spanish cruiser and the British men-of-war *Peacock* and *Maggie*, which happened to be then in the harbour. He started, with fourteen Krubos as carriers, on the 8th January from Bao, on the eastern side of the island, accompanied by two native guides. A hard climb brought him on 13th January to the open grounds of the peak region, where his guides deserted him. In this part of the mountain the paths and views were obscured by dense mist, through which the party made its way with difficulty. They nevertheless reached the summit on the next day, January 14th. The bottle, with enclosed note in Spanish, left by a previous climber, Julian Pellou, dated April 3rd, 1860, was found on the peak. Observations for fixing the altitude were made by Lieutenant Rogozinski with all possible accuracy, and after admiring the view over the almost unexplored southern side of the island (the northern side being hidden by clouds), the party commenced their descent, making botanical collections the whole way; the mosses especially were found very numerous in species on the various parts of the peak, and the collection will be sent for determination to Dr. Rehman, of Lemberg, who has himself explored as a botanist the mountainous parts of South Africa. Numerous orchids were met with on the lower slopes of the peak. The Spanish authorities had not thought it possible that a lady could reach the top of the peak, and on the return of the party to Santa Isabel they received the party with great demonstrations.

Lupton Bey.—Mr. Malcolm Lupton sends us the following letter which he has received from Emin Pasha, in answer to his letter asking the late Governor of the Equatorial Province for any information he might have regarding the fate of his brother, Lupton Bey:—

“BAGAMOIO, *March 28, 1890.*

“DEAR SIR,—Your very kind note February 19th a.c. reached me yesterday, and I hasten to thank you for remembering me. Concerning news from your brother, my former assistant and always valued friend, I am sorry to say that, any communications between the Equatorial Provinces and Khartum having ceased for years, I was never able to learn satisfactorily what had become of him. Whilst a prisoner in Dufilé, in October 1888, I heard from a Khartum man

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that Frank, at that time, was alive, and in charge of the Mahdi's arsenal. Since then I never had news from him. To the last moment, and until he was forced to surrender by the treachery of his own men, he behaved most gallantly, and never would have given in but for his being left by his men. Never man did better service and worked harder than poor Frank, and I shall always remember with pleasure the days we passed together. I enclose, as a gift to you, the last three notes he sent me at a time when the Mahdi's people were around him. I am too old for hoping to meet him again, but I fondly hope he may be spared to return to the relatives he loved so well.—Believe me, dear sir, yours very faithfully, DR. EMIN."

Death of Mr. Alexander Mackay, the Pioneer Missionary of Victoria Nyanza.—News reached England last month of the death of this well-known explorer and pioneer of civilisation in Eastern Equatorial Africa, which event occurred in the beginning of February at Usambiro, south-west of Victoria Nyanza. Mr. Mackay was the son of the Rev. Dr. Mackay, the author of the 'Manual of Modern Geography' and other educational works, who is still living. He was one of the first to offer his services to the Church Missionary Society when that body resolved on sending a mission to Uganda, in consequence of Stanley's letter on the favourable attitude of King Mtesa in 1875. Mr. Mackay had received an excellent training in Berlin as a mechanical engineer, and was, besides, versed in several branches of physical science. He resided in Uganda from December 1878 to July 1887; occupied in the reduction of the language to writing, translating portions of the Scripture, constructing buildings, vessels for navigating the lake, and training the natives in various handicrafts. At length he was driven out by the hostility of the Arab traders, and has since lived at the mission stations south of the lake. He occasionally communicated short accounts of his explorations to the Society, and when Dr. Junker came down to the coast, in 1886, he sent by him several volumes of meteorological observations made for many successive years in Uganda, which are now in the hands of Mr. A. Buchan, of Edinburgh, for reduction and publication.

Exploration of the Mount St. Elias District, N.W. America.—Two expeditions are now on their way to Mount St. Elias, travelling by different routes. One is that of Lieut. Seton-Karr, who, two years ago, attempted the ascent of Mount St. Elias. On his present trip he will secure Skeena river Indians as guides, and ascend the Yukon, White, and Altschik rivers, and the east branch of Copper river to their sources. From the Yukon he will go to Chilcat, and then, if possible, to Dry Bay by a trail which is commonly believed to exist, but which no white man has ever yet followed. This trail the Lieutenant believes is known to the Indians, and will lead straight across Grand Plateau. The other expedition is called the "Frank Leslie's" party of newspaper men. They are to descend Copper river to its mouth, and then come south by the United States steamer *Pinta*. It is possible that this party and Seton-Karr may meet, but the latter will travel alone, save for his Indian guides.

Before returning, he will satisfy himself whether there are any mountains in the neighbourhood higher than Mount St. Elias. The Royal Geographical Society has supplied Mr. Seton-Karr with hypsometrical instruments; he expects to be absent four months.

A Journey in Central Peru.—In continuation of his travels in Peru and Bolivia, Dr. A. Hettner made in the autumn of last year a three months' journey, which took him through Abancay and into the valley of the Pachachaca, thence on to the desert tableland of Puna and the Western Cordilleras, and finally to the coast at Chala. On the return journey the traveller again visited the salt lake of Parinacocha, which is almost dried up, and then ascending, from Pauza, Mount Sarasara (16,500 feet), the most northerly of the isolated volcanoes of the Western Cordilleras, arrived eventually at Arequipa. From the latter point Dr. Hettner ascended Charchani (19,500 feet), the volcanic character of which he was able to determine.

Explorations in Patagonia.—Mr. A. P. Bell, a civil engineer, conducted in 1887, an expedition to the head-waters of the river Chuput. The immediate object in view was the discovery of a pass leading from the Upper Chuput to Chilian territory, through which to construct a railway in continuation of that already laid down by Mr. Bell from Puerto Mardryn to the Chuput. It was also intended to go over again some of the ground surveyed by Colonel Fontana in 1885–86, and attempt if possible to cross the watershed to the Pacific coast. Mr. Bell was accompanied by Mr. C. V. Burmeister, son of the well-known naturalist, Prof. H. Burmeister, of Buenos Ayres. Fontana's route was followed up to the point where the Chuput takes an east and west direction. The travellers then made their way to the sources of the river in a due westerly direction, whereas Fontana had taken the north-westerly route. In the vicinity they discovered a stream flowing west, which the Indians who accompanied them called the Carren-Leufu; it does not appear to be identical with the river Corcovado, which Fontana also found flowing west. Both these streams are un-navigable, in consequence of the rapids. The banks of the Carren-Leufu are covered with a dense undergrowth, and the travellers did not therefore attempt to follow the river. The return journey was made by the same route.—Subsequently (November 1887 to May 1888) Mr. Burmeister undertook another expedition. Starting from the Chuput, he followed first of all Moyano's route, keeping along the Rio Chico to the Lakes Colhue and Musters; and then wandered across to the western slopes of the Cordilleras, whence he reached the river Santa Cruz by way of the Rio Chico, but not by Moyano's route. Not far from the coast he arrived at Puerto Descado, and proceeded along the Descado, which is not a river, but only a narrow inlet. He eventually returned to Lake Colhue, and thence back to the Chuput.

A New Expedition to East Greenland.—It is announced that Lieutenant C. Ryder, who has taken such a prominent part in the exploration of West Greenland, contemplates an expedition to the east coast of Greenland, with the view of exploring the still unknown stretch of coast lying between 66° N., the furthest point reached by Captain Holm, and 73° N., the terminating point of the surveys of the second German Polar Expedition (1869–70). The expedition, which will consist of nine persons with three boats, is expected to last two years.

REPORT OF THE EVENING MEETINGS, SESSION 1889–90.

Eighth Meeting, 24th March, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.O.S.I. &c. President, in the Chair.

ELECTIONS.—*Capt. Thomas Henry Butterworth* (Indian Marine); *Walter D. Coggeshall, Esq., C.E.*; *G. M. Edwardes Jones, Esq.*; *Right Hon. Lord Kinnaird*; *William Henry Mau, Esq.*; *Belgrave Ninnis, Esq., M.D.*; *William D. Pitcairn, Esq.*; *Major N. Powlett, R.A.*

An address was delivered on:—

North American Trans-Continental Pathways; Old and New; by Mr. Augustus Allen Hayes, of New York.

The author began by saying that the subject of his address lay mainly within the present boundaries of the United States; a sufficiently great domain, stretching, as it does, almost from what Lord Dufferin calls “the regions lying under Arcturus and lit by the rays of the Aurora” to the coral reefs of Florida and the tropical valley of the Rio Grande del Norte; and from one mighty ocean to another. Although new politically, this region is quite the reverse ethnologically. Relics are being daily found of mighty races who dwelt in the land in prehistoric days; relics of lost peoples, religions, customs, and arts, picturesque and imposing architecture. He would not, however, go back to prehistoric days, but only to a period of antiquity great for the United States, viz. the end of the fifteenth century. About a hundred years before the *Mayflower*, there were Christian gentlemen and soldiers traversing the desert wilds of the Western Continent. His own travels and studies had given him a profound admiration for these splendid pioneers, who went out into the arid wilderness, carrying the Cross in one hand and the sword in the other. His would be indeed a narrow soul who would deny them the possession of calm courage, phenomenal persistence, and superb self-devotion; and it was they who marked—or, to use the frontiersman’s expression “blazed out”—our first Trans-Continental pathways. In 1529, only thirty-five years after Columbus, a gallant and adventurous Spanish admiral, named Panphilo de Narvaez, effected a landing on the coast of what is now the State of Florida; in search, perhaps, of the mythical treasures of which reports were continually brought to the Spaniards; or of that fountain of youth which was to be connected, for centuries to come, with the name of Ponce de Leon. With him, individually, we have nought to do; but in that hall, where welcome and appreciation have been accorded to many a brave and distinguished traveller and explorer, it was particularly fitting that mention should be made of one of his officers, a knightly soul named Alvar Nufiez Cabeza de Vaca, who has slept for nearly three and a-half centuries in an unknown grave, but who was the

ne plus ultra of a pioneer, and the first man who crossed what is now the United States. He and three others (Andres Dorantes, Alphonso del Castillo Maldonado, and an Arabian negro named Estevanico or Stephen) were the only survivors of a detachment cut off from the main body; and after long imprisonment among the Indians, and sufferings protracted for something like eight years, they made their appearance at Culiacan, the capital of Sinaloa, one of the Pacific divisions of old Mexico. I point out the route laid down by the best authorities. What must have been the hardships of this extraordinary journey we cannot conceive; but he might mention that, within a few years, and in these modern days of progress, a detachment of United States troops, tried and seasoned Indian fighters, with experienced officers and their complement of skilful scouts, were very near perishing, to a man, of thirst, while traversing only a portion of what is believed by some able students to have been Cabeza de Vaca's route, near the valleys of the Canadian and Cimarron rivers. One Mendoza, the viceroy, was glad to welcome these wayfarers and listen to their tales. He had been hearing, for some time, of the wonderful "seven cities of Cibola" lying away to the north of Sinaloa, and the journey of the four pathfinders bore fruit in the organisation, in 1540, of his celebrated expedition to find these Seven Cities, resulting in the marvellous journey of our second pathfinder, Vasquez de Coronado, to the kingdom of Quivira. In 1542 he reached 40° N. lat., in a region the soil and productions of which he described.

Whither did Coronado go? and Where was Quivira? There has been as bitter wrangling in America over these questions as is customary in such matters in other parts of the world. The best authority regarding them was the late General Simpson, of the United States Army, a very able and accomplished officer of Engineers, who had served in the regions in question, and was well equipped for investigation. He published, in the journal of our Smithsonian Institution, a monograph and map, describing Coronado's journey, and both were promptly and fiercely attacked. He (the lecturer) took a great interest in the matter: and it seemed to him that General Simpson's position was unassailable. He pointed out his track and the situation of the Seven Cities, now believed to be identical with seven villages of that curious race, the Zuni Indians. He plotted his skeleton map on a modern Railway and County one, and this made Coronado cross the line between the present States of Kansas and Nebraska at a certain point. He learned, only a few years ago, with keen satisfaction, that a farmer—a pioneer husbandman, cutting with his sharp ploughshare a deep furrow in virgin soil, close to the point just mentioned, brought up *two of Coronado's Moorish bronze stirrups*, curved for the moccasins of the Spanish horse-men and incrustated with the rust of centuries. This discovery attracted but little attention; and a paper which he, Mr. Hayes, published on the subject had very few readers. Nevertheless, it is of the utmost importance from a geographical and historical point of view: for it proves conclusively that, nearly 80 years before the landing of the Pilgrims, and about two and a half centuries before their descendants had pushed their settlements westward to the banks of the great Missouri, Coronado was on or near them.

After the days of this brave Spaniard we have a long stride to make.

Coronado was close to the Missouri in 1542: and the exhaustive United States Government Report on Pacific Railroad Surveys gives 1806—nearly two centuries and three-quarters later—as the date when the first white man, coming from the east, took his way westward therefrom. It had seemed to him so strange, so incomprehensible almost, that no American or European should have traversed these regions in all those long years, that he had devoted such time as he could spare in the last decade, to the attempt to arrive at some certainty in the matter. He had been on the ground himself several times and traversed much of it. He had read

everything regarding it, in English, French, and Spanish, on which he could lay his hands. He had corresponded with experts, advertised, and, in fact, exhausted every resource at his command; he had followed "trails" or "traces," as they call them in the west, which seemed most promising and then suddenly ended. He started with hope and enthusiasm, and he had learned wisdom by experience, for the results of his labours in the particular direction have been so insignificant that his only excuse for making them public must be the hope that some one, better equipped and with more time at his command, may be impelled to take up the subject, and succeed better than he had done.

Some time, probably, about the latter part of the sixteenth century, the Spaniards founded, in what is now New Mexico, a small town with a very large and sonorous name: La Villa Real de Santa Fé de San Francisco. He said "founded:" but it is rather "Europeanised;" for Santa Fé probably had a prehistoric past: and there seems to be nothing in its situation to justify its original selection by the Spaniards. It was, by the way, the last stronghold of old days on the border and, before the days of the railroad, a very quaint, curious, and interesting place indeed. From it, expeditions were undoubtedly sent northward; but little can be ascertained with certainty about them. He had read, for instance, an elaborate account of the rediscovery of Quivira by one Don Diego de Peñalosa; and then a book by a modern Spanish writer, in which this whole narrative is declared to be pure fiction. Then those oftentimes admirable explorers, the missionaries, appear on the scene: having made several long journeys, and not only reached Salt Lake in the eighteenth century, but probably found their way to the Pacific Coast through what is now Arizona: for it was after the middle of that century that the romantic and pathetic story of the founding of missions on the Californian shore begins.

When in Santa Fé, years ago, he learned from an old interpreter that he had himself seen, in the ancient Spanish palace, a memorandum of two "trails"; one leading to California, and the other to Kaskaskia—a little French settlement on the Mississippi, in what is now Illinois. In the effort to discover this latter route, he (Mr. Hayes) took much trouble and spent a great deal of time; he enlisted the aid of the Governor of New Mexico, but he could not find the memorandum. Next, he brought to bear the tremendous pressure of a great railway; all in vain—in fact, at that juncture he learned that a previous governor, angry because the Legislature would not give him an appropriation for a building in which to store the records, made a bonfire of them all behind the palace. Then he appealed to his friend Mr. E. G. Mason, of Chicago, who has spared the time from the practice of an arduous profession, for the most interesting and valuable researches in the west, and who had caused the whole of the parish records of Kaskaskia, from 1688, to be transcribed. Here, again, was there no mention of priests, trails, or Santa Fé. Then he learned that a Mr. Morrison, a merchant of Kaskaskia, had, about 1800, sent a Canadian half-breed *voyageur* or *coureur du bois*, to Santa Fé with a consignment of merchandise. Of course, nothing could seem more likely than that Morrison should have heard of the Spanish mart from some Jesuit or Franciscan father, who had taken up the pilgrim's staff and crossed the arid plains. He was a long time in learning the truth about this affair, i.e. that no one in Kaskaskia knew anything of pilgrims or the like; that the merchant was in the habit of sending his *voyageurs* among the Indians to trade, and that one of them named Lalande managed to reach Santa Fé in 1804. He sold his goods and received the money, but he never returned to his employer. He appropriated the whole of the proceeds and lived in Santa Fé to the end of his days, highly respected, and called *rico*, or rich, by his new neighbours.

Thus, after all, he (Mr. Hayes) was obliged to conclude that the story of the

memorandum was a romance, that there was no trail to Kaskaskia at all, that he could curtail the long gap after Coronado by but two years. Lieutenant Pike, of the United States Army, who was sent in 1806 to explore the great West, followed, with his party, the course of the Arkansas river to the mountains, and was arrested by the Spaniards as an alleged trespasser on their soil, and conducted to Santa Fé. His pleasant story, known as "Pike's Account," was published in England, can be found in most large libraries, and is well worth reading.

Coming within the range of authentic history, he would refer to just one episode in the forty years after 1806, the opening of the great "Santa Fé Trail." Six years after Lieutenant Pike returned, four men attempted to reach New Spain, and were kept prisoners for nearly nine years; but, in 1822, there was opened a road from the Missouri, 800 miles long, rising so imperceptibly as to seem dead level, and without a bridge from end to end. Over it went the great trade to Santa Fé for fifty years. This wonderful road followed, in a general way, the valley of the Arkansas to its junction with the Timpas, then turned to the south, reached the valley of the Purgatoire, crossed the Raton Mountains and reached Santa Fé by the Mora valley to Las Vegas, and then a tortuous and trying route over hills and through cañons. Then came the war with Mexico, and the treaty which gave California, New Mexico, and Arizona to the United States; later, the discovery of gold on the Pacific coast. Then, indeed did transcontinental travellers become legion, and route after route was tried. Then, again, came the days of the pony express and the overland stages, and at last came the marvellous achievement of the first trans-continental railway.*

After the lecture,

Dr. RAE expressed the pleasure with which he had listened to the instructive, interesting, and amusing address given by Mr. Hayes. He had not himself travelled across the United States, but he had crossed the continent farther north, through British North America, to Vancouver's Island. He made that journey in 1864, not along the line that the Pacific Railway had since taken, but a route previously surveyed by Mr. Fleming. Of course it was rather an arduous journey, and he descended the Fraser river with very great difficulty. The Indian guides refused to proceed, but at last a smart young servant offered his services, the Indians lent their canoes, and he ran down the river. The rapids were very difficult and dangerous, but he managed to get through. One small matter had been omitted from the paper. The name of Sir Alexander Mackenzie had not been mentioned, though he traversed the whole of British North American territory. Before doing so, he went to England to study astronomy, so that he might be able to take observations. He went up the Peace river and down the Fraser, and made a very good geographical survey. That was prior to the journey of Lewis across the Continent in 1804-6.

The PRESIDENT, in conclusion, said he was sure the meeting would instruct him to thank Mr. Hayes for the very agreeable entertainment he had afforded them.

ANNOUNCEMENT OF THE STANLEY MEETING.

It was announced by the President that May 5th had been definitely fixed for the meeting at which Mr. Stanley is to deliver an address on the Geographical Results of the Emin Relief Expedition, and there was every reason to hope that the Prince of Wales and the Duke of Edinburgh would also be present.

* The above is an abridged report of Mr. Hayes' eloquent lecture.

Ninth Meeting, 14th April, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.C.S.I. &c. President, in the Chair.

PRESENTATION.—*Lieut. F. E. Haigh, R.N.*

ELECTIONS.—*Rev. W. J. Canton; Harry Bramble Francis, Esq.; Geo. Murray Gunn, Esq.; Lieut.-Colonel Reginald Hennell (Late Bombay Army); Alfred Henry, Esq.; Commander George Hodgkinson (Late R.N.); Emalie John Horniman, Esq.; Joseph Dallin Paul, Esq., R.N.; Chevr. Max de Proskowetz; John Thompson, Esq.; Fred. D'Abernon Vincent, Esq.; C. J. E. Welby, Esq.; Lieut. B. Whitehouse, R.N.*

The paper read was:—

Journey to the summit of Kilimanjaro. By Dr. Hans Meyer. Will be published in a subsequent number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—February 7th, 1890. The COMTE DE BIZEMONT in the Chair.—M. Venukoff communicated some news regarding Russian explorers and geographical work. A young Russian traveller, son of General Strelbitzky had just returned from a journey into the eastern part of Khorassan and Seistan, in the course of which he had discovered a salt lake to the south of Haf, in a region hitherto represented on our maps as only a desert. In the town of Haf he reports an increase in the number of Hindoos, who are gradually accumulating all the wealth of the place.—At the commencement of January, the Congress of Russian naturalists and geographers was held at St. Petersburg. General Tillo exhibited his hygrometrical maps of Russia, comparing them with those of Switzerland, France, Austria, &c. Professor Klossovsky read an able paper upon the fluctuations in the level of the Black Sea and on the temperature of its waters. M. Istomine presented a report upon the results of his ethnographical researches in the region of the Petchora. M. Aggheenko read a paper on the botanical geography of the Crimea, and M. Khakhanoff discoursed upon the ancient limits of the distribution of the Georgians in Asia Minor. M. Venukoff also communicated a letter from M. Paul Venukoff, giving an account of his explorations in the Mugodjars Mountains in 1889. The party quitted Orenburg on 20th May, and proceeded up the valley of the Ilek to Ak-Tube, where final preparations for the journey were made. Leaving Ak-Tube, they followed the broad, verdant valley for some distance, and then crossing the river, struck across into the interior of the steppes. The steppes at this season of the year present a magnificent picture, being covered with luxuriant herbage; in some places this is of quite a bluish tinge, owing to the growth of absinthe, in others the tall clumps of feather-grass give the appearance of undulations of the soil. There is a gradual rise of the ground up to the Mugodjars Mountains. The chain runs from north to south between the 48° and 49° 30' N. Lat., and is from seven to ten miles in breadth, being divided into several groups of summits. The highest peak is Mount Airuk (1890 feet). The valleys between the hills are most picturesque, abounding with vegetation, herbaceous rather than arborescent; here are found the "zimovki" or winter huts of the Kirghizes. The central part of the Mugodjars is formed of diorites, diabases, and proterobases. The highest summits are thus composed, with a mixture of porphyrite, variolites, gabbro, &c. The quartz porphyries,

syenites, and granite do not appear in many places; the outer spurs of the hills contain schist, Devonian calcareous tufa, and occasionally conglomerates. In the southern part of the Mugodjars the structure is less complicated; the central chain is composed of various greenstones, and the spurs contain strata of silica and tufa. M. Venukoff is of opinion that the ancient granites and syenites have been first of all swept away, and perhaps also in part upheaved by the quartziferous porphyries; then probably, during the carboniferous period, these rocks were penetrated afresh by the greenstones, diorites, diabases, porphyrites, &c. No horizontal arrangement of the schists and of the strata of Devonian limestone has been displaced. The variety of tufa in the mountain spurs testifies to great erosions; but the upheaval of the mountains, which probably took place after the Devonian period, evidently continued up to the end of the chalk period. In any case, whether judged by their "tectonique" or by the rocks composing them, the Mugodjars are undoubtedly a continuation of the Urals, although there is no immediate connection between the two systems.—The Society received news to the effect that Mr. J. Martin, who started last spring from Kansu, had quitted Pekin *en route* for Lan-chow, whence he would proceed to Kansu. He had received much assistance from M. Koumani, the Russian Ambassador at Pekin, who had furnished him with a Cossack for an escort.—A letter was read from General Poizat, commanding the Algiers division, giving, as requested by the Society, the latest news which had been obtained by him as to the fate of M. Camille Douls, who was assassinated in the Sahara in 1888. Information had been collected by officers under General Poizat's command, and others, showing that the unfortunate traveller, who had assumed the name of El Hadj Abdelmalek, was probably strangled by the Dermehaga Arabs at a place between Aulef and Akabli.—M. R. du Caillaud communicated a *résumé* of a letter from Père Magalli, giving an account of an excursion made by him in 1887, from Riobamba (Ecuador) to Canelos, by a new route. The journey from Riobamba to Macas occupied ten days. The latter village numbers from 300 to 400 inhabitants, and is situated on the border of the forest inhabited by the Zivaros. After a month's stay at Macas, M. Magalli started on the 4th December, with another missionary, across the virgin forest, through which, in many places, a path had to be hewn. Two Indian chiefs acted as guides for some days, but eventually deserted the travellers. After considerable difficulty they arrived at Canelos on the 23rd December.—M. Grandidier, of the Institute, wrote to the effect that the Academy of Sciences had awarded the "Gay Prize" to M. E. Drake del Castillo, for his memoir on the flora of the islands of Polynesia and the neighbouring countries. The author shows that the Polynesian plants found on the coast and lowlands are nearly all Indo-Malayan or cosmopolitan, rarely American or Australian, and that they have been brought thither either by ocean or air currents, or by birds or man, while the plants flourishing in the high valleys and mountains are, on the contrary, "special" in their character. Among the 1224 species peculiar to the Polynesian flora, which the traveller mentions, 32 per cent. are of Asiatic type, 2 or 3 per cent. only of Australian and New Zealand type, 18 per cent. of American, and 47 of the cosmopolitan type. The author's conclusions are adverse to the hypothesis of the existence at a remote geological epoch of a vast continent occupying a large part of the Pacific Ocean, and, inasmuch as the affinities between the species peculiar to the different archipelagoes and those of the neighbouring mainlands increase in direct ratio to the proximity of those archipelagoes to those lands, he believes that natural agents have transported a first vegetation to these islands, which has then given place to a new flora.—M. Venukoff, in presenting to the Society, in the name of its author, the hypsometrical map of Russia in Europe, recently published by General Tillo, stated that this map (scale 1:2,520,000) contained the results of

all the hypsometrical works of General Tillo, which had extended over a period of fifteen years. The map was a reduction of the large map of Russia, which showed all the known altitudes, 51,385 in number, and also a network of equidistant lines, determining the variations in the relief of the soil. Its limits were the 44th and 60th parallels of latitude. The mean height of Russia in Europe was shown to be nearly 558 feet.—M. de Brazza, who was present at the meeting, read some extracts from the report of M. Fourreau, who had made an excursion into the unknown forests of the Ogowé.—In conclusion, M. Ch. Varat gave an account of his journey in Korea, which he had undertaken at the instance of the Minister of Public Instruction.

— February 21st, 1890: COMTE DE BIZEMONT in the Chair.—M. W. Huber, the reporter of the Commission on the Awards, announced the decisions of the Commission for the year 1890, as follows:—Grand gold medal to Captain Binger for his journey from the Niger to the Gulf of Guinea by way of Kong; gold medal to M. Borelli, for his travels in Shoa; gold medal to M. Jacob, for his explorations on the Kulu-Niari; gold medal to Commander de Lannoy, for his map of Africa, prepared under the direction of the Geographical Service of the Army; silver medal to M. Camille Paris, for his journey in Annam; Logerot Prize to M. Crampel, for explorations to the north of the Ogowé; Alph. de Montereau Prize (awarded for the first time), to M. A. Martel, for studies in the Causes of the Cevennes; Jomard Prize to M. Bréard, for their work entitled ‘*Histoire de la marine marchande au sixième siècle.*’—M. Venukoff transmitted a note upon the growth of the delta of the Neva, which had been read before the Congress of Russian Naturalists held last January.—According to information which had reached the Society, Lieutenant Jaime had made the voyage along the Niger to Kabara, the port of Timbuktu, in six weeks, or less than half the time occupied by Lieut. Caron. Geographically the results of this voyage go to confirm the accuracy of Caron’s hydrographical maps and observations.—M. Hamy communicated a letter he had received from M. Catat, who was charged with a scientific mission in Madagascar. The letter, dated 20th January, 1890, announced the return to the capital of the author and his companion, M. Maistre, after some arduous exploratory work, in course of which M. Catat had crossed the island from east to west along the 16th parallel of latitude. Among his collections he had obtained some skulls of the Sakalavas, which would throw new light upon the ethnology of this race. He was contemplating a journey to Fort Dauphin, across the country of the Betsileos, which is still imperfectly known, and that of the Bares, which is quite unexplored.—The General Secretary stated that, according to news received by M. Burean, Professor of the Jardin des Plantes, three European travellers, whose nationality was not indicated, had been assassinated in Hadramaut (Arabia).—In conclusion, M. de Nordling read a paper upon the universal hour; M. T. de Quarenghi took a prominent part in the discussion which ensued.

— March 7th, 1890: COMTE DE BIZEMONT in the Chair.—A letter was read from M. Bonvalot, dated 14th November, 1889, from Charkalik (Lob Nor).—An interesting memoir was presented by Captain E. Courbis, who had been carrying out surveys in the oasis of Uargla, with regard to the dunes and subterranean waters of the Sahara. He is of opinion that the dunes are not, as some have thought, the product of the disintegration on the spot of the soil, but that they are caused by the heaping up of the fine sand, driven by wind currents and accumulated at given points. What is the cause of these accumulations? M. Rolland, who has studied the subject, supposes a connection between these chains of dunes and the relief of the soil. The author does not agree with this explanation. He observes that the dunes are always

found in depressions and never upon plateaus; the beds of the "ueds" of the Sahara are covered with these chains of sandhills, which run in winding curves. Their formation is not due to vegetation acting as a barrier to the wind-driven sand, for there are many spots covered with bushes where the sand does not accumulate in any great quantity; neither is it because they are sheltered from atmospheric currents, as they are found in depressions several miles in breadth, and nearly always running across the valley. The explanation is, according to M. Courbis, to be found in the fact that the sand of these dunes is moist, and being heavy, becomes fixed. Other travellers have remarked upon this moisture of the sand. The sheet of water is found a few feet below the surface at the foot of the dunes. The Arabs are guided by this fact in selecting sites for their wells. Duveyrier, Fourreau, Flatters, and Largrau, who have remarked upon the existence of dunes near the wells, have explained this by saying that the sand sucks up the rain-water like a sponge. The author at some length seeks to show that this cannot be so. He is forced to the conclusion that the chains of dunes, like a meandering river, follow the courses of subterranean waters. At the mouth of an affluent, they become more important, because of the greater volume of subterranean water. All travellers have observed these variations. The dunes are not met with in the region of the chalk plateaus, because the soil does not hold the necessary moisture to fix the sand. In places where the dunes are found, water can generally be obtained at a depth of about 12 feet, whereas in others, where the sandhills are absent, soundings to a depth of 150 feet have not reached water. The author concludes by citing examples in support of his contention.—M. C. Maisae, writing from Madagascar, gave an account of the journey made by him from Tamatave to the capital by way of Lake Alatroa. The principal results from a geographical point of view, were a survey of his itinerary from Teneriffe to Imerimandroso and Antananarivo, from which it appears that Lake Alatroa in its general position is placed on our maps about 25 miles too much to the east; also a survey of Lake Alatroa, and of the upper course of the Manangory.—In conclusion M. Rolland read a paper upon the project of a Trans-Saharan Railway, intended to connect Algeria with the Sudan. The author pointed out that France, possessing Algeria and Tunis on the north, Senegal and the adjacent regions on the west, and the Gaboon-Congo on the south, had exceptional facilities for extending her commercial empire over the whole of Central and Western Sudan, from Lake Chad to the Senegal and the Congo. After comparing Algeria, the Senegal, and the Congo as bases for penetrating into the interior, he came to the conclusion that Algeria offers the greatest facilities for a direct route into the heart of the Sudan. Some imports and exports would probably not be able to bear the heavy transport rates along so lengthy a railway as that proposed, and it would be more economical to send them by the navigable routes, e. g. to the Lower Niger by the Benue, to the Congo by the Shari and the Mobangi, or to Senegal by Sokoto and the Upper Niger. But such a railway would have other advantages than those directly commercial, and it was a necessity in order to overcome the resistance of the Tuaregs and to extend French influence in the interior. The Tuaregs were divided into two sections, the Azdgers and the Hoggars, the latter only were hostile. The author showed that the whole of the trade between the Mediterranean and Central and Western Sudan, from the Atlantic to the Libyan Desert, was in the hands of the Tuaregs, so that it was necessary either to conciliate or conquer these people. The route he advocated for a railway was what was known as the "eastern" route, starting from the province of Constantine, and passing through Uargla, Igharghar, and Amguid. From the latter point the whole of Central Sudan would be dominated.

NEW GEOGRAPHICAL PUBLICATIONS.†

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

EUROPE.

Birlinger, [Dr.] A.—Rechtsrheinisches Alamannien. Grenzen, Sprache, Eigenart. —Forschungen zur deutschen Landes- und Volkskunde . . . herausgegeben von Dr. A. Kirchhoff. Vierter Band, Heft 4. Stuttgart, J. Engelhorn, 1890: 8vo., illustrations.

Bonaparte, [Prince] Roland.—Le Glacier de l'Aletsch et le lac de Märjelen. Paris, 1889: 4to, pp. 26. [Presented by the Author.]

A description of the Aletsch Glacier and of the curious icebound lake of Märjelen, with illustrations.

Lawson, W. R.—Spain of To-day; a Descriptive, Industrial, and Financial Survey of the Peninsula. Edinburgh and London, W. Blackwood and Sons, 1890: sm. 8vo., pp. vi. and 164. Price 3s. 6d. [Presented by the Publishers.]

An account of a recent visit to Spain, with special reference to the economic conditions of the country, and to the Rio Tinto Mines.

Ratzel, [Dr.] F.—Die Schneedecke, besonders in deutschen Gebirgen.—Forschungen zur deutschen Landes- und Volkskunde . . . herausgegeben von Dr. A. Kirchhoff. Vierter Band, Heft 3. Stuttgart, J. Engelhorn, 1889: 8vo., maps and illustrations.

Richards, [Admiral Sir] G. H.—Report on the Present State of the Navigation of the River Mersey (1889), to the Right Honourable the Commissioners for the Conservancy of the Mersey. With maps and appendix. London, 1890: 8vo., pp. 21.

ASIA.

Anderson, John, M.D., LL.D., F.R.S.—English Intercourse with Siam in the Seventeenth Century. Trübner's Oriental Series. London, 1890: pp. xiii. and 503, 8vo. Price 15s.

This book might have formed a companion volume to the late Sir H. Yule's 'Diary of Sir W. Hedges,' published by the Hakluyt Society (1887-89). Like that work, it is founded on the records preserved in the India Office, and lately made accessible for purposes of research by Mr. F. C. Danvers. The name and titles of its editor and author are sufficient guarantee of the character of the work, and it is evident that great care and labour have been bestowed upon it. Nevertheless, we could have wished for more geographical illustrative matter in the notes, and a better map. If the history of English trade with Siam during the seventeenth century prove to be somewhat dry reading, this is no fault of Dr. Anderson, who has done his part well, but rather of the persons who figure on his stage. These English merchants, factors, and agents, appear to have been very ordinary mortals, chiefly guided by mercenary instincts and a sense of their own overweening importance.

It is only fair to add that the tale of their bickerings, jealousies, and factions is relieved now and again by instances of splendid heroism, as when John Jourdain, to maintain the reputation of his nation among the natives, fought, with only two ships lying at anchor in the harbour of Patani, three Dutch men-of-war manned by 800 men, an action deserving that "favourable censure" passed on another memorable English feat of arms fought in a different quarter of the globe at a much later period—"C'est magnifique, mais ce n'est pas la guerre."

Years before the English tried to secure a share of the Siamese trade, their rivals, the Dutch, had been firmly established in the Malay peninsula, and a

good part of the correspondence shows what efforts our countrymen made to gain a footing at the Court of Siam. The system of royal monopolies by which the king of that country sought to maintain his exclusive right to trade, and the pretensions of the East India Company, against which George White vigorously protested, prevented the development of commercial intercourse between the respective nations, and led to wars, massacres, and all kinds of knavery and injustice. Towards the close of the century, the French, anxious to make their influence felt, sent a second embassy (their earlier attempts having been unsuccessful) to Siam, organised on a different scale. The disasters which befell this mission are narrated by Dr. Anderson from the chronicle of Père Tachard, its historian, and other contemporary writers.

Revolutions broke out subsequently, and were of constant occurrence during the next seventy years (till 1769), leading, in the words of our author, to the "destruction of trade and impoverishment of the nation," and finally to the detachment of the province of Tenasserim from the kingdom of Siam, and its annexation by Burmah, while the "time-honoured capital of Ayuthia, in which so many Englishmen had traded, lived, and died, was reduced to ashes"; the downfall of this city bringing about the elevation of Bangkok to the dignity of the capital of Siam.—[E. D. M.]

Chesney, [Hon. Lieut-Gen.] G.—Alexander the Great's Invasion of India.—Journal of the U. S. Institution of India, Vol. XIX. No. 79. Simla, 1890: 8vo., pp. 1-13, maps.

[Transcaspiian Expedition.]—Wissenschaftliche Ergebnisse der im Jahre 1886 Allerhöchst befohlenen Expedition nach Transcaspien. Band I. Zoologie. Tiflis, 1890: map and plates. [Presented by Dr. G. Radde.]

Woodthorpe, [Col.] R. G.—The Lushai Country.—Journal of the U.S. Institution of India, Vol. XIX. No. 79. Simla, 1890: 8vo., pp. 14-18, map and illustrations.

AFRICA.

Bonaparte, [Prince] Roland.—Le premier établissement des Néerlandais à Maurice. Paris, 1890: 4to., pp. 60. [Presented by the Author.]

This is to serve as an Introduction to a work, now in preparation, by the author on the voyages of Tasman, and discusses the early doings of the Dutch in Mauritius, with illustrations reproduced from old Dutch works.

Cotteau, Edmond.—Une ascension au Pic de Ténériffe. Auxerre, 1890: 8vo., pp. 8, illustration. [Presented by the Author.]

[Dankelman, Dr. von.]—Beiträge zur Kenntniss des Klenias des deutschen Togo-landes und seiner Nachbargebiete an der Gold- und Sklavenküste. Separatabzug aus den "Mittheilungen aus den deutschen Schutzgebieten," Band III. Berlin, 1890: 8vo., pp. 45, plan and plate. [Presented by the Author.]

Loti, Pierre.—Au Maroc. Paris, C. Lévy, 1890.

The well-known French writer and ex-naval officer who, under the pseudonym of "Pierre Loti," has given the world so many admirable sketches of life and scenery in the Iceland seas, Cochin China, Japan, and the Pacific Islands, here relates his experiences of travel in Morocco and of life at Fez, where he went in the train of a recent French Embassy. He describes with his usual force, vivacity, and literary skill the waste flowery plains over which the route to the capital lies, and the strange barbarous court and city in which he found a temporary residence. There is no new geography in the book, but no one who can appreciate picturesque descriptions, and wishes to realise for himself the aspect and the present condition of Morocco, should fail to read it.

Plantel, Eugene, Attaché au Ministère des Affaires Etrangères.—Correspondance des Deys d'Alger avec la Cour de la France, 1579-1833. Recueillée dans les

Dépôts d'Archives des Affaires Etrangères, de la Marine et des Colonies, et publiée avec une introduction, des éclaircissements et des notes. Paris, Félix Alcan : 2 vols. 8vo., pp. lxxv. and 560-619, with 2 illustrations.

These volumes contain an immense mass of correspondence, with copious notes, but no attempt at narrative. They illustrate, in perplexing detail, the nature of French relations with Algiers, as Sir Lambert Playfair's 'Scourge of Christendom' has done in a condensed form for British relations.

At the end there is a list of Pashas, Aghas, and Deys, of French Consuls and special envoys, and of Treaties between France and the Regency.

Zululand.—Further correspondence respecting the Affairs of Zululand and Adjacent Territories. (In continuation of [C.—5522] August 1888.) [C.—5892] London, Eyre & Spottiswoode, 1890 : pp. xviii. and 417, map.

AMERICA.

Dana, [Prof.] J. D.—Areas of Continental Progress in North America, and the Influence of the Conditions of these Areas on the work carried forward within them. [From the Bull. Geol. Soc. Am., Vol. I., 1889.] 8vo.

Green, W. Spotswood, [M.A., F.R.G.S., A.C.]—Among the Selkirk Glaciers : being the Account of a Rough Survey in the Rocky Mountain Regions of British Columbia. London, Macmillan & Co., 1890 : 12mo., pp. xv. and 251. Price 7s. 6d. [Presented by the Publishers.]

The Rev. Spotswood Green visited, in 1888, the Selkirk Range, which has been rendered conveniently accessible by the Canadian Pacific Railway, with a commission from the R.G.S. to map as much as might be possible in a season of the chain with a view to throwing light on its general and glacial features. The present book is an enlargement of the report made to our Society. It is written in a lively style, which does not interfere with the communication of a great deal of instruction and new information as to the forests and glaciers of the Selkirks. The higher peaks appear, for their very moderate elevation above the valleys at their base (*circa* 7000 feet), to be singularly difficult of access, and they are in addition rendered difficult of approach by the thickness of the forest and the want of facilities of transport. The climate, however, is favourable in summer ; beautiful lakes diversify the valleys ; and the glaciers are extensive and picturesque, falling in broken icefalls from the high ridges. This little volume will doubtless some day be highly prized as the foundation-stone of the Alpine literature of the New Switzerland of the Far West.

It is to be regretted that more justice has not been done to Mr. Green's subject in the way of illustrations. The plates give little idea of the characteristic scenery of the Selkirks—and they have a very marked character of their own, as may be seen by any one who cares to turn over the fine photographs of this region, including many of the highest peaks, lately added to the R.G.S.'s collection.—[D. W. F.]

Wright, G. F. [D.D., LL.D., F.G.S.A., &c.]—The Ice Age in North America : its Bearings on the Antiquity of Man. Kegan Paul, Trench & Co., 1889 : 8vo., pp. xviii. and 622. Price 21s.

The writer of this important work is one of the many investigators who have been busily engaged for the past fifteen years in collecting facts relating to the glacial period in North America. He has here summarised in a volume, illustrated with maps and plates in a manner English publishers are apparently unable to rival or even attempt, the results of careful observations and very extensive reading. Beginning with a brief explanation of "What a glacier is," and a narrative of "A month on the Muir Glacier in Alaska," he gives a short (and it must be added defective) sketch of the present glaciers of the world, and then plunges into topographical details as to the extent of glaciers in the glacial age in North America. From this, the central point and *raison d'être* of his work, he diverges to treat of the various phenomena connected with glaciers ; lake-basins, cirques, and valleys ; the loess, and erratic boulders, and proceeds

finally to discuss the wider questions of the cause and date of the glacial period (or periods), its influence on the distribution of animal and vegetable life, and the existence of preglacial man.

The limits of the great icesheet that once covered a large portion of Canada and the United States have now been approximately defined, chiefly by tracing out the lines of its terminal moraines, and the results of ice action on a vast scale have been carefully studied. The southern edge of the icesheet is clearly shown in the numerous maps accompanying the volume. It ran parallel to, but slightly south of, the course of the Missouri, and then along the valley of the Ohio, until, near the present confines of Pennsylvania, it bent across to the Atlantic coast close to the point where New York now stands. The most original part of the volume is occupied in going over in detail the proofs and the exact limits of this frontier of ancient frost, and for this the reader must be referred to Dr. Wright's own pages.

When the author comes to summarise evidence and discuss disputed questions of glacial science, he shows himself, to our thinking, if generally impartial, not always discriminating. He does not seem to appreciate, or to care to weigh scrupulously, the relative value or pertinency of much of the evidence quoted. But to the inquirer who is curious to learn how the facts gathered on this great area may affect the conclusions of students whose glacial experience is mainly European, his fairness is more valuable, perhaps, than greater discrimination with more bias might have been.

It may be convenient and instructive for our readers if, in place of attempting any detailed summary of a book which proposes to deal with so many of the deep and intricate questions of cosmology involved in glacial epochs, we confine ourselves to putting before them the observations as to glacial action with regard to the erosion and transportation of material by glaciers, scattered up and down Dr. Wright's pages, a subject to which their attention has in these pages been recently directed in a paper on the "Conservative Action of Glaciers" (vol. x.), by the present writer. Disbelievers in glacial erosion, in the sense in which the term has been extensively used by Professors Tyndall, Geikie, and others, have been constantly reproached for basing their arguments on the action of the comparatively insignificant ice-streams of Europe in the nineteenth century. It should be instructive for us—for both sides—to learn what is the general result of observations on the action of continental ice, the thickness of which has to be reckoned in thousands of feet. We shall, therefore, pass in review as quickly as possible the salient facts brought forward by Dr. Wright's principal witnesses.

We pass over here Professors Niles's and Spencer's observations in Switzerland and Norway: the latter have been already referred to in these pages. Both are against extensive glacial erosion.

An old calculation of Dolfuss-Ansset, made in 1864, that the stream of the Unter Aar Glacier brings down "two and a half times as much eroded matter as water could do in the same period," is quoted. But Professor Heim, of Zürich, the most recent authority on the subject (whose work unfortunately appears to be unknown to Dr. Wright) has arrived at a very different result. (See Heim's 'Gletscherkunde,' quoted in 'Alpine Journal,' vol. xii. p. 300).

Mr. I. E. Marr is next quoted as recording how the erosive power of an icesheet is well seen by a glance at the observations made on the amount of sediment in two rivers flowing from two neighbouring Greenland glaciers. The great difference between the two streams is attributed to the fact that the glacier feeding the muddier torrent flows faster than the other. That is to say, the question is begged. It would be equally legitimate to attribute the difference between the black and white torrents of Switzerland and the Caucasus to the relative paces of their parent glaciers. But we know that soil, or the nature of the rocks, goes for much in the matter. These are favourable specimens of the evidence alleged for extensive erosion by glaciers.

Let us now see what facts Dr. Wright advances that favour the view upheld in these pages that the action of the ice has been mainly conservative, and that it has been useful chiefly in the transportation of material disintegrated by other agencies. We quote, "The contrast between the glaciated and the unglaciated

region in the extent to which the surface rocks are disintegrated by subaerial agencies is very striking. South of the glaciated region granitic masses and strata of gneiss are often completely disintegrated to a great depth, sometimes amounting to scores of feet. . . . North of the glacial boundary it is very rare to find any such extensive evidence of disintegrating agencies. . . . There is little more loose soil over the margin of the glaciated region than would result from the simple transportation of the disintegrated material from the northern and central portions of the glaciated region to the marginal area."

Again, "The glaciated area seems a vastly newer country than the unglaciated. In the glaciated region the waterfalls have hardly done more than begun to recede; the valleys and gorges are both narrower and shallower than in the unglaciated portion of the country; the lakes and kettleholes are yet unfilled with sediment, and their outlets have not yet to any great extent lowered the drainage lines; the striated rocks have resisted disintegration to a remarkable degree during postglacial times, and the moraines and kames have retained their original forms with little signs of erosion."

"The whole body of facts concerning a ground moraine speaks in like manner of the limited amount of disturbance in certain conditions which is produced by the ice as it moves over loose material. There can be little doubt that for a breadth of 100 miles or more on the border of the glacial limit in North America the ice advanced over the loose material without greatly disturbing it as a body. Indeed, this great mass of firmly compacted, unassorted, and glaciated material would seem to have accumulated by degrees—the moving ice dragging along under it successive strata of the grist which it had ground from the surface of the rocks far to the north, where its action had been more vigorous and long continued."

The buried forest near, and once under, the Muir Glacier, Alaska, is then referred to as "another striking illustration of the power of the ice to move for a limited distance over loose material without disturbing it" (p. 203).

Next we learn that American "advocates of the great erosive power of glacier ice appeal to the general appearance of the exposed glaciated surfaces, and particularly to some islands in Lake Erie." Dr. Wright gives us his own observations on these islands. They are seamed by "tortuous grooves." It is evident in some cases that the main features of these deepest grooves have been determined by preglacial or subglacial water action. There are numerous shallower scratches, and—mark this—they cross one another in different directions, indicating four distinct and successive movements of the ice. Dr. Wright sums up thus: "While all this is witness to the efficiency of the ice as an eroding agency, it conveys the impression that the erosion accomplished by each successive movement was concentrated in special channels, and was nowhere excessive." *Excessive!* No, indeed; since it was not even sufficient to rub out grooves a few inches deep! Could a more conclusive fact than that of these cross-striae possibly be cited? If they were really caused by successive movements extending over long terms of years, then a final nail has surely been driven into the coffin of the erosion theory.

Let us go for a few more facts to Greenland. Dr. Rink noticed that about 40 miles from the seaward edge of the ice rises a row of mountain tops. They had been an obstacle to the movement of the ice, and on the side facing the interior the glacier was broken and piled up several hundred feet against the rock. Dr. Kane observes that "the general configuration of the Greenland glaciers shows that they adapt themselves to the inequalities of the basin country beneath. There was every modification of hill and valley, just as upon land."

"It seems to be admitted that the surface of the great ice-cap of Greenland is free from boulders, except in the lines of movement extending from these projecting mountain-tops" (or *nunataks*), which are exposed to subaerial denudation.

We now turn to lake-basins and cirques. Mr. H. Russell thinks, from his experience in the Sierra Nevada, that "the conclusion that lake-basins are a result of glacial action is too strongly supported to be questioned." He thinks so, because he knows of no other agent capable of eroding hollows in solid

rock. The lake he cites as an instance of a glacial lake has "on either hand overshadowing cliffs which tower upward for a thousand feet," and the groovings show that ice has flowed in and out of it. He does not explain why natural concavities as well as convexities should not have been formed in a mountain region when it was in a plastic condition—as much as in pie-crust. Has it never struck any scientific traveller that where there are most tarns there are also, generally, most waterfalls? May not many tarns be the result of the local failure of water-action to create for the streams channels deep enough to drain such natural concavities?

Mr. Russell, moreover, believes that *cirques*, even *cirques* occurring "on either side of a fragment of table-land and eroded back until only a knife-edge of rock, so narrow and broken that the boldest traveller would hesitate to traverse it, is all that divides one profound depression from another," are due to glaciers. With all respect to the Norwegian Lorange who "shows that when a névé fills a cirque it is capable of removing blocks of rock from the enclosing walls," we must say that this statement involves a most erroneous apprehension of what a snow *cirque* is, of the meaning of a Bergschrund, and of the character and motion of névés. The blocks, loosened by changes of temperature from the enclosing walls, may be carried slowly downwards by a névé, but that snow lying near a knife-edge can erode backwards is a tale fit for closet students rather than for mountaineers with eyes in their heads.

Dr. Wright concludes his citations on lake-basins and cirques with the odd remark:—"These facts confirm the theories of the leading glacialists of Europe, for instance, Dr. Penck, who ascribes the excavations of the most important lake-basins in Bavaria, like the Ammer See and Wurm See, to glaciers, and states that "a lake-basin filled with water or sediment lies at the mouth of each of the Alpine valleys, through which glaciers protruded in ancient times." He surely has not appreciated the fact that the lakes and hypothetical lake-basins cited by the German writer lie in the plains, and that his "facts" have "proved" "an ice-cascade exerts the greatest erosive power at the base of the scarp which it descends" and that having lost part of its velocity, it has to climb in order to escape out of its own hole; yet, this same natural agent, with its velocity reduced by miles of comparatively level progress, is to be credited with the creation of sub-alpine lake-basins. In truth, the arguments for the glacial excavation of the basins of alpine tarns and sub-alpine lakes are mutually destructive.

But we have little fault to find with Dr. Wright's final summing up, after he has dismissed his individual witnesses, and is free to express their effect on his personal conviction.

"Summarily stated, our convictions are, that like everything else connected with the action of such a complicated cause as that brought into view in the production of glacial phenomena, the exact extent of the erosive and transporting power of ice is difficult to determine. The action of ice over the glaciated region took place after other forces had been in full action during long ages; and hence it is often impossible to separate the effects of the second cause from those of the first. But there can be no doubt that running water is by far the most efficient of all eroding agencies which have given shape to the contour of the continents. . . . Water as an eroding agency has had a great advantage over ice in the far greater length of time it has been on the field to operate. Still, it cannot be doubted that ice has had no small part in transforming the appearance of the portions of the world to which it has had access. Of this the evidence is abundant in the great number and size of the boulders scattered over the glaciated region, hundreds of miles from their native ledges, and weighing hundreds and even thousands of tons.

"Inasmuch as ice is frozen water, its melting furnishes the torrents to aid in the transportation. The finely comminuted material ground up underneath the ice, is largely carried away by the torrential sub-glacial streams continually pouring out from the icefront. It is doubtful if the larger portion of the glacial grist is not thus transported far beyond the limit of the glaciated region."

Dr. Wright does well to insist on the part played by sub-glacial streams. The fact that water is active as an eroding agency under the bed of every glacier

has been generally left out of account. The beds of glaciers are often seamed by deep gorges cut by their torrents, which are living forces for miles above the point where they first issue into the light of day. The contrast between the erosion of the subglacial streams and the abrasion of the ice itself may be well seen in many most accessible spots, such as Rosenlauri, in the Alps.

It may, in conclusion, be permissible to hazard a conjecture on one phenomenon of the Arctic regions described by Dr. Dall as "one of the most wonderful and puzzling in existence," the solid icecliffs overgrown with vegetation of Eschholz Bay in Alaska. In the Caucasus, at the source of the Cherek, a glacier coming from very friable schistose mountains, and covered therefore thickly with small débris, has made a sudden retreat. It has left its snout, a hill of ice perhaps 200 feet in height and several hundred yards in diameter, behind it, and on this some vegetation has begun to flourish. If an ice sheet in the Arctic region retreated, might it not leave similar and more permanent fragments of itself behind it? It is true, this explanation would be shaken if the neighbouring heights in Alaska show no traces of glacial action, as is reported, but on this point there seems room for doubt.

In the space at disposal, it has been impossible to do more than follow up a few of the suggestions of Dr. Wright's varied and valuable work, and but inadequate justice has been done to its contents as a whole.—[D. W. F.]

ARCTIC REGIONS.

Kükenthal [Dr.] and Walter [Dr.] Bericht über die von der Geographischen Gesellschaft in Bremen veranstaltete Forschungsreise in das europäische Eismeer. "Deutsche Geographische Blätter," Heft 1 & 2, Band xii., Bremen 1890.

This is a full account, of much value, by Dr. Kükenthal of his journey to the Spitzbergen region in the summer of 1889. There is a good map and two coloured illustrations, one of King Karl's Islands, and the other of the east coast of Barents Island. Dr. Walter adds an appendix on the natural history of the expedition.

Nansen, Fridtjof.—Plan til en ny polarekspedition. 8vo., pp. 28. Reprinted from *Naturen*.

This is a paper by Dr. Nansen, describing the plan of the proposed expedition to the North Pole. He proposes to follow the ocean-currents as far as possible, and his idea is to have a vessel specially built in Norway, and proceed through Behring Strait to the New Siberian Islands, which he would make his starting-point.

AUSTRALIA.

Ross, Malcolm.—A Complete Guide to the Lakes of Central Otago: the Switzerland of Australasia. Illustrated with Sketches by L. W. Wilson. Wellington, 1889: sm. 8vo., pp. 67.

This little guide-book describes the Wakatipu, Wanaka, and Hawea Lakes districts of Central Otago, including information regarding routes, accommodation, and expenses attending a visit to this part of New Zealand.

GENERAL.

Archives des Missions Scientifiques et Littéraires. Choix de Rapports et Instructions publié sous les auspices du Ministère de l'Instruction Publique et des Beaux-Arts. Troisième série. Vols. xiv. and xv. Paris, E. Leroux, 1888-89: 8vo., pp. (vol. xiv.) 565, maps; (vol. xv.) 484, plates.

Vol. xiv. contains the following Reports:—On a mission in Tunis (1886), by R. Cagnat; on a mission executed in Italy (Feb. to April 1885), by Charles Molinier; extract from the Report of a mission on the northern coast of Venezuela, by M. Chaper; on a mission to the Lebanon (Syria) (1884), by H. Pognon; on the island of Bongao (Sulu Archipelago) (January 1883), by Alfred Marche; on the island of Paragua, or Palawan (Sept. 1883), by the same; on the island of Paragua (Palawan) (Philippine Islands) (March 1884), by the same; on the

exploration of Ulugan Bay, west coast of Palawan, by the same; on the Calamianes Archipelago (Philippine Islands) (Sept. 1884), by the same; on Ernest Chantre's work, entitled, "Recherches Anthropologiques dans le Caucase," by A. de Quatrefages; on a mission in Italy, from the 24th Jan. to the 24th Feb. 1886, by Paul Tannery; on a mission to the Kingdom of Shoa and the Galla country (East Africa), by Alphonse Aubry; on the State Archives at Luxemburg, by M. Bonnardot; on a mission in England and Wales, by J. Loth. Vol. xv. contains, among other things:—Report on a mission in Spain to investigate the Archives of Alcalá de Henares, and Simancas, by Alfred Baudrillart; and a Report on the work accomplished in Norway, and Scotland, in the interest of Oceanography, by J. Thoulet.

Clyde, James.—School Geography. Twenty-fourth edition. With Nine Maps. Edinburgh, Oliver and Boyd; London, Simpkin, Marshall & Co., 1890: 12mo., pp. 551. Price 4s. [Presented by the Publishers.]

This edition has been well brought up to date, and the work still retains its position as one of the best of the old School Geographies.

[**Columbus' Spanish Letter.**].—La Lettre de Christophe Colomb annonçant la Découverte du Nouveau Monde 15 Février–14 Mars 1493. Texte original Espagnol édition princeps in-folio, différente des deux éditions in-4to connues jusqu'à ce jour. Reproduction en Fac-similé d'après l'exemplaire récemment découvert en Espagne, actuellement en la possession de l'Éditeur. Paris, J. Maisonneuve, 1889: folio. Price 2l.

This is a facsimile reproduction of the original Barcelona edition (printed in April 1493) of Columbus's Spanish letter announcing the discovery of America, the sole surviving copy of which was lately discovered in Spain. It consists of two leaves, or four pages, only.

[**Consular Reports.**].—Miscellaneous Series, 1889:—Russia, Notes on a Visit to the Town of Novorossisk; Borneo, Notes on a Visit to the Territory of Sarawak. Annual Series, 1889:—Persia, Report for the year 1888 on the Trade of Bushire, Report for the year ended March 31, 1889, on the Trade of South Persia and the Persian Gulf; Portugal, Report on the District of Mossamedes (St. Paul de Loanda); Greece, Report for the year 1888 on the Trade and Agriculture of Cephalonia; Guatemala, Report for the year 1888 on the Trade, Commerce. and Industries of Guatemala; Tunis, Report for the year 1888 on the Trade of Tunis; Spain, Report for the year 1888 on the Trade, &c. of Cuba. Annual Series, 1890:—Chile, Report for the year 1888 on the Trade of Chile. London, Harrison and Sons, 1889–90: 8vo.

Many of these reports are of geographical interest.

Dana, James D. [L.L.D.].—Corals and Coral Islands. New York, Dodd, Mead and Co. [1890]: large 8vo., pp. 440. [Presented by the Author.]

This well-known and classical work on corals has this year attained to a third edition. It contains a number of beautiful illustrations, including coloured plates, four of which are new. Four new maps have also been introduced; one, of the Central Pacific; the second, of the large coral-reef region of the Louisiade Archipelago, in the south-west Pacific; the third, a new map of the Florida and Bahama coral-reef banks, from the charts of the U. S. Hydrographic Department; and the fourth, a reduced copy of part of the Hawaiian Government map of the vicinity of Honolulu, showing the coral reefs off the shores, and the positions of the artesian borings in this part of the shore region of Southern Oahu. The volume is divided into six chapters: Chapter i. treats of corals and coral makers; chapter ii., the Structure of Coral Reefs and Islands; chapter iii., the Formation of Coral Reefs and Islands, and causes of their features; chapter iv., the Geographical Distribution of Coral Reefs and Islands; chapter v., Changes of Level in the Pacific Ocean; chapter vi., Geological Conclusions. The author has endeavoured, as far as possible, to bring the present edition up to date of publication.

Darwin, Charles.—Journal of Researches into the Natural History and Geology of the Countries visited during the Voyage Round the World of H.M.S. *Beagle*, under the command of Captain Fitz Roy, R.N. A new edition. London, John Murray, 1890: 8vo., pp. xvi. and 551. Price 21s.

Although, since its first production, a great many editions of Darwin's "Voyage of a Naturalist" have been issued, no attempt has been made hitherto to produce an illustrated edition, in which the numberless places visited and objects described should be depicted. This want has now been supplied, the result being the present handsome volume, which abounds with illustrations, chiefly from sketches made on the spot by Mr. R. T. Pritchett. Some of Mr. Pritchett's sketches, it is to be regretted, have not been done justice to.

Frenzel, C. and Wende, G.—Deutschlands Kolonien. Kurze Beschreibung von Land und Leuten unserer aussereuropäischen Besitzungen. Hannover, Meyer, 1889: 8vo. pp. 128.

This is a useful summary of knowledge up to date of the German foreign possessions.

[**German Colonies**].—Koloniales Jahrbuch. Herausgegeben von Gustav Meinecke. 2tes Jahrgang. Das Jahr 1889. Berlin, Heyman, 1890: 8vo., pp. 312.

This new German Colonial Annual consists in the first part of a number of special papers on subjects affecting colonial interests. There is a paper on the Anti-slavery question in East Africa. R. Von Haker contributes a memoir on a system of surveying for use in the tropics, and the Rev. Paul Steiner on civilisation on the Gold Coast during the last hundred years. Germany in Brazil is the title of a paper by C. Bolle, while E. Wolbroth reviews the mission-work in the German Protectorate during 1888-89. Dr. Paul Reichard has a paper of much interest on the industry and art of the East and Central African tribes, while another paper deals with the Imperial Government and colonial policy. Then follows a series of sections, each dealing with a particular colony or protectorate.

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

EUROPE.

Belgium.—Carte du Touriste dans les Montagnes des Provinces de Liège, Namur et du Luxembourg, par Joseph Kips. Scale 1:200,000 or 2·7 geographical miles to an inch. Liège et Namur, chez tous les Libraires. London, 14, Moore Street, Chelsea, S.W. Price 1s.

— Plan de Namur (Naemen) à l'échelle de 1:10,000 or 7·2 inches to a geographical mile, par Joseph Kips. Namur, chez tous les Libraires. London, 14, Moore Street, Chelsea, S.W. Price 9½d.

Deutschen Reiches.—Karte des —. Herausgegeben von der Kartogr. Abteilungen der Königl. Preuss. Landes-Aufnahme 1889-1890. Sheets: 121, Swinemünde; 400, Gross-Wartenberg; 447, Hirschberg in Schl.; 448, Waldenburg in Schl.; 540, Saarburg im Rheinland. Scale 1:100,000 or 1·3 geographical miles to an inch. Price 1s. 6d. each sheet. (*Dulau.*)

France.—Carte de la —, dressé par le Service Vicinal par ordre du Ministre de l'Intérieur. Scale 1:100,000 or 1·3 geographical miles to an inch. Sheets:—V.—15, Carhaix; VII.—15, Lamballe; VIII.—17, Bain; XI.—12, Caen; XI.—29, Bordeaux; XVI.—23, Boussac; XVI.—24, Guéret; XVII.—4, Dunkerque; XVII.—5, Bergues; XVIII.—6, Lille; XVIII.—22, Moulins (Ouest); XIX.—

21, Decize; XIX.—22, Moulins (Est); XX.—7, Maubeuge; XXIII.—29, Die; XXIV.—34, Salernes; XXVI.—25, Chamonix; XXVII.—33, Menton. Price 7d. each sheet. (*Dulau.*)

Oesterreichisch-Ungarischen Monarchie.—Specialkarte der —. Scale 1:75,000 or 1 geographical mile to an inch. K. k. militär-geografisches Institut, Wien. Sheets:—Zone 26, Col. XV. Priedor und Sanskimost; 26—XVI. Banjaluka; 26—XVII. Prnjavor; 27—XVI. Čelinac und Ratkovo; 27—XVIII. Gračanica und Tešanj; 28—XV. Vrtoše dl. und Ribnik Grn; 28—XVII. Skender-Vakuf und Paklarevo; 29—XVI. Grbavica und Glamöb; 29—XVII. Travnik und Bugojno; 30—XVII. Prozor; 32—XXI. Plevlje und Nova-Varoš. Price 1s. 4d. each sheet. (*Dulau.*)

ORDNANCE SURVEY MAPS.

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ENGLAND AND WALES: Devonshire: 80 N.W., S.W., 1s. Wiltshire: 38, 44, 51, 63, 68, 69, 2s. 6d. each.

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ASIA.

Indian Government Surveys:—

Indian Atlas. Quarter Sheet: 28 S.W. Parts of Districts Hazara and Rawalpindi (Punjab) and of Kashmir State; Sheet 54, Districts Hoshangabad, Nimar and Betul (Central Provinces), Amraoti and Akola (Berar), and Khandesh (Bombay Presidency). Scale 4 miles to 1 inch.—India. Map to illustrate the Systems of Railways. Corrected up to 31st March, 1889. 96 miles to an inch.—Bombay Survey, 1 inch to a mile. Sheet No. 181, Parts of the Panch Mahals Collectorate and of the Rewa Kantha Agency. Seasons 1882–83 and 1883–84.—Punjab Survey, 1 inch to a mile. Sheet No. 241, District Hissar. Seasons 1876–78 and 83–84. No. 242, District Hissar and Patiala State. Seasons 1848–50, 76–78, and 83–84. No. 289, District Umballa (Preliminary edition). Season 1886–87.—North-West Provinces and Oudh Survey, 1 inch to a mile. Sheets

No. 170 and 171, District Mirzapur. Seasons 1881-83. No. 201, District Mirzapur. Seasons 1883-84-85. No. 217, Districts Gorakhpur and Ballia (with overlap in District Sarun of Bengal). Seasons 1875-76 and 81-85.—Central India and Rajputana Survey, 1 inch to a mile. No. 385, Parts of Gwalior, Datia Native States (C.I. Agency) and Jhansi District (N.W. Provinces). Seasons 1856-57, 59-60, and 62-63. No. 404, Parts of Gwalior and Orchha Native States (C.I. Agency), Lalitpur and Jhansi District (N.W. Provinces). Seasons 1855-57 and 60-61.—Bengal Survey, 1 inch to a mile. Sheet No. 196, District Cuttack. Season 1878-79. No. 364, Districts Mymensingh and Dacca. Seasons 1850-52 and 1857-58.—Upper Burma Survey, 1 inch to 4 miles. Sheet No. 23 S.W., N, E, T, F, Series (second edition), Parts of Districts Bhamo, Wuntho and Myadaung, and of Yunan (China). Season 1887-88.—North-Eastern Trans-Frontier, 1 inch to 8 miles. Sheet No. 7, Sikkim and Bhutan, with parts of Nepal, Tibet and adjacent British territory.—North-Eastern Trans-frontier, 1 inch to 4 miles. Sheet No. 7 N.W. Sikkim and parts of Bhutan and Nepal.—North-Western Trans-frontier, 1 inch to 4 miles. Sheet No. 30 S.E. Parts of District Dera Ghazi Khan and Bahawalpur Native State (Punjab). Seasons 1869-75.—District Sibsagar, Assam, 1 inch to 4 miles. With additions and corrections up May 1889.—District Sarun, Province of Behar (second edition), 1 inch to 4 miles. With corrections and additions to April 1889.—District Agra, 1871-76, 1 inch to 2 miles. 1889.—Parts of Lushai, Cachar, and Manipur, 1 inch to 8 miles.—Country adjoining the Chittagong Hill Tracts, 1 inch to 4 miles (second edition). August 1889.—Preliminary Map of Part of Karenni. Season 1888-89. 1 inch to 4 miles. August 1889.—Preliminary Map of Chin Hills. Season 1888-89. 1 inch to 4 miles. August 1889.—Preliminary Map of Part of Bhamo District. Season 1888-89. 1 inch to 4 miles.—Andaman Islands, 1 inch to 4 miles. Sheets Nos. 5 and 6. Seasons 1885-1886. Sheets Nos. 7 and 8. Seasons 1884-85-86.

AFRICA.

Africa.—Stanford's Library Map of ——. New edition, 1890. Scale 1:5,977,382 or 81·8 geographical miles to an inch. Edward Stanford, London. Price in 4 sheets, coloured, 1*l.* 15*s.*

This is a new edition of Stanford's well-known Library Map of Africa, and, as a whole, it has been fairly brought up to date, especially as regards the political boundaries. The physical features, however, are not sufficiently expressed, a fault plainly discernible in the case of Abyssinia, where there is little to indicate the mountainous nature of the country.

Afrika in 6 Blättern, von R. Lüddecke. Mit einem vollständigen Namensverzeichnis. Scale 1:10,000,000 or 137 geographical miles to an inch. Gotha, Justus Perthes. Price 10*s.* (*Dulau.*)

This map is composed of sheets 66 to 71 of the new edition of 'Stieler's Hand Atlas.' These have been joined, and are now published in a handy form, to fold in a cover; a copious index, and explanatory letterpress in English, German, French, and Italian, are also given. The sheets of which this map is composed have already been noticed in the 'Proceedings' at the date of their publication.

Afrika.—Deutsche Kolonialkarte von ——, von Ed. Gaebler. 1:16,000,000 or 219 geographical miles to an inch. Und die deutschen Schutzgebiete in der Südsee. Lang, Leipzig. Price 1*s.* 6*d.* (*Dulau.*)

Mozambique.—Carta de ——. 1889. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Ministerio da Marinha e Ultramar. Comissão de Cartographia. Lisboa, 1889.

As this map is not accompanied by any explanatory letterpress, the inference is that all the coloured portion of it is intended to represent the Portuguese Province of Mozambique; and if this be the case, it will at once be seen that a very large area is laid down as Portuguese territory to which, from an English point of view, that country has no claim whatever. This fact is clearly demonstrated by comparing it with a map of Central Africa by E. G. Ravenstein, lately published by Philip & Son, on which the boundaries of the colony of Mozambique are indicated. The map is nicely drawn, and all trade routes and the proposed railways are laid down.

AMERICA.

Argentina.—Mapa de los ferro-carriles, telegrafos y correos de la República —, por el Dr. José Chavanne. Scale 1 : 3,500,000 or 47·6 geographical miles to an inch. Buenos Aires. Price 7s. 6d. (*Dulau.*)

ATLASES.

Argentina.—Atlas de la República —, construido y publicado por resolucion del "Instituto Geografico Argentino," bajo los auspicios del Exmo Gobierno Nacional y redactado por el Dr. Arturo Seelstrang, Miembro del Instituto. Sheets III., IX., XV., XVII., XXIII., and text. Buenos Aires. 1889.

The present issue of this atlas is accompanied by letterpress containing a history of the commission appointed to superintend the construction of the maps, and a detailed list of the documents and surveys which have been used in their production. The four maps published in the present instance are as follows:—Sheet III. Ciudad de Buenos-Aires, on which is given a list of public buildings, markets, churches, &c., as well as a plan of the Island of Martin Garcia on an enlarged scale; Sheet IX. is a map of the Province of Corrientes; Sheet XV. the Province of Mendoza; Sheet XVII. the Province of Rioja, and Sheet XXIII., the Government of Neuquen. These maps, which have been entirely produced at Buenos Ayres, are very creditable specimens of cartography, the hill-shading on sheets XV., XVII., and XXIII. being very effective. All railways, telegraphs, and roads are clearly laid down, and the heights are given in metres. As widely different areas are given on sheets of an uniform size, the scales on which the maps are drawn of necessity vary considerably.

Bayern.—Topographischer Atlas von —, bearbeitet im topograph. Bureau d. K. h. Generalstabes. Scale 1 : 50,000 or 1·4 inches to a geographical mile. München. Sheets—66, Wegscheid, West; 72, Mühlendorf, Ost und West; 73, Rothalmünster, Ost; 75, Miudelheim, West. Price 1s. 6d. each sheet. (*Dulau.*)

Canada.—The Pocket Atlas and Gazetteer of the Dominion of —. By J. G. Bartholomew, F.R.S.L., F.R.G.S. Edited by J. M. Harper, M.A., Ph.D. Quebec. London, John Walker & Co., 1890. Price 3s. 6d.

This little atlas contains 36 maps, which, though drawn on a small scale, will, in connection with the Gazetteer, be useful for reference when other and more complete works are not available.

Hachette et Cie.—Atlas de Géographie Moderne, édité par —. Ouvrage contenant 64 cartes en couleur, accompagnées d'un Texte Géographique, Statistique, et Ethnographique, et d'un grand nombre de cartes de détail, figures, diagrammes,

etc. Par F. Schrader, F. Prudent et G. Anthoine. Paris, Librairie Hachette et Cie., 1890. 11° Livraison. Price 10*d.* (*Dulau.*)

The present issue of this atlas contains maps of Italy, Spain and Portugal, and Greece. In the letterpress which accompanies the maps, a general summary of information with regard to the physical and political geography of each country is given, the writer's remarks being illustrated by numerous diagrams and small maps.

Stieler's Hand-Atlas.—Neue Lieferungs-Ausgabe von —, 95 Karten in Kupferdruck und Handkolorit, herausgegeben von Prof. Dr. Herm. Berghaus, Carl Vogel und Herm. Habenicht. Erscheint in 32 Lieferungen (jede mit 3 Karten, die letzte mit 2 Karten und Titel.) Einundzwanzigste (21) Lieferung. Inhalt: Nr. 39, Grossbritannien, Südliches Blatt in 1:1,500,000 von A. Petermann. Nr. 42, Dänemark in 1:1,500,000 von C. Vogel. Nr. 43, Russland, Übersicht in 1:10,000,000 von A. Petermann. Gotha, Justus Perthes, 1890. Price 1*a.* 6*d.* each part. (*Dulau.*)

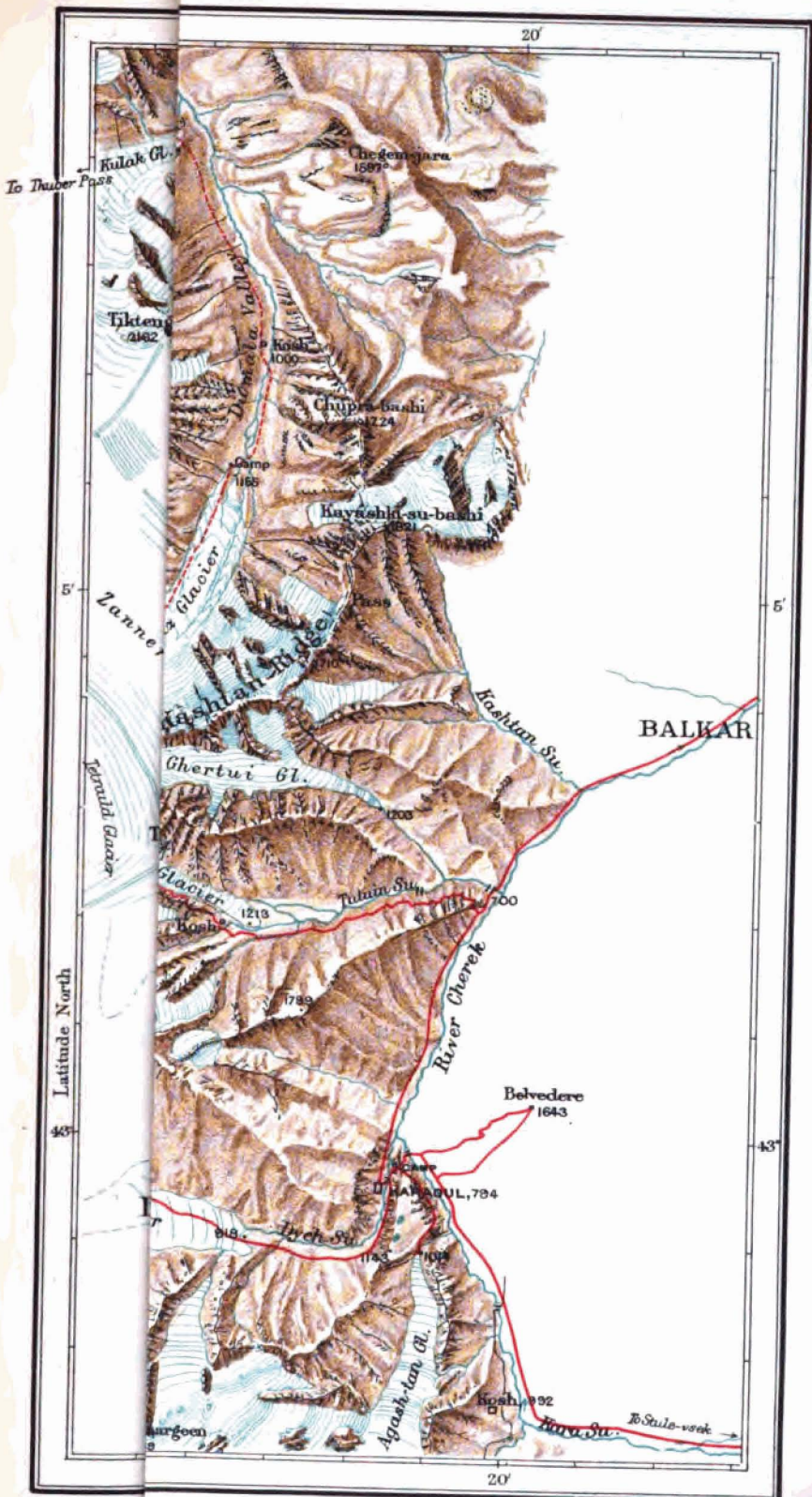
In the present issue, sheet 39 is a map of the southern half of Great Britain, on which there are two insets, one of the Channel Islands, and another of London; the latter is, however, drawn on such a small scale that it serves no useful purpose. Sheet 42 is a map of Denmark and the neighbouring country, with insets on which are given Iceland, Greenland, the Faroe Islands, Bornholm, the Danish West Indies, and a plan of Copenhagen. Sheet 43 is a map of Russia in Europe and Scandinavia, with inset maps of St. Petersburg and its environs, Moscow and the surrounding country, and a hydrographic map of Russia. The soundings and elevations above sea-level are shown in metres.

PHOTOGRAPHS.

British Columbia and the Canadian Pacific Railway.—Sixty-nine photographs, taken by W. Notman & Son, Montreal, have been added to the collection by purchase, and can be obtained from those photographers (price 2*s.* each). They form an excellent series, giving a capital picture of the scenery along the Canadian Pacific Railway, and particularly of the lakes, forests, and glaciers of the Selkirk range, many of the highest peaks of which are represented under the names assigned to them by Mr. Spotswood Green. Some of the photographs, such as that of Cathedral Peak, recall the dolomitic scenery of South Tyrol; others are particularly interesting as showing the peculiar geological formations in different parts of the country.

Caucasus.—Mr. Hermann Woolley has forwarded to the Society 48 photographs taken in the Caucasus in 1888 and 1889. They illustrate chiefly the heights round the hitherto unexplored Dychnu Glacier, the Bezingi Glacier, and the neighbourhood of Uruspieh and Elbruz. They include portraits of the chiefs' families and Tartar natives. Very fine enlargements have been made of several of the views, of which the village of Chegem and Shkara from above the Dychnu Glacier are perhaps the most striking. The agents for these are Messrs. Spooner, Strand.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Geographical Results of the Emin Pasha Relief Expedition.

By H. M. STANLEY.

(Address delivered at the Special Meeting in the Albert Hall, May 5th, 1890.)

Map, p. 372.

YOUR ROYAL HIGHNESSES, LADIES AND GENTLEMEN,

I am sure there is not a person present who, if he knew my feelings at this moment, would wish to be in my place. I stand apparently in a very desirable position, in close proximity to the heir of the throne of England and to his royal brother, the object of hearty welcome, but I feel inexpressibly grieved that I am able to render so poor a return for your kindness. Matter enough I possess to fill many hours of interest for you; but, unfortunately, I have had no time to prepare anything that I would call worthy of this great assembly. I therefore hope that, in addition to the warm welcome you have given me, you will be lenient in your judgment of the merits of what I am about to tell you this evening.

Our late journey for the relief and rescue of Emin, the Governor of Equatoria, was over 6000 miles in length, and occupied us 987 days; 500 of those days were passed in the great Central African forest, and for 487 days we lived or journeyed through grass lands. Let us talk of the forest first.

A writer on Africa lately wrote a book, wherein he said: "Day after day you may wander through these forests with nothing except the climate to remind you where you are. . . . The fairy labyrinth of ferns and palms, the festoons of climbing plants blocking the paths and scenting the forests with their resplendent flowers, the gorgeous clouds of insects, the gaily plumaged birds, the paroquets, the monkey swinging from his trapeze in the shaded bowers—these are unknown to Africa. Once a week you will see a palm; once in three months the monkey will cross your path; the flowers on the whole are few, the

trees are poor, and to be honest"—nay, if this is honest description, I must close right here. We have travelled 1670 miles through the great forest of Equatorial Africa, and we are compelled to declare that the writer's description of Africa is altogether wrong, that it bears no more resemblance to tropical Africa than the tors of Devon resemble leafy Warwickshire, the gardens of Kent, and the glorious vales of this island. Nyassaland is not Africa, but itself, and only a small section of a great continent which embraces over 11,000,000 of square miles.

Let me guide you rapidly through this forest, and I promise not to mislead you.

Its greatest length is from near Kabamarrè in South Manyema to Bagbomo, on the Welle-Makua in west Niam-Niam, 621 English miles; its average breadth is 517 miles, which makes a compact square area of 321,057 square miles. A serpentine line through the centre of this would represent our course. This enormous tract is crammed with trees, varying from 20 feet to 200 feet high, so close that the branches interlace one another and form an umbrageous canopy. It is absolutely impenetrable to sunshine. While the sun scorches and dazzles without, a little dust of white light flickering here and there only reveals the fact. Generally it was a mystical twilight, but on misty or rainy days the page of a book became unreadable; at night one fancied that the darkness was palpable and solid. The moon and stars were of no avail to us. As there are about 150 days of rain throughout the year, and almost every rainfall except a drizzle is preceded by squalls, storms, tempests, or tornadoes, with the most startling thunder-crashes and the most vivid flashes of lightning, you may imagine that the houseless traveller in such a region must endure much discomfort.

I have passed far more hours than I would like to say spell-bound with wonder during various phases of existence within it. I have caught myself often unconsciously wondering at the strange resemblance to human life visible in the forest. It was represented here very faithfully in all its youth, vigour and decrepitude. There were trees prematurely aged and blanched, others were tumourous, others organically weak, others were hunchbacks, others suffered from poor nutrition; many were pallid and shrunk from want of air and sunshine, many were supported by their neighbours because of constitutional infirmity, many were toppling one over another as though they were the incurables of a hospital, and you wonder how they exist at all. Some are already dead, and lie buried in reeking composts of humus; some are bleached white by the palsying thunderbolt, or shivered by the levin brand or quite decapitated, or some old veteran born long before the siege of Troy is decaying in core and vitals. But the majority have the assurance of insolent youth, with all its grace and elegance of form, the mighty strength of prime life, and the tranquil pride of hoary aristocrats, or the placid endurance of ripe old age. All characters of humanity are repre-

sented here except the martyr and the suicide. Sacrifice is not within tree nature, and it may be that they only heard two divine precepts: "Obedience is better than sacrifice," and "Live and multiply."

And as there is nothing so distasteful to me as the mob of a race-day, so there is nothing so ugly in forest nature as when I am reminded of it by the selfish rush towards the sky in a clearing, the hour it is abandoned by the human owners. Hark! the bell strikes; the race is about to begin! I seem to hear the uproar of the rush, the fierce, heartless jostling and trampling, the cry "Self for self; the devil take the weakest;" to see the white-hot excitement, the noisy fume and flutter, the curious inequalities of vigour, and the shameless disregard for order and decency.

I have sat at my tent door watching the twilight deepen into a sepulchral gloom, knowing the elements were gathering for a war with the forest. I have heard the march of the storm advancing with the speed of a hurricane, and the sullen roar of the forest, as with nerves collected it swung its millions of giant heads to wrestle with it. The groaning, and rending, and crashing! I have seen the mighty swaying and surging of a countless army of tree-tops, and their leaves all quivering and rustling, and the undergrowth dancing as though in approval of the strength of its grey sires; and then I have heard the rain follow in a torrential downpour, hushing the storm and the strife, and descending in cascades from the drowning trees. We have watched the humus absorbing the rainwater as it fell, until, like a sponge, it was full, and the water rising by inches around us; and for twelve, fifteen, and eighteen hours the rain has steadily poured until it seemed as though we were never to see dry ground again. And then, after an uneasy night, wakened now and then by a falling tree which made the earth quake, or an unusual thunderclap overhead, as loud as if a planet had exploded, I have sat and watched the steaming vapour rise in blue clouds and sail up among the still foliage in ever thickening folds, and have wondered how the atmosphere would ever become clear again. Yet within a few hours the sun would be felt shining with purified lustre again; and every now and then, as some strata of foliage would be lifted by a sportive breeze, there would be subtle changes of light, and the dull green and damp leaves would shine with fitful life.

When there is so much vigorous life round about us in these eternal woods, it did seem strange to us that vegetable life was so incommunicable with our own. But yesterday we sympathised with the trees, as they roared in pain and torment, battling with the angry storm, and as they stand now so spectral and still in mute peacefulness, still so keen are our sympathies with them that one fancies there should be some mode of speech between us and them. I saw that some of them were many centuries old; some in prime life with every fibre healthy; some glorious in youth and strength; some goitrous, warty, ulcerous, stunted, and unwholesome; some slaves of slaves strangled by rigid clutch of a

pythonous parasite, the parasite in its turn bound firm with exceeding tension by a snaky creeper, and that also covered with lichen and moss ; some with great sores exuding globules and pastils of gummy matter, the ants feeding on them like flies on pus ; some old ancient palsied by a lightning stroke—life, death, and decay all around, as with us.

I have been absorbed in comparing the existence of some of those tree kings with events of human history. That splendid palm by the river side took root half a century before the Great Plague of London. Yonder stately bombax, springing up a head and neck above myriads, was born probably about the time of that memorable scene on Calvary. That wrinkled ironwood, four feet in diameter, was an infant under the shelter of his old sire when the tower of Babel was building.

And what office, if any, may one of these forest giants hold, whose blossoming crown and globe of foliage rises so high above the herd ? Is it that of a watchman looking out for tidings ? Is he the sire of the tribe ? Does he herald the dawn and the morning sun, and bid the trees unfold their buds, and shake their leaves for rejoicing ? Or has he gained such proud pre-eminence by his selfish and exuberant vitality ? But lo ! the storm approaches ; there is fury and wrath, the thunderbolt falls, and the proud king falls, severed at the neck. You almost hear the cry, "The King is dead, long live the King !"

Since I have made my map, I have taken the trouble to measure the extent of the area covered by this forest, and I find it to be something like 224,000,000 acres ; and if we allow each tree 30 feet around for sufficient space, and only forty-eight trees to the acre, we have the colossal figure of ten thousand seven hundred and fifty-two millions as the total number ; and if we calculate the plants and saplings of the impenetrable undergrowth, we shall be among the incalculable billions.

The longevity of the animal creation found in the rivers and shades of these aged woods is something worth glancing at. The elephant and the hippopotamus and the crocodile may boast of their 400 years of life ; the tortoise, a century ; the buffalo, fifty years ; the crows, eagles, ibis, and touracos, nearly a century ; the parrot, heron, and flamingo, sixty years.

From the chimpanzees, baboons, and monkeys, with which the forest abounds, is but a step, according to Darwinism, to the pigmy tribes whom we found inhabiting the tract of country between the Ihuru and Ituri rivers. They were known to exist, by the Father of poets, nine centuries before the beginning of the Christian era. You may remember Homer wrote about the sanguinary battle that was reported to have taken place between the pigmies and the storks. In the fifth century before Christ, Herodotus described the capture of five young explorers from the Nasamones, while they were examining some curious trees in the Niger basin ; and how the little men took them to their villages and showed them about to their fellow pigmies, much as you would like us to show the pigmies about England. The geographer Hekateus, in the

fifth century, located the pigmies near the equator of Africa, under the shadows of the Mountains of the Moon ; and I find that, from Hipparchus downward, geographers have faithfully followed the example of Hekataeus ; and nearly a year ago we found them where they had been located by tradition, under the names of Watwa and Wambutti. The forest which we have been just considering extends right up to the base-line of the Mountains of the Moon.

We were just now paying due reverence to the kings of the forest who were born before the foundations of the Tower on Shinar plain were laid, and because it seemed to us that in their life they united pre-historic times to this society-journal-loving nineteenth century. Let us pause a little, and pay honour to those little people who have outlived the proud Pharaohs of Egypt, the chosen people of Palestine, and the Emperors of Babylon, Nineveh, Persia, and the Macedonian and Roman Empires. They have actually been able to hold their lands for over fifty centuries. I have lately seen the wear and tear on the Pyramids of Egypt, and I can certify that the old Sphinx presents a very battered appearance indeed ; but the pigmies appeared to me as bright, as fresh, and as young as the generation which Homer sang about.

You will therefore understand that I, who have always professed to love humanity in preference to beetles, was as much interested in these small creatures as Henry Irving might be in the personnel of the Lyceum. Near a place called Avetiko, on the Ituri river, our hungry men found the first male and female of the pigmies, squatted in the midst of a wild Eden, peeling plantains. You can imagine what a shock it was to the poor little creatures at finding themselves suddenly surrounded by gigantic Soudanese, 6 feet 4 inches in height, nearly double their own height and weight, and black as coal ; but my Zanzibaris—always more tender-hearted than Soudanese—prevented the clubbed rifle and cutlasses from extinguishing their lives there and then ; and brought them to me as prizes, in the same spirit as they would have brought a big hawkmoth, or mammoth longicorn for inspection. As they stood tremblingly before me, I named the little man Adam, and the miniature woman Eve—far more appropriate names in the wild Eden on the Ituri than those of Vukukuru, and Akiokwa, which they gave us. As I looked at them and thought how these represented the oldest people on the globe, my admiration would have gone to greater lengths than scoffing cynics would have expected. Poor Greekish heroes and Jewish patriarchs, how their glory paled before the ancient ancestry of these mannikins ! Had Adam known how to assume a tragic pose, how fitly he might have said, “ Yea, you may well look on us, for we are the only people living on the face of the earth who from primeval time have never been removed from their homes. Before Yusuf and Mesu were ever heard of, we lived in these wild shades from the Nile Fountains to the Sea of Darkness ; and, like the giants of the forest, we despise Time and Fate.”

But, poor little things, they said nothing of the kind. They did not know they were heirs of such proud and unequalled heritage. On the contrary, their faces said clearly enough, as they furtively looked at one and the other of us, "Where have these big people come from? Will they eat us?" There were some nervous twitches about the angles of the nose, and quick upliftings of the eyelids, and swift searching looks to note what was in store for them. It is not a comfortable feeling which possesses a victim in the presence of a possible butcher, and a possible consumer of its flesh. That misery was evident in the little Adam and Eve of the African Eden. The height of the man was four feet, that of the woman a little less. He may have weighed about 85 pounds. The colour of the body was that of a half-baked brick, and a light brown fell stood out very clearly. So far as natural intelligence within his limited experience, he was certainly superior to any black man in our camp. The mysteries of woodcraft, for instance, he knew better than any of us. He knew what wild fruits were wholesome, and what fungi were poisonous. He could have given us valuable lessons how to find our way through the forest. I saw also that he could adapt himself to circumstances. If the pot was to end him, a very little shrinking only would betray his fear of pain; if he were to be treated affectionately, none could be so ready to appreciate affection and kindness.

We began to question him by gestures. Do you know where we can get bananas? He catches the cue; he grasps his leg to show us the size, and nods his head rapidly, informing us that he knows where to find bananas of the size of his leg. One sees that he can exaggerate as well as Mark Twain. We point to the four quarters of the compass questioningly? He points to the sunrise in reply. Is it far? He shows a hand's length. Ah, a good day's journey without loads; two days with loads! Do you know the lhuru? He nods his head rapidly. How far is it? He rests his right hand sideways on the elbow joint. Ah, four days' journey. Is there much food on the road. He pats his abdomen lovingly, with an artful smile, and brings his two hands to a point in front of him, from which we may infer that our paunches will become like prostrate pyramids. We ask him why Avetiko has so little food. The little man attempts to imitate the sound of gun-shots, and cries "Doooo," and we are informed quite intelligently that the devastation is due to the Manyema.

I suppose we must have passed through as many as a hundred villages inhabited by the pigmies. Long, however, before we reached them they were deserted, and utterly cleared out. Our foragers and scouts may have captured about fifty of these dwarfs, only one of whom reached the height of 54 inches. They varied from 39 to 50 inches generally. They are so well proportioned that at first sight they might be taken for ordinary mankind; but when we place by their side a European, a Soudanese, or a Madi, they appear exceedingly diminutive. By the

side of dwarfs of mature age, a Zanzibari boy of thirteen would appear large.

The agricultural settlements in this region are to be found every nine or ten miles apart; and near each settlement, at an hour's march distance, will be found from four to eight pigmy villages, situated along the paths leading to it. The larger aborigines are very industrious and form a clearing of from four hundred to a thousand acres. Amid the prostrate forest they plant their banana and plantain bulbs. In twelve months the prostrate trees are almost hidden by the luxuriant fronds and abundant fruit of unrivalled quality, size, and flavour. It would be easy to prove that in the forest an acre of banana plants produces twenty-five times more food than an acre in wheat produces in England. The pigmies appear to be aware that a banana plantation is inexhaustible, and to think that they have as much right to the produce as the aboriginal owners. Therefore, they cling to these plantations and make the larger natives pay dearly for the honour of their acquaintance. In another manner they perform valuable service to them, by warning them of the advance of strangers and assisting them to defend their settlements; they also trap game and birds, and supply the larger natives with peltry, feathers, and meat. It appeared to me that the pigmies were regarded somewhat as parasites, whose departure would be more welcome than their vicinity. When honey, and game, meat, peltry, and feathers get low or scarce in the neighbourhood, the pigmies pack their household goods on their women's backs, and depart elsewhere, to attach themselves to some other plantations. A forest village consists of from 20 to 100 families of pigmies, and probably, in that area between the Ihuru and Ituri rivers, there are as many as 2000 families living this nomadic and free life, in the perpetual twilight of the great and umbrageous forest of Equatorial Africa.

Having, within the brief time permissible, considered the forest and its inhabitants, let us take up the subject of the pastoral land and its tribes.

In Equatorial Africa the pasture land, adapted for cattle, generally begins at an altitude of 3200 feet above the sea; but the best and most nourishing grasses are found above 4000 feet. The forest ends completely at 3500 feet, and the land soon afterward varies from 4000 to 6000 feet, and extends in a belt parallel with the Albert Lake and between the lakes Victoria and Tanganyika down to Ukawendi, and from Abyssinia and east of the Victoria, down to the Rufiji. In the intra-lake region are the nations of Ankori, Uganda, Unyoro, Karagwé, Mpororo, Ihangiro, Uhaiya, Uzungora, Uzinja, Ruanda, Urundi, Uhha, and Unyamwezi. On the grassy plateau, parallel with Lake Albert, we found quite a mixed race, called the Bavira, Balegga, and Wahuma. The latter named differ as much in their physiognomy, customs, and characteristics from the other two, as an octoroon differs from a negro. The Wahuma are very

numerous in Unyoro and Uganda, throughout the intra-lake region, especially in Ankori. Their sole occupation is keeping cattle. As you proceed further south, and reach Unyamwezi, the Wahuma become known as Watusi. In Unyoro they are known as Waima and Wachwezi; among the Bavira and Balegga they are called Wawitu; but all the Wahuma, Wachwezi, Wawitu, and Watusi speak the same language; therefore we class them under the generic term Wahuma. They are distinguished from among the agricultural classes, with whom they live as herdsmen, by their complexion, length of limbs, small head and ears, long slender hands and feet, and regular features. Among the purest families these distinctions are very marked, the complexion being frequently like the colour of yellow ivory. They do not hesitate to tell us disdainfully that they are not hoemen, if we seek to purchase grain or potatoes from them. The produce of their dairies suffices, with a few hides, to purchase all the vegetable food they need. They will live among the hoemen and allow their cattle to graze on the pasture in the land, but will build their huts and zeribas separate, and apart altogether from the villages of the other class; they will employ female servants, or own female slaves, but they will not cohabit with them. And the Wahuma race grow side by side with the darker agricultural class without taint, by preserving their customs intact. Wheresoever they obtained the idea, they believe that the other class is infinitely below them; and absolute destruction of their communities and disruption of the families will not induce them, except on very rare occasions, to mingle their blood with any of the agricultural class. But yet, as we proceed further south, we find that at some time there has been an admixture of the two races, which has produced a composite race, which unites the characteristics of both the superior and inferior race, and who are both agriculturists and herdsmen combined, as in Europe. It has been a subject of engrossing interest to me to discover why I find among a nation in the far interior, pure negroes, a composite of the Wahuma, and negroes and the pure Wahuma. I am about to give you the deductions drawn from about 24,000 miles of travel in Abyssinia, Ashantee, the Livingstone Search, Across Africa, two Expeditions up the Congo, the Exploration of certain tracts on the East Coast, and elsewhere, with this last Expedition for the quest and rescue of Emin.

Probably many of you have had an idea that the Africans are all negroes; and I feel sure that if the various types of Africans were suddenly presented to you on this platform, you would still be ready to affirm that they were negroes; but you must permit me to say that you would commit a grave error.

I have already spoken to you of one race inhabiting that great Equatorial forest—the pigmies, who are a diminutive negro race, despite the fact that they are divided into two distinct types—the dark, long-headed, prognathous-jawed, and a lighter, round-headed, broad-faced

type. You also know the true negro of West and South-east Africa, characterised by woolly hair, expanded nose and sunken nasal ridge, fat everted lips, and exceeding prognathy. You also know the tall, war-like Zulu and Kaffir, who are not pure negroes, but negroid. You must accept them as types of the composite race I just spoke to you about.

Next comes the Mhuma, and if you wish a rough and ready picture of him you must imagine a traditional lanky New Englander, darkened with burnt cork, with a negroid wig; or plant a Zulu and a Hindu before you, and produce an Indo-African type out of the compound—features regular, hair curly but silky, small round head, shapely neck, small thin lips, small ears, slender hands and feet, tall, and perfect in figure from the knees upward. That is the representative of the Wahuma, who disdains the use of the hoe, and despises the planter and the sower, and will not intermarry with the negro and commit the awful crime of miscegenation any more than the proudest Virginian in America. They came from Abyssinia, a long time ago. They resemble the Abyssinian Somalis and Gallas. You may call them if you will Abyssinian or Ethiopic, but the comprehensive philosophic term would be Indo-African.

A fifth race is represented by the Semitic Africans, who are to be found principally among the Mahdists to-day at Darfour, Kordofan, and Dongola; and a sixth race is found among the Berberines, as represented by the Tuaregs and Bedawy of North-west Africa.

We must be satisfied for the present with concluding that the pigmies and the negroes are the primitive races of Africa; that Ethiopia in pre-historic times was invaded by various migrants from the great Aryan race; that as they multiplied they scattered southward and mixed with the negro tribes, and produced that composite race represented by the Zulus, Kaffirs, Bechuanas, Matabeles, Mafitte, Watuta, and Wanyamwezi. A later movement conveyed tribes having peculiar customs, who finding the intra-lake region best adapted for their cattle, clung to the land and its rich pasture, indifferent to the fate of the tribes or natives employed in tilling the ground, and their clannish descendants are the Indo-African Wahuma.

Among the most interesting discoveries that we were enabled to make during our late expedition, are the connection between the Lake Albert Edward and Lake Albert, the famous Mountains of the Moon, and the extension of Lake Victoria to the south-west. Lake Albert, discovered by Sir Samuel Baker in 1864, called Muta Nzigé by the natives around it, begins in N. lat. $1^{\circ} 10'$ or thereabouts. Near its head there enters a powerful river a hundred yards wide, nine feet deep and a current of three knots an hour. It is called the Semliki, and on following that deep sunken trough, which is a prolongation of that occupied by the Albert Lake, we find, after following a winding course of 150 miles, that it issues from another Muta Nzigé Lake, now called

Albert Edward, situated at an altitude of about 900 feet above Lake Albert, or 3307 feet above the sea. At a distance from the right bank of the Semliki river, of from 5 to 15 miles, there rises a lofty range of snowy mountains. As the snow-line on the equator is found at 15,260 feet above the sea, and as the height of snow visible above that was between 3000 and 4000 feet, the altitude of the highest peak of Ruwenzori, as the Wahuma call it, must be between 18,000 and 19,000 feet.

In the chapter on geology, which I find in your last edition of 'Hints to Travellers,' I find a very peculiar sentence, which reads, "Few, if any, geologists now believe that mountains were simply thrust up from below." All that I can say is that I am sorry for the geologists, for who that sees a pile of earth above a fox's hole will doubt that the material came from the hole? In the case of that trough, 230 miles long and 30 miles wide, 3000 feet deep, occupied by the two lakes Albert Edward and Albert, and the Semliki Valley in the midst of what was once an elevated plateau 5000 to 6000 feet above the sea, and seeing that enormous range upheaved above the plateau, who can doubt that the material came from that trough? The rocks of Ruwenzori are igneous, its serrated summits and their semicircular formation indicate the existence at one time of craters, and since the upheaval the sides have been grooved by glaciers, scoured by torrential rainfalls, and channelled into deep ravines by the threescore of streams and their affluents formed by the melted snows, and the débris has been spread over the Semliki valley and into the beds of the two lakes.

I humbly crave your pardon if I say anything extraordinary, but my exceeding interest in the subject of the Semliki Valley leads me to suggest what I am about to say, in order that some gifted person connected with geology may turn his earnest attention to this theme, and throw more light upon it. Thoroughly believing as I do that the abyss now occupied by the two lakes and Semliki Valley was formed by a sudden subsidence which compressed the vapours and gases beneath to be vented by the craters of Ruwenzori, I have been speculating as to what aspect the awful chasm bore after the volcanoes had belched their contents and formed the snowy range. Let us suppose that we are far back in the pre-historic period and looking down from the western edge of the disrupted plateau, into the profound abyss just formed. Ruwenzori is active, tall columns of smoke and fire spring up from the vents, rivers of lava pour down the sides, fragments of rock are hurled far up, and fall crashing on the slopes, thundering down to the bottom, until nearly midway between the lakes are formed dykes of congealed lava and arrested rock; and in the course of time Ruwenzori has ceased to be disturbed, and rises in a series of cones, formed of igneous rock and débris. The snows gather over what was lately molten rock, cinders, and huge fragments thrown up. The temperature in the bottom of the abyss is torrid, above the snow-line it is below zero; but the heated

vapours from below, and the hot equatorial sun effect a constant descending movement of the snow above, and ruinous avalanches roll down crashing, and formidable glaciers drive irresistibly downward, each bearing their masses of earth, to restore the material whence it came; and the tropic rains begin to score and groove, and channel and wash away the loose soil and fragments, some into the Albert Edward, and some into the Albert, and some into the valley, until at last they have arrived at the summit of their obstructions, at their respective northern extremities, and when they are brimful they run over—the Albert northward, through the lower level of the uplands north of Tunguru, the Albert Edward over the obstructive dykes in the Semliki Valley—and when that period has arrived let us try and discover what means we have at present for measuring the lapse of time. Thirteen years ago the French missionaries settled on Lake Victoria, and since then they have found that the lake has subsided three feet, which would be equal to two inches and eight-tenths of an inch per annum. If the upland at the north end of Lake Albert had then an average altitude of 2000 feet above the present level of the lake, it has required 8666 years for Lake Albert to reach its present stage, that is if the White Nile, escaping from the north end, has worn away its reefs and dykes at the same rate that the Victoria Nile has worn the lip of its rocky obstructions at the Ripon Falls.

We have a second means of guessing within a certain number of centuries, the age of the elapsed period, in that recent increase in the extent of the Semliki Valley at the head of Lake Albert, and the exposure of the terrace at the south-west end, which rises gradually from the edge of the lake to the base of the plateau wall that suddenly rises 2500 feet behind it. From the south end of the lake to the edge of the dense tropical forest, there are about 30 miles in a straight line; the rise of the land is at the rate of two feet in a mile. For 20 miles of the distance the old bed of the lake is covered with poor innutritious grass; for the remaining 10 miles it is covered with scrubby acacias which gradually become a thin forest, mixed with euphorbia and tamarinds which are hardy trees. The forest gradually becomes thicker and more umbrageous, and here and there is a borassus palm. To expose that 30 miles of lake-bed, I estimate that it required between 260 and 300 years, and that length of time to enable the tropic rains to scour the salts and acrid properties from the earth in a sufficient quantity to enable those palms and tamarinds to grow. On proceeding southward from the southern edge of the lake we first see soft alluvial mud deposited by the Semliki, then a saline earth uncovered, then scant feeble grass, which as we proceed becomes richer and taller. At 20 miles we see a few acacia scrubs dotting the plain every 400 yards or so—then very thin straggling groups, which in a day's march you see deepened into a shady forest. At 30 miles you enter under the impervious umbrage of a tropic forest, which grows

darker and taller, and presently impenetrable, and for 30 miles you are among the marvels of vegetable life, then you emerge among the acacias again, and 12 miles from Lake Albert Edward they disappear altogether, and you see nought but grass, decreasing in height, losing succulency, feeble and scant, until you are on the saline mud of the shore of the Upper Lake. I hope now that you perceive that I am only suggesting; I by no means assert anything except what we saw and know from observation. If the south end of Lake Albert is $1^{\circ} 10'$ N. lat. now, in 1864—when Sir Samuel Baker discovered it—the south end was in N. lat. $1^{\circ} 7'$. In the natal year of his Royal Highness the Prince of Wales, it was at N. lat. $1^{\circ} 4' 30''$. Five years after Charles the First began to reign, the south end was in N. lat. $0^{\circ} 40'$. During the siege of Troy, the two lakes were one, and the south end of the great lake was in $1^{\circ} 10'$ S. lat.; and if these two lakes wear away their obstructions as they have been doing, in the year 2150 there will be no Lake Albert Edward, and in the year 2540 the Lake Albert will have vanished, and the Semliki Valley will have extended its length to 2° N. lat., and the Semliki river will have united the Victoria Nile to form the Bahr el Abiad, or White Nile.

Do you know that I hesitated to mention the discovery of the Mountains of the Moon as much as you would to confess to having seen the famous sea serpent? I was quite prepared to hear some one ready to heap ridicule on the statement; but I have since been able to fortify the assertion by inspecting the maps of the ancients—Greeks and Arabs. That they were not explored long ago is due solely to the vagaries of individual cartographers. Why, as long ago as Homer, the Mountains of the Moon, and the fountains of the Nile, and the pigmies, had been heard of and located with excellent judgment; but Hekataeus, Hipparchus, Ptolemy, Idrisi, the Portuguese, Dutch, and French cartographers, shifted these interesting features of African geography whither they listed. From 10° north of the equator they shifted the Mountains of the Moon to 20° south, and then 10° nearer to the neighbourhood of the Line, and then with a flying leap to 10° north of it. They caused the old continent to assume an exceedingly dissipated appearance in the sixteenth century, and in the seventeenth they gave it a penitent shore-line; but the crime of crimes was perpetrated in the middle of the last century, when D'Anville, a Frenchman, and other cartographers, conspired to rob Central Africa of the three lakes which had played such a part on past maps, and to draw the Mountains of the Moon as extending from the Gulf of Guinea to the Gulf of Aden. You need not wonder that during the last forty years you have heard travellers indulging in intemperate language whenever the Mountains of the Moon were mentioned.

Listen to this beautiful legend which I obtained while I was at Cairo, among many others. It is taken from a book with the taking title of 'The Explorer's Desire':—

“There is a difference of opinion as to the derivation of the word ‘Gumr.’ Some say that it ought to be pronounced Kamar, which means the moon. Hence *Jebel Gumr*—the Mountains of the Moon; but the traveller *Ti Tarshi* says that it was called by that name because the eye is dazzled by the great brightness. This mountain, the *Gumr*, extends eastward and westward into uninhabited territory on both sides. Indeed, this whole chain is uninhabited on the southern slope. This chain has peaks rising up into the air, and other peaks lower. Some have said that certain people have reached these mountains and ascended them and looked over to the other side, where they saw a sea with troubled waters dark as night (*Lake Albert Edward*, of course), this sea being traversed by a white stream bright as day, which enters the mountains from the north, and passes by the grave of the great *Hermes*, and *Hermes* is the prophet *Idrisi*, or *Enoch*.

“It is said that *Enoch* there built a dome. Some say that people have ascended the mountain, and that one of them began to laugh and clap his hands, and throw himself down on the further side of the mountain. The others were afraid of being seized with the same fit, and so came back. It is said that those who saw it, saw bright snows like white silver glistening with light. Whoever looked at them became attracted, and stuck to them until they died, and this science is called ‘*Human Magnetism*.’

“*Adam* bequeath the Nile unto *Seth*, his son, and it remained in the possession of these children of prophecy and of religion, and they came down to *Egypt* (or *Cairo*) and it was then called *Lul*, so they came and dwelt upon the mountains. After them came a son called *Kinaan*, then his son *Mahaleel*, and then his son *Yaoud*, and then his son *Hamu*, and his son *Hermes*, that is, *Idrisi* or *Enoch* the prophet. *Idrisi* it was who reduced the land to law and order. He then went to the land of *Abyssinia* and *Nubia* and gathered the people together, and extended the distance of the flow of the Nile, or reduced it according to the swiftness or sluggishness of the stream. It is said that in the days of *Am Kaam*, one of the kings of *Egypt*, *Idrisi* was taken up to heaven, and he prophesied the coming of the flood, so he remained on the other side of the equator, and there built a palace on the slopes of *Mount Gumr*. He built it of copper, and made eighty-five statues of copper, the waters of the Nile flowing out through the mouths of these statues, and then flowing into a great lake, and thence to *Egypt*.

“*Idyar el Wadi* says the length of the Nile is two months’ journey through *Moslem* territory, and four months’ journey in uninhabited country; that its source is from *Mount Gumr* beyond the equator, and that it flows to the light coming out of the *River of Darkness*, and flows by the base of *Mount Gumr*.”

There is no need for me to tell you that *Jebel Gumr* is *Ruwenzori*, the “*Cloud King*”; that the *Sea of Darkness* is the *Albert Edward Nyanza*,

and that the River of Darkness is henceforth to be known as the Semliki, which empties into Lake Albert, and that from the latter lake issues the White Nile, which near Khartoum joins the Blue Nile.

Another emotion is that inspired by the thought that in one of the darkest corners of the earth, shrouded by perpetual mist, brooding under the eternal storm-clouds, surrounded by darkness and mystery, there has been hidden to this day a giant among mountains, the melting snow of whose tops has been for some fifty centuries most vital to the peoples of Egypt. Imagine to what a god the reverently-inclined primal nations would have exalted this mountain, which from such a far-away region as this contributed so copiously to their beneficent and sacred Nile! And this thought of the beneficent Nile brings on another. In fancy we look down along that crooked silver vein to where it disports and spreads out to infuse new life to Egypt, near the Pyramids, some 4000 miles away, where we behold populous swarms of men—Arabs, Copts, Fellahs, Negroes, Turks, Greeks, Italians, Frenchmen, English, Germans, and Americans—bustling, jostling, or lounging, and we feel a pardonable pride in being able to inform them for the first time that much of the sweet water they drink, and whose virtues they so often exalt, issues from the deep and extensive snow-beds of Ruwenzori or Ruwenjura—"the Cloud King."

We have travelled along the north, the north-west, and eastern coasts of Lake Albert Edward. We have had abundant opportunities of hearing about the south and western sides. The south side of the lake, much of which we have viewed from commanding heights such as Kiteté, is of the same character as the flat plains of Usongora, and extends between 20 and 30 miles to the base of the uplands of Mpororo and Usongora. Kakuri's canoe-men have been frequent voyagers to the various ports belonging to Ruanda and to the western countries, and all around the lake, and they inform me that the shores are very flat, more extensive to the south than even to the north, and more to the west than to the east. No rivers of any great importance feed the Albert Edward Lake, though there are several which are from 20-50 feet wide and two feet deep. The largest is said to be the Mpanga and the Nsongi. This being so, the most important river from the south cannot have a winding course of more than 60 miles, so that the farthest reach of the Albertine sources of the Nile cannot extend further than 1° 10' S. latitude.

Our first view, as well as the last, of Lake Albert Edward was utterly unlike any view we ever had before of land or water of a new region. For all other virgin scenes were seen through a more or less clear atmosphere, and we saw the various effects of sunshine, and were delighted with the charms which distance lends. On this, however, we gazed through fluffy, slightly waving strata of vapours of unknown depth, and through this thick opaque veil the lake appeared like dusty

quicksilver, or a sheet of lustreless silver, bounded by vague shadowy outlines of a tawny-faced land. It was most unsatisfying in every way. We could neither define distance, form, nor figure; estimate height of land-crests above the water, nor depth of lake; we could ascribe no just limit to the extent of the expanse, nor venture to say whether it was an inland ocean or a shallow pond. The haze, or rather cloud, hung over it like a grey pall. We sighed for rain to clear the atmosphere, and the rain fell; but, instead of thickened haze, there came a fog as dark as that which distracts London on a November day.

In brief words, the north-west and west sides of Ruwenzori, blessed with almost daily rains and with ever-fresh dews, enjoy perpetual spring, and are robed in eternal verdure; the south and south-west sides have their well-defined seasons of rain and drought, and if seen during the dry season, no greater contrast can be imagined than these opposing views of nature's youth and nature's decay.

But, alas! alas! in vain we turned our yearning eyes and longing looks in their direction. The Mountains of the Moon lay ever slumbering in their cloudy tents, and the lake which gave birth to the Albertine Nile remained ever brooding under the impenetrable and loveless mist.

The question has been asked by stolid and thoughtless people—What good has been derived from our late expedition, which less than a year ago was about commencing its long march to the sea from Lake Albert? and I answer that to humanity the gain has been great. The world is richer by the knowledge that there are 10,000 million more trees in it than we knew of before; that there are exhaustless quantities of rubber and gums, and dye-stuffs; that there is navigation furnished by nature, by which those interested in these treasures can proceed to collect them; and that by these vegetable products the millions of degraded human beings within that great forest will in process of time learn that their fellow creatures have far vaster value than the value of their flesh.

As a Christian nation you should rejoice that the few thousands of pounds you lent for this service rescued over 400 men, women, and children from slavery; that you restored 290 people to their homes in Egypt; that you restored the late Governor, stagnating among the impossibilities, to active service for a friendly nation; and a gallant captain and explorer to his countrymen of Italy, and a merchant Greek to his family; and I am quite sure that you begrudge your bounty as little as we our service. Thirdly, as geographers, you must be gratified with the wide extension of geographical knowledge gained. The Aruwimi river is known almost throughout its entire length; you know the extent of that immense forest; you know the connecting link of water between the two lakes along the course of the Albertine Nile; the classic river the source of which Alexander, Cambyses, Cæsar, and Nero desired to know, you now know to its very fountain head; those lofty

Mountains of the Moon, which have been so anxiously sought for since Homer's time, have now been surveyed and located. The most glorious portions of Inner Africa have been traversed and described for the first time; and we know that there is scarcely an acre throughout the area but is a decided gain to our earth; and I assert that every mile of new lands traversed by us will serve in the coming time to expand British commerce, and stimulate civilised industry. And, finally, we have extended British possessions to the eastern limits of the Congo Free State, having acquired many a thousand square miles of territory for the assistance, by force of arms and other considerations, against their enemies the Warasura.

Our promise had been, on setting out on this expedition, to do as little harm and as much good as possible. We, therefore, submit these bare outlines of our service, hoping that they will be acceptable to you.

The meeting at which the foregoing paper was read was convened also with the intention of welcoming Mr. H. M. Stanley on his return to England, after his successful expedition across Africa for the relief of Emin Pasha. The Fellows of the Society and their friends and guests invited by the Council assembled to the number of 6200; and the meeting was honoured by the presence of their Royal Highnesses the Prince and Princess of Wales, the Duke of Edinburgh, and many other members of the Royal Family, besides numerous distinguished representatives of Science, Art, Literature, Politics, Law, and Commerce, and Presidents or Delegates of Provincial and Foreign Geographical Societies. A large map, 60 feet from east to west and 30 feet from north to south, showing the route of the expedition from sea to sea and the broader physical features of Equatorial Africa, with the names of the chief features visible from all points of the hall, was displayed behind the platform, and 6000 copies of a folding hand-map, printed on thin cardboard, were distributed among the audience.

The chair was taken by the PRESIDENT, the Right Hon. Sir MOUNTSTUART E. GRANT DUFF, G.C.S.I., who in opening the proceedings spoke as follows:—

Your Royal Highnesses, Ladies, and Gentlemen,—Those who have welcomed or will still welcome Mr. Stanley have, or will have, regard chiefly to the philanthropic, to the commercial, or to the political possibilities of the future. I suppose that most of us as individuals are interested in one or other or all of these matters; but the Geographical Society, as a society, is interested only in the extension of man's knowledge of his environment. It is because Mr. Stanley has done so much to extend that knowledge that we have convened this enormous gathering, far the largest which has ever come together under our auspices. Of Mr. Stanley's recent travels I will say nothing. He is here to tell you about them himself. I should like, however, in a single sentence, to record the principal things which Mr. Stanley did for geographical science before he entered upon his recent expedition. In the first place, along with Livingstone—a name never to be mentioned without honour—he explored the northern portion of Lake Tanganyika and settled the question, then much debated amongst geographers, whether the Nile did or did not take its rise in those ample waters. That question he settled in the negative. Then, upon his second expedition, he traced down the Shimeyu river, which flows from the south about 300 miles into the Victoria Nyanza, and is accordingly one of the

ultimate sources of the Nile. Thirdly, he circumnavigated the Victoria Nyanza, which is only a very little smaller than Lake Superior, the largest of the fresh-water seas of the world. Fourthly, he discovered a new lake, which he has now named in honour of His Royal Highness, on whose presence we congratulate ourselves to-night. Next he circumnavigated Lake Tanganyika, and examined its then dry outlet the Lukuga, discovered a few months previously by Lieutenant Cameron, and sagaciously concluded that it would again, as shortly afterwards happened, discharge its waters into the Lualaba. Then he traced the Lualaba itself, and settled the question which possessed the mind of Livingstone so much in his last years: what the Lualaba really was—whether it was the Nile or the Congo. Mr. Stanley proved, by following it down to the Atlantic, through an Odyssey of wandering and an Iliad of combat, that it was the Congo; and by that means he threw open to the enterprise of civilised man a territory fully as large as that of British India. These are mighty achievements, and it must be remembered that in all of them, as in this last journey, which has been equally fruitful of geographical discovery, Mr. Stanley was his own surveyor, his own astronomical observer, and the recorder of his own actions. You will then not think it surprising, and I am certain that I shall have the full support and sympathy of every person here present when, in the name of the Royal Geographical Society, and by its authority, I give its warmest thanks to Mr. Stanley for what he and his companions have done for geographical science. We thank him and we thank them all, white or black, living or dead. That gifted man, too early lost to geographical science, to letters, and to the State, the last Lord Strangford, said of Mr. Gifford Palgrave, when the latter returned from Arabia and recounted his journeys to us, that there had been nothing like it since Herodotus recited at Olympia. I do not know whether Herodotus ever really recited at Olympia. Of this I am certain, however, that if he did so, he did not address an audience either so numerous or so distinguished as that which is here assembled; and in all that mighty audience there is not one single human being who is not delighted to see and impatient to hear the illustrious explorer whom I now invite to address you.

On the conclusion of Mr. Stanley's Address,*

H.R.H. THE PRINCE OF WALES said:—Ladies and Gentlemen,—By the permission of our President, a task has been confided to me, which is both an easy and a difficult one. It is an easy one, inasmuch I shall have the pleasure to propose to you a hearty vote of thanks to Mr. Stanley for the interesting address he has given us, but I feel it should have been placed in worthier hands to propose this vote of thanks. We have, I know, all listened with profound attention and interest to the address which has fallen from Mr. Stanley. It is marvellous to me that in the short space of time which he had, he was able to give us so much valuable and interesting information. His name must ever go down to posterity as one of our great travellers, and I may say philanthropists, and one whom I feel sure the Royal Geographical Society will ever be proud of. I would further remind you that fifteen years ago, under the auspices of the *New York Herald*, Mr. Stanley went out to look for the great traveller, Livingstone, and succeeded in finding him. Since then he discovered the Congo, which has become now a great Free State; and last, not least, he was sent by some philanthropic gentlemen to try and find, and to release the last of the ever-to-be-regretted Gordon's lieutenants—Emin Pasha, in which he succeeded. We have heard to-night, and I have had also opportunities of hearing from him on other occasions, the terrible difficulties he had to undergo in

* *Ante*, p. 313.

reaching his last object. He has told you of the great equatorial and almost impenetrable forest, 621 miles in length ; he has told you also of that wonderful race, the Pigmies, who have existed, he says, for fifty centuries, and who I think were perhaps more instrumental in lengthening his journeys than any other cause. He has also told you—a matter of great interest—of the actual position of the Mountains of the Moon, which have been described to us by the ancients as placed in various positions. I do not profess in any way to claim the proud right of addressing you as a geographer, but at the same time, it affords me sincere satisfaction that the task, however shortly and imperfectly I have carried it out, has been imposed upon me, to ask you most cordially not only to vote a hearty and unanimous expression of thanks and gratitude for the admirable and interesting address which we have heard to-night, but also to extend to Mr. Stanley a hearty welcome on his return after his long and arduous journey, and to beg that that extension may also be given to those brave and distinguished gentlemen whom I see here to-night, who accompanied him on his journey.

H.R.H. THE DUKE OF EDINBURGH said :—Ladies and Gentlemen,—I am sure if the Prince of Wales found himself in any difficulty with regard to proposing the vote of thanks which I have now the pleasure to second, I feel myself in a still greater difficulty in having to follow the speech which he has made, for he has touched upon every subject which the interesting address of Mr. Stanley contained, and I feel myself, therefore, in great difficulty in saying anything further, excepting that on the occasion when we first had the opportunity of hearing him at St. James's Hall, he gave us a description of his work in connection with the Relief Committee that sent him out, and here he has given us more directly information in connection with the Society which has met here this evening. The description of the forest through which he travelled, I am sure was one which was very impressive. Its climate and light seem to have been such that one would prefer the London fog which he alluded to. But the great value of the information which we have before us this evening is the completion of the map across the whole of the continent, which map has been so much distorted in previous times. I fear I have no other words to add in seconding this vote of thanks, excepting my own most cordial welcome to him and his colleagues on their return from their arduous journey.

The vote of thanks was carried amid great applause.

The PRESIDENT, rising again, said :—In the year 1873 the Royal Geographical Society assigned its gold medal to Mr. Stanley. By doing that it exhausted all its ordinary powers of honorific distinction ; but the Council of the Society has come to the conclusion that Mr. Stanley had done so very much more since that time than he did before it, that it was their duty to assign to him another medal for his later work. Mr. Stanley would not wish, and the Society would not wish, that that honour should appertain only to him. They have accordingly awarded medals to all his gallant companions. Mr. Stanley's medal, specially designed for the purpose, has been made of British gold, which has been given for the express purpose by Mr. Pritchard Morgan, who desires thereby to show his admiration for Mr. Stanley's achievements. For his companions, medals of the same design have been struck in bronze. The Society will also like to know that the Council has thought it right to assign marks of honour to all the Zanzibaris and other natives who have accompanied Mr. Stanley across the continent of Africa. The distinction to be assigned to them will take the form of a silver star with a suitable inscription. I have now to request the Prince of Wales to be so good as to present the medals to Mr. Stanley and his companions.

H.R.H. THE PRINCE OF WALES then presented the medals to Mr. Stanley, Lieut. Stairs, Dr. Parke, Captain Nelson, Mr. Jephson, and Mr. Bonny.

Mr. STANLEY responded for himself and his companions as follows:—Mr. President, Your Royal Highnesses,—It has been said that no great work was ever done through hate, and neither was it done for hire, but it has been done through love, and you will have to accept what I have done as having been done solely through love of the work I was appointed to perform. It was a former President of this Society who sent Dr. Livingstone on his last fatal journey. I spent four months and four days with him, when I had the pleasure of hearing a good many things about this Society for the first time in my life. Among many other things of which I have a keen recollection are the gorgeous entertainments sometimes given by the Royal Geographical Society to its explorers, but he did not say very much about the medals. I have seen the medals since I have returned, and to-day I have got the grandest, the noblest, the biggest of all, and it has been presented by H.R.H. the Prince of Wales to me, which lends additional honour to it. The presence of those who have gathered here to welcome me after my last journey also enhances the value of the gift. This grand galaxy of beauty and talent will vividly impress the occasion on my memory. I beg to express to you my best thanks, and if my companions will permit me, to thank you in their name also.

In conclusion, the PRESIDENT said:—I am sure it would be the desire of all present that I should express your thanks to their Royal Highnesses the Vice-Patron and Honorary President for having attended and taken part in the proceedings. The meeting is now adjourned.

Ascent to the summit of Kilima-njaro.

By Dr. HANS MEYER.

(Read at the Evening Meeting, April 14th, 1890.)

Map, p. 372

AN orographical map of Africa shows at the first glance that the backbone of that continent lies in the east, facing the Indian Ocean, whilst its main body, with its arterial system of huge rivers, stretches away to the westward, far into the Atlantic. The eastern highlands, beginning at the head of the Gulf of Suez, first follow the shore of the Red Sea through Nubia and Abyssinia, then extend through Enarya, Kaffa, and the regions of the Kenia and Kilimanjaro as far as the watershed between Tanganyika and Nyassa, whence, trending to the westward, they form the height of land separating the basin of the Congo from that of the Zambezi. This eastern rim of the dark continent presents thus, as it were, a reflected image of the Andes lying on the western flank of South America. In these African highlands, however, very different from what we meet with in the Andes, mountains and mountain ranges play quite a subordinate part, plateaus and table lands being the most prominent feature. Where bold mountain masses rear their heads above the general level, as in Abyssinia and under the Equator, they point to the activity of volcanic forces. Elsewhere in Africa volcanic rocks are met with, but nowhere on so vast a scale as in the east, and nowhere else

have they modified the surface features of the land on an equally extensive scale.

Volcanoes all over the world point to the existence of deep-reaching faults in the earth's crust, through which they rose into being. The linear arrangement of volcanoes indicates the course of such a line of fracture along the surface of the earth. So also in Africa. The great East African line of eruption begins in the southern portion of the Red Sea, and ends in the region surrounding Kilima-njaro. It attains its greatest width in Abyssinia, whence it gradually contracts southwards. In the district of Samburu, recently explored by Count Teleki, it presents itself as a trough depressed between parallel ridges of hills which enclose an extended chain of salt lakes and swamps. It again increases in breadth in the region of Kilima-njaro and Meru. Beyond this there are indications of its extending to the Nyassa and the Zambezi, whilst on the north it crosses the Red Sea into Arabia and reaches into southern Syria. The Ruwenzori, Gambaragara, Gordon Bennett, and other mountains to the west of the Victoria Nyanza, appear to indicate the existence of a secondary parallel line of volcanic eruption.

The origin of most African volcanoes reaches back to the Tertiary age. Only a few of them still exhibit signs of activity in the shape of solfataras; one of these is in eastern Abyssinia, another near Lake Samburu, and a third on Lake Naivasha. Eruptions no longer take place.

In Africa, as in other parts of the world, the energy of volcanic forces appears to have attained its maximum in the equatorial regions. Within these the peak of Ruwenzori towers up 17,400 feet above the sea, Kenia rises to a height of 19,000, and Kibo, the highest summit of Kilima-njaro, attains 19,700. Kilima-njaro is thus the loftiest mountain within the limits of Africa.

It is not therefore difficult of comprehension that this, the highest of African mountains, has afforded a place to all the climates of the world upon its slopes, and that from its tropical base to its ice-crowned summit it offers facilities for the existence of every variety of plant and animal. Nor need we wonder, that ever since its existence became known, it should have proved an object of much interest and speculation. Since its discovery in 1848 by Rebmann, the missionary, Kilima-njaro has been visited by forty-five Europeans, including explorers, sportsmen, Christian missionaries, and political agents, desirous of gaining a foothold within its fertile districts.

In the spring of 1887, I, too, yielded to the fascination of what was still a virgin peak, having previously to some extent familiarised myself with Africa, by a visit to the Cape Colony, the Transvaal, and Natal.

Starting from Mombaza in June 1887, I followed Thomson's and Johnston's route as far as Taveta and Marangu, and subsequently returned to the coast for the most part by Johnston's route along the Pangani river. The ascent of Kilima-njaro I attempted, not from

Mandara's district of Moji (Moshi), as von der Decken, New, Thomson, and Johnston had done, but from Mareale's village in Marangu, on the eastern slope of the mountain. This route I selected because from here Kilima-njaro—like Etna—rises by such gentle slopes, that a vehicle could be driven up to an altitude of 14,500 feet, were it not for the existence of a belt of primeval forest, of numerous ravines, and impracticable lava-fields. Kilima-njaro rises in beautiful contours from a steppe, having an average elevation of about 2600 feet above the sea-level. Its base from east to west, measured from the Lumi river to the termination of its western ridges, is about 60 miles, and from the southern foot-hills to the chain of swamps in the Nyiri plain to the north is a distance of about 50 miles. Its two culminating cones, the Eastern Mawenzi and the Western Kibo, lie about six miles apart.

In three days we reached an altitude of 14,500 feet, and there found ourselves upon a lofty plateau, lying between Kibo and Mawenzi, some four miles in width, from which rose five small cones composed of ashes and lapilli. Here I and my companions camped for a couple of days. We attempted the ascent of the summit from the eastern side of the Kibo cone, but at an elevation of 17,880 feet my further progress was barred by the face of the upper ice-cap, rising to a height of 100 feet. My companion, exhausted with the difficulties imposed by the snows of a tropical winter, had remained behind at an altitude of 16,500 feet.

On my return to Europe, I fitted out a second and larger expedition. In the summer of 1888 I conducted my caravan, consisting of 230 men, to Usambara, so as to reach Kilima-njaro by way of Pare, intending subsequently to extend my explorations to the Muta Nzige (Albert Edward Nyanza), discovered by Stanley, and the snow mountains in its neighbourhood.

The journey through Usambara proved a success, and made us hopeful of the future. We succeeded for the first time in traversing this mountain country in its entire length, and in delineating it correctly upon a map.

Before, however, we could reach Kilima-njaro, my plans were frustrated by the revolt which had broken out on the coast. My caravan was broken up, and I was compelled to leave the whole of my outfit behind at Semboja's in Masinde, and to return to the coast. There my few followers were overpowered by the Arab sheikh Bushiré, and we were maltreated and loaded with chains, until eventually I was able to purchase our freedom by the payment of a heavy ransom. I had lost everything, and had once more to return to Europe, for the purpose of fitting out a third expedition.

That quality of the human heart which makes that appear most desirable to us, which entails the greatest vexation and most obdurately resists our will, was once more exemplified in my case with regard to Kilima-njaro. I was, in fact, possessed with it. But quite apart from this personal fascination, there existed substantial reasons in plenty to

prompt me on to its exploration. The problems still awaiting solution regarding the flora and fauna of the most elevated part of Africa, the geological structure of the gigantic volcano, and the climate, and more especially the nature of ice and snow under the African Equator, would have attracted every friend and student of nature.

Does a yawning crater lie upon the highest heights of Kibo, beyond that encircling wall of ice and snow to which I had won my way in 1887, as I then believed, or is its rocky summit buried beneath a rolling covering of snow, as a late traveller suggested? Is the ice and snow upon the summit of Kibo of a similar nature to what is found on other equatorial mountain giants, such as those of South America, or do peculiar formations exist up there? Is the mantle of ice and snow clothing the two peaks of Kibo and Mawenzi as large in extent in the tropical summer as when I observed it in the winter of 1887, or is, perchance, the less lofty Mawenzi entirely free from snow after October, when the summer season begins? Do the more elevated flora and fauna point to a preponderating immigration from North African mountains, or have they more in common with the species of South Africa, thus affording us a retrospective insight into the geological past of Africa?

These, and many others of a similar nature, were the problems awaiting solution. After I had obtained the permission of the British East Africa Company, for which I stand much indebted, to travel through their territories, and had secured an Alpine climber of the first rank in the person of Herr Ludwig Purtscheller of Salzburg as a fellow traveller, we left the shores of Europe behind us in July, carefully equipped for our expedition, and landed in sea-girt Zanzibar in the beginning of August. Difficulties beset our path from the very commencement, and when we reached Zanzibar we had every reason to despair of carrying through the entire programme. A blockade had been declared over Eastern Africa, and the importation of arms and ammunition was prohibited. The steamer consequently refused to convey our arms, in spite of the warm recommendation of the German and English Governments. They had thus to be left behind at Aden. To complete our discomfiture, our entire outfit, including tents, camp-beds, tables, and so on, was shipped to Colombo in Ceylon, instead of to Zanzibar, in consequence of an oversight on the part of our agent.

After much trouble Admiral Fremantle, the commander of the blockading squadron, permitted me to buy guns and ammunition in Zanzibar for ourselves and fifty of my followers, and to convey them by Mombaza through English territory into the interior. I immediately ordered tents to be made, engaged a caravan of some sixty men by the help of the well-known Indian, Seva Haji, and at the end of August steamed off with my complete caravan in the gunboat *Somali* for Mombaza, where I met with the most friendly support on the part of Mr. Buchanan, of the British East Africa Company.

The route from Mombaza to Taveta, the shortest to the foot of Kilima-njaro, I had already followed in 1887. It has so often been travelled over and described by Europeans, that it is unnecessary here to picture it in detail. In its general features the ground behind the narrow coast belt rapidly rises in a series of terraces to a height of 1000 feet above the sea, and with it an abrupt transition takes place from the luxuriance of the tropical vegetation near the coast to the bare steppe of the interior, sparsely clothed with scrub and stunted trees. Want of water and the absence of human beings form its leading characteristic features.

But once beyond the Taita mountains we enter a country abounding in game, and this compels us to assume that the animals are content with the plentiful supply of dew which falls during the cold nights.

Thanks to the fact that this time I had taken with us several loads of water for the porters, and that the eight Somali I had engaged at Aden kept the order of march very strictly during the journey, we arrived at Taveta on the eastern base of Kilima-njaro after fourteen days' march, with a loss of only five men.

Half-a-day's march before we reached Taveta we had our first view of the great mountain. Kibo and Mawenzi stood out clear in the cloudless sky, and at the first glance we could distinctly perceive that the ice mantle on Upper Kibo extended far less down the flanks of the mountain than in July 1887, while the rocky slopes of Mawenzi were entirely free from snow.

After our people had recovered from the fatigues of the march in the favoured fruit-fields of Taveta, we journeyed towards the southern base of the mountain, and ascended to Mandara's district of Moji, where I made the acquaintance of the American naturalist Dr. Abbott, and of Mr. Morris, of the Church Missionary Society. Abbott had already passed two years on and about the Kilima-njaro, busily engaged in hunting and collecting, and is sure to add very much to our knowledge of the fauna of this region.

Daily annoyed by Mandara's insolence and importunities, I soon removed my camp to Mareale's village in Marangu, where I had stayed in 1887, and where I was once more received as a welcome friend. I knew that my caravan would be perfectly safe with Mareale. He is the only Chaga chief of my acquaintance, whom I, as well as the other Europeans who have visited him, can honestly speak of as being upright in his conduct, of frank disposition, great personal amiability and modesty. He is the model of a young prince, despite the blackness of his skin.

The great difficulties experienced in earlier ascents of the upper slopes of Kilima-njaro, and the chief obstacles to a protracted stay on the mountain, did not so much arise from deficiencies in the camp equipment as from the speedy failure of the food supply for the explorers and porters. Taught by experience, I had this time brought with me

large sleeping-bags, made of sheepskins, beside blankets and rubber coverings, and I also organised a commissariat service for carrying regular supplies of food to the upper regions.

While the main portion of the caravan encamped in Marangu, I ascended with Herr Purtscheller and eight picked men through the primeval forest, to a stream beyond, where I had encamped in the year 1887, at an altitude of 9200 feet. Here our large tent was pitched, straw huts were built for the men, and firewood collected. Accompanied by four men we travelled for two more days up the broad, grassy, southern slopes of Kilima-njaro to the fields of lapilli on the plateau between Kibo and Mawenzi, and found there to the south-east of Kibo, under the protection afforded by some blocks of lava, a spot at an altitude of 14,270 feet, well suited for the erection of our small tent. As soon as the instruments and apparatus had been placed under cover, three of the men returned to the camp on the edge of the forest, and only one, a Pangani negro, Mwini Amani by name, remained to share with us uncomplainingly our sixteen days' sojourn on the cold and barren heights.

With regard to our maintenance, it had been arranged that every third day, four men should come up with provisions from the lower camp in Marangu to the central station on the edge of the forest, and that two of the men stationed there should thence convey the necessary food to us in the upper camp, returning immediately afterwards to their respective starting-places. And this accordingly was done. Every third day we found, on returning from our excursion, fresh meat, beans and bananas in our tent, and not once did we suffer from want. Firewood was supplied by the roots of the low bushes still growing here in a few localities, and our negro fetched a daily supply of water from a spring rising below the camp. In this manner we were enabled, as if from an Alpine Club-hut, to carry out a settled programme in the ascent and surveying of the upper heights of Kilima-njaro.

The ice-crowned Kibo towered up steeply another 5000 feet, to the west of our camp, itself at an altitude of 14,300 feet. The 3rd of October we undertook our first ascent. The previous day we had resolved to make the first attempt, not in the direction chosen by me in 1887, but up a large rib of lava which juts out to the south-east, and forms the southern boundary of the deepest of the eroded ravines on this side of the mountain. Our simple plan of operations, which we succeeded in carrying out, was to climb up this lava-ridge to the snow-line, to begin from its uppermost tongue the scramble over the mantle of ice, and endeavour to reach by the shortest way the peak to the south of the mountain which appeared to be the highest point.

As our camping place lay at a considerable distance from the foot of the above-mentioned spur, we started at half past two in the morning, in the biting cold, and sought our way by the glimmer of a

lantern over the rock-strewn slopes. We were provided with ice axes, snow spectacles, Alpine-ropes, and other necessary articles; my climbing irons alone were wanting. They had journeyed to Ceylon with our tents, and the want of them placed me in many precarious situations, in spots where Herr Purtscheller, by the aid of his climbing-irons, could obtain a firm foothold. At dawn we stood 15,480 feet high, on the steep rocky cliff north of the above-mentioned ravine, the bottom of which lay 500 feet below. Further progress was impossible in our proposed direction; nothing remained but to scramble down into the valley, strewn with débris, and clamber up its southern wall. This mistake cost us almost three hours of the best part of the day.

It was not till half-past seven o'clock that we reached the crown of that rib of lava which had been our goal from the very first, and, panting for breath, we began slowly to pick our way over the boulders and débris covering the steep incline of the ridge. Every ten minutes we had to pause for a few moments to give our lungs and beating hearts a short breathing space, for we had now, for some time, been above the height of Mont Blanc, and the increasing rarefaction of the atmosphere was making itself gradually felt. At an altitude of 17,220 feet we rested for half an hour; apparently we had attained an elevation superior to the highest point of Mawenzi, which the rays of the morning sun were painting a ruddy brown. Below us, like so many mole-heaps, lay the hillocks rising from the middle of the saddle. A few roseate cumulus clouds floated far over the plain, reflecting the reddish-brown laterite soil of the steppe; the lowlands, however, were but dimly visible through the haze of rising vapour. The ice-cap of Kibo was gleaming above our heads, appearing to be almost within reach.

Shortly before ten o'clock we stood at its base, at an elevation of 18,270 feet above sea-level. At this point the face of the ice does not ascend, but almost immediately afterwards it rises at an angle of 35°, so that without ice-axes it would have been absolutely impracticable. The toilsome work of cutting steps in the ice began about half-past ten; slowly we progressed by the aid of the Alpine rope, the brittle and slippery ice necessitating every precaution. At the time of our ascent there was no snow whatever on Kibo. That which from below had appeared like a glittering white sheet of snow, was, as a matter of fact, the surface, disintegrated by the combined action of the sun and wind, of the ice cap, which covered the lava slopes of the ancient volcano with a thickness of 200-230 feet. Since there can exist no real reservoir for névé, owing to the symmetrical slopes of the truncated cone that Kibo forms, the compacted sheet of ice which covers the whole of the upper portion of the mountain, has nothing in common with the glacier formations of our Alps. The upper edge of the mountain affords a basis where the falling snow can accumulate. But it is only where the covering of ice is intersected by fissures and crevasses, and

sends out tongues of ice—whether in consequence of the steep incline of the outer mantle of the cone, or else because of the existence of ravines—that these detached portions gain the appearance of a genuine glacier. In such cases the melting water flows out of their ends as running brooks.

We now made our way across the crevasses of one of these real glaciers, the same that projects downwards into the valley which we had traversed in the early morning, and took a rest under the shadow of an extremely steep protuberance of the ice-wall at an altitude of 19,000 feet. From our standpoint the lowland and its masses of clouds was no longer visible, for the crown of the ice-cap, which from below we had deemed the highest point, lay now beneath us. Although the temperature scarcely exceeded freezing-point, the refraction, which the small amount of vapour in the rarefied air could diminish but little, grew so painful and intense, even through our veils and snow-spectacles, that for the four following days I could not bear to open my eyes, unless protected by dark blue glasses, while the skin peeled off both our faces and necks.

On recommencing the ascent, the difficulty of breathing became so pronounced, that every fifty paces we had to halt for a few seconds, bending our bodies forward and gasping for breath. The oxygen of the air amounts here, at an elevation of 19,000 feet, to only 40 per cent., and the humidity to 15 per cent. of what it is at sea-level. No wonder then our lungs had such hard work to do. The insufficiency of oxygen and humidity, the too great bodily strain, and more especially the strong psychical exertion, all combined to exhaust our nature. The surface of the ice became increasingly corroded, more and more it took the form which Güssfeldt, speaking of Aconcagua, in Chile, calls *nieve penitente*. Honeycombed to a depth of over six feet, in the form of rills, teeth, fissures, and pinnacles, the ice-field presented to the foot of the mountaineer difficulties akin to that of a "Karrenfeld." We frequently broke through as far as our breasts, causing our strength to diminish with alarming rapidity. And still the highest ridge of ice appeared to be as distant as ever.

At last, about two o'clock, after eleven hours' climb, we drew near the summit of the ridge. A few more hasty steps in the most eager anticipation, and then the secret of Kibo lay unveiled before us. Taking in the whole of Upper Kibo, the precipitous walls of a gigantic crater yawned beneath us. The first glance told us, however, that the most lofty elevation of Kibo lay to our left, on the southern brim of the crater, and consisted of three pinnacles of rock rising a few feet above the southern slopes of the mantle of ice. Our strength would not have sufficed to carry us thither that day, for we would then have had to risk being forced to bivouac at our final goal, without any protection whatsoever against the coldness of the night, a proceeding which would infallibly have ended in our destruction.

We first reached the summit on the 6th of October, after passing the night below the limits of the ice, in a spot sheltered by overhanging rocks, at an altitude of 15,160 feet, an elevation corresponding to that of the summit of Monte Rosa. Wrapped up in our skin bags, we sustained with tolerable comfort even the minimum temperature of 12° F., experienced during the night, and were enabled, about three o'clock in the morning of the 6th October, to start with fresh energy on our difficult enterprise of climbing the summit—and this time Njaro, the spirit of the ice-crowned mountain, was gracious to us: we reached our goal. At a quarter to nine we were already standing on the upper edge of the crater, at the spot from which we had retraced our steps on the 3rd of October.

Our further progress, from this point to the southern brim of the crater, although not easy, did not present any extraordinary difficulty. An hour-and-a-half's further ascent brought us to the foot of the three highest pinnacles, which we calmly and systematically climbed one after another. Although the state of the atmosphere and the physical strain of exertion remained the same as on the previous ascent, yet this time we felt far less exhausted, because our condition morally was so much more favourable. The central pinnacle reached a height of about 19,700 feet, overtopping the others by 50 to 60 feet. I was the first to tread, at half past ten in the morning, the culminating peak. I planted a small German flag, which I had brought with me in my knapsack, upon the ragged lava summit, and christened this—the loftiest spot in Africa—Kaiser Wilhelm's Peak.

After having completed the necessary measurements we were free to devote our attention to the crater of Kibo, of which an especially fine view is obtainable from Kaiser Wilhelm's Peak. The diameter of the crater measures about 6500 feet, and it sinks down some 600 feet in depth. In the southern portion the walls of lava are either of an ash-grey or reddish-brown colour, and are entirely free from ice, descending almost perpendicularly to the base of the crater; and in its northern half the ice slopes downwards from the upper brim of the crater in terraces, forming blue and white galleries of varying steepness. A rounded cone of eruption, composed of brown ashes and lava, rises in the north portion of the crater to a height of about 500 feet, which is partly covered by the more than usually thick sheet of ice extending from the northern brim of the crater.

The large crater opens westwards in a wide cleft, through which the melting water runs off, and the ice lying upon the western part of the crater and the inner walls, issues in the form of a glacier. What a wonderful contrast between this icy stream, and the former fiery incandescence of its bed! And above all this there reigned the absolute silence of inanimate nature, forming in its majestic simplicity a scene of the most impressive grandeur. An indelible impression is created in the

mind of the traveller to whom it has once been granted to gaze upon a scene like this, and all the more when no human eye has previously beheld it. And certainly as we sat that evening in our little tent, which we finally reached at nightfall, after a most arduous return march through the driving mist, and carried our thoughts back to the expeditions of 1887 and 1888, we would indeed have changed places with no one.

It would take too long were I to chronicle our later ascents, and trips and rambles, with the same detail as in the case of our scaling the summit of Kibo. Allow me, therefore, to pass over the minute details and combine the main results in one general retrospect.

We made our way to the central peak of Mawenzi, the eastern summit of Kilima-njaro, by three separate ascents, on the 13th, the 15th, and 21st of October, and sought to lift the veil that hung over the structure and peculiarities of this wonderful mountain. The result was as follows:—The characteristic feature of Mawenzi is its tremendously jagged surface, the denudation of its lava rock having penetrated to the very heart of the mountain, and given birth to stupendous walls and precipices, which radiate from a central crest running north and south, and are joined at their distant bases to each other by mounds of detritus. In the west of the mountain the *tali* of lava detritus, showing the greatest variety of form and colour, and a perfect Paradise for mineralogists and petrographers, slope gently out on to the elevated saddle stretching over to Kibo. On the eastern side, however, the mountain, from an altitude of about 17,050 feet, descends with dizzy abruptness for some 6500 feet, into a huge ravined cauldron of erosion, from which it continues down to the level of the plain, in far-reaching and symmetrical slopes, for another 8200 feet.

Judging by the lie of the lava strata and transverse fissures, the former crater of Mawenzi must be sought for south-east of the present summit. The whole structure, however, of this ancient volcanic ruin, points to its having been, in its original form, if not considerably higher, at least quite as high as the much more recent and better-preserved Kibo.

We found ice in October on Mawenzi, in many of the hollows and cavities, but nowhere in any considerable quantity.

The most loftily situated flowering plants of Kilima-njaro are to be found on the sheltered south-western flank of Mawenzi, where they can support existence on the large *tali*, exposed to the strong insolation, and nourished by a few purling streams. Here a small carpet of flowers extends to an altitude of 15,700 feet, the approximate height of Mont Blanc. The light-grey woolly hair which covers all these *Gnaphalia*, *Artemisiæ*, *Heliochryssæ*, and grasses, to protect them from the great transpiration, makes the outer appearance of the different species very similar to each other. Sometimes they grow close together in concave clumps, to protect themselves on the one hand against the frost, and

on the other hand from the excessive transpiration, and sometimes they creep closely along the earth, so as to derive that advantage from the greater warmth of the ground which the coldness of the atmosphere denies. The predominating colour of leaf and blossom, besides yellow, is the violet anthocyan tint, which absorbs the intense light of these upper regions, and converts it into heat. The species seem to possess a closer relationship with Abyssinian and Asiatic than with South African varieties, and indeed members of the same genus as a red lichen (*Gasparrinia elegans*) that extends to the Kibo snow-line, grow in Spitzbergen. Wonderful to relate, the tender shoots of the most elevated flowering flora are frequently sought after by the eland antelopes, which ascend from the northern slopes of the mountain over the saddle to crop the aromatic herbs growing on the heights. We could frequently watch the browsing animals on quiet afternoons. There were no traces, however, of elephants in these altitudes, though they are numerous on the upper grassy slopes.

The feathered denizens of the air were represented on the saddle plateau by a slender and lively stonechat, and by a quick-flying species of rock-swallow which builds its nest on the lava hillocks of the plateau. They feed upon several varieties of beetles, wasps, and flies, which swarm as far as the flowering plants extend, and on a small black spider which lives far away up in the volcanic cinders. The antelopes can ascend from the northern face of Kilima-njaro as far as the saddle without let or hindrance, for the primeval forest, as we were able to discover, which on the south and eastern flanks covers the whole zone lying between 6500 and 10,000 feet, forms here only a thin and frequently interrupted belt, and becomes increasingly narrow towards the west, till finally it disappears entirely on the northern face of Kibo. Instead of the fertile terraces of Chaga, which occupy the southern slopes of Kilima-njaro between the elevations of 4000 and 6000 feet, we find on the northern slopes, which are precisely similar in contour, nothing as a rule but scrub wastes or grass prairies, over which the Masai, ascending from the sunburnt plains, graze their cattle. The smoke rising from their camp-fires is a noticeable feature in many directions.

On the 17th of October we spent a day on the northern face of Kibo, and discovered, at an altitude of 18,700 feet, a two-tongued glacier, and also far out in the plain three long swampy lakes reaching to the large Nyiri marsh. We ended our labours on this side of the mountain by a third visit to the Kibo crater on the 19th of October, when we succeeded in descending to its base from the east, across the cleft I was unsuccessful in reaching in 1887; and which proved highly productive for the study of the wonderful formations of ice existing there.

For sixteen days we had been working at an altitude varying between 15,000 and 20,000 feet in height, and during that time had climbed Kibo four times, and Mawenzi thrice; we had discovered the great crater on

the top of Kibo, and the first African glacier; we had examined as thoroughly as possible the whole of the more elevated regions, and had made complete surveys and collections. Our task would have been still more difficult had it not been for the assistance rendered by Mwini Amani, who, defying the cold, satisfactorily performed his daily camp duties of fetching water, collecting fuel, lighting the fires, greasing the boots, &c. The hardships most grievous to be borne were not the nightly marches in wind and snow, nor the camping in icy cavities of rock, but rather in such trivial occupations as cooking, and our enforced inattention to personal cleanliness owing to our scanty stock of water. Only the æsthetic pleasure derived from rock, and ice, and air, the absolute absorption in the majestic beauty and grandeur of nature, helped over the hardships of these weeks—all else was "duty."

To complete our picture of Kilima-njaro, I now planned an ascent from the west and southern sides of the mountain. Before, however, I could carry out this intention, it was necessary to grant my few trusty blacks, who had, so far, faithfully stood by me, a few days to recruit in the warm lowlands of Mareale. This interval I utilised by making an excursion, with some other men of my caravan, to the unexplored mountains of Ugweno, which rise to the south. In the space of fourteen days we explored and surveyed, by a series of routes crossing and intersecting each other, this mountain region, which possesses a fairly dense population, is well cultivated and watered, and favoured above all by the mildness of its climate. But to go deeply into this portion of our journey does not lie within this evening's programme. Let it suffice that the mountainous region of Ugweno ranks only second to the favoured district of Chaga for natural wealth and beauty, and is almost the equal of the highlands of Usambara.

On returning from Ugweno to Kilima-njaro over the heated steppe, we immediately attacked the southern slopes of Kibo. But this time fortune, which till now had been so gracious to us, changed. The rainy season had begun, causing a complete breaking up of the weather. We recognised now that, more by chance than knowledge, we had chosen the most favourable time for our previous fortnight's work, for during that time the summit was generally clear, the precipitation but small, and the area covered by ice at its minimum.

From this time heavy storms took place daily about noon, which regularly covered the heights with fresh snow, and hid the mountain from sight for the greater part of the day. Any more big ascents were clearly out of the question. And so with heavy hearts we forsook the mountain grass-lands on the southern slope, and descended through the primeval forest to the western States of Chaga, so as at least to have observed the snow peak from all quarters.

We proceeded down the primeval forests covering the southern slopes of Kilima-njaro, where we were once surprised by a herd of elephants,

fourteen in number, and through the Chaga States of Uru, Kindi, Kombo, Naruma, and others, in which we created no little stir, as ours were the first European faces the natives had ever seen. Having crossed the Ngombere and Weriwari, the largest rivers rising on Kilima-njaro, we soon reached Majame, at the western base of the mountain, at an altitude of 4600 feet. There we enjoyed a few days of quiet leisure and surveyed the western and southern parts of Kilima-njaro, the results fully rewarding all our trouble.

On no other side is the mountain scenery of so impressive a nature as on this. The mountain mass rises in a typical volcanic curve with such unbroken regularity from the Southern plain which lies at an elevation of 2600 feet, to the brim of Kibo, an altitude of 19,700 feet, that no single detail escapes a searching eye. While the intervening saddle hides the view of the base of the Kibo cone from Marangu and Moji in the south-east, an uninterrupted prospect is obtained from the west. The dark belt of the primeval forest extends here farther up the mountain, while the brighter zone of grass lands above it is narrower, and almost touches the fringe of the ice mantle, which reaches from the summit to the base of the Kibo cone. This coat of icy mail more than 6000 feet in height, and about the same in breadth, adapts itself to the volcanic shape of the mountain, and forms a spectacle probably not to be met with elsewhere on the earth's surface in similar grandeur.

To the west of this ice-mantle Kibo is cloven from head to foot by a stupendous rift, with precipitous walls, down which the great crater on the summit pours an ice stream, through its western cleft already mentioned, and which issues from its mouth as a compact glacier. This is the largest glacier on Kilima-njaro. From its end the most important water-channel from the ice of Kibo, the Weriwari river, takes its rise, while, from the sheet of ice on the southern face, the Ngombere stream carries down the melted ice to the all-gathering waters of the Pangani.

We returned to Marangu by the same route as we had come, through Moji, and had only too often the opportunity during our march of observing the sad traces of war, which at that time was devastating the fairest districts of the Chaga country. On the one side, Mandara of Moji, on the other, Sinna of Kiboso had sounded the war-cry, and, in consequence, the whole of Chaga from Marangu to Majame was split up into two rival camps. Mareale alone on the east border of the scene of action preserved an armed neutrality, which, as yet, his jealous neighbour Mandara had not dared to disturb. Certain districts, as Lambungu and Uru Salue, had been forsaken to the last man by their panic-stricken inhabitants, and their dwellings burnt to the ground. The slave-trade flourished under these conditions. We found among each chief's retinue a few slave dealers, mostly Swaheli belonging to Mombaza or Pangani, who return to the coast as soon as they have bought two or three prisoners of war. The fortune of war appeared to be turning in favour

of the vigorous and circumspect young Sinna of Kiboso, truly to the blessing of the whole country, the development of which is impossible until these miniature "states," and the perpetual plundering expeditions attending their existence, shall have disappeared. From the number of warriors which the various states were able to put into the field, I estimated the population of Chaga at 46,000 souls, this being rather under than above the mark.

On the 30th of October we sorrowfully bade farewell to Kilima-njaro, the most beautiful and interesting, as well as the grandest, region in the dark continent. We travelled by forced marches from Taveta to the coast, and, after many adventures, once again saw the white walls of Mombaza gleaming above the blue waters of the Indian Ocean, on the 13th of December, after our three and a half months' ramble in the regions of Kilima-njaro. Four days later a favourable wind wafted our sailing boat to Zanzibar, unfortunately just too late to share in the festive reception of Stanley and Emin, who, a few days previously, had arrived at Bagamoyo.

After fourteen days spent in disbanding our expedition in Zanzibar, we left its hospitable island, and steamed homewards into the heart of a European winter.

Kilima-njaro is settled—the African giant is vanquished. But still, for long years to come, it will prove an ample field for detailed exploration; and, until the time when it too shall dissolve and pass away, it will afford, by its majestic solitude, its grandeur, and its beauty, an unfailing source for exciting the feelings and fancies of every one who can trace an eternal Godhead in the silent language of Nature.

After the reading of the foregoing paper,

Mr. JOSEPH THOMSON said he had listened to the paper with an interest which few others present could have felt. In 1863 he had the good fortune to travel round the base of Kilima-njaro, and to ascend to a height of 10,000 feet, although with no intention of attempting to scale the peak. He therefore knew something of the magnetic attraction that Kilima-njaro threw over people's minds. Of all the wonderful sights that Africa presented none approached Kilima-njaro. He had looked down upon Lake Nyassa from the highlands to the north, and on Lake Tanganyika, and had seen the Niger flowing through the primeval forest, and had travelled over the Atlas Mountains, but none of those sights could in any way compare with Kilima-njaro. It was the simple majesty of the scene, a mountain rising from a plateau of 3000 feet, in one clear sweep to 20,000 feet. It was very fitting that it should be a German who had reached the peak for the first time. It was a German, Dr. Redman, who first revealed the peak; it was Baron Von der Decken who first brought back any scientific details about it. Mr. New, of the Church Missionary Society, added some details, and he (Mr. Thomson) had been enabled to add something to the knowledge of its geography to the east, west, and north; but after all, the great part of the work had been done by Germans. The Geographical Society gladly acknowledged daring deed and splendid work by whomsoever it was done. Dr. Meyer had done both daring deed and magnificent geographical work. He was gratified to find that some of the views he had expressed regarding Kilima-njaro had been supported by what Dr. Meyer had said. Simply

from examining the shape of it, he came to the conclusion that there was a crater on the top of Kibo, and that Kimawinzi was the older of the peaks. That had been confirmed by Dr. Meyer.

Mr. DOUGLAS FRESHFIELD said he had no pretensions to be an African traveller, he had not even sent his portrait to the African Exhibition, but perhaps on one ground he might, even as an African, venture to congratulate Dr. Meyer. He thought that Dr. Meyer and himself were probably the only two people in the room who had ever enjoyed a glissade of 1000 feet on African snow. His (Mr. Freshfield's) had been obtained on the Algerian Atlas. But he desired, as one of the eccentric body of travellers whose aim was not only to get further away from their fellows but nearer to the angels, to offer his congratulations to Dr. Meyer on his success in reaching to the summit of the great African volcano. It did not appear that the climb was in itself a very difficult one, in the sense in which ascents were called difficult in the High Alps, but, as in all distant countries, the difficulty was to get a competent party to the foot of the mountain. Mr. Thomson and Mr. Johnston, both capable travellers, found that a single traveller without Alpine experience or friends was helpless when he got to the snow-level. What deserved the most praise in Dr. Meyer's exploration was his perseverance. He (Mr. Freshfield) had never before heard of any explorer who had made the same ascent three times himself. De Saussure had considered it sufficient to climb Mont Blanc once, but Dr. Meyer had ascended Kilima-njaro three times, and his experience went to show that mountain sickness, like sea-sickness, is to a great extent a matter of individual temperament, and still more of training. The difference in the rarity of the air, between 20,000 and 30,000 feet, was relatively small compared with that between 10,000 and 20,000 feet, and therefore there was reason to hope that Providence had made no mountains that men could not get up. Dr. Meyer had also drawn fresh attention to the existence of highlands in Africa, which might afford permanent homes to Europeans. If Kilima-njaro had been allotted to Germany, Kenia had been allotted to England, and since Dr. Meyer had added 1000 feet to the previously accepted height of Kilima-njaro, he saw no reason why competent English mountaineers might not add 2000 feet to Kenia. He trusted that the native names of the mountains would be retained. He recently read with delight that the native name corresponding to Ruwenzori, "The Skypiercer," was being restored to Mount Cook in New Zealand, and he hoped that, whatever individual names might be attached to minor features, the names of Kilima-njaro, Kenia, and Ruwenzori would be retained by geographers. They owed a debt of gratitude to Dr. Meyer, for having put nearly the finishing touch to their knowledge of one at least of the great African volcanoes. All that was now wanting was the verification of Dr. Meyer's measurements, and some fuller details as to the lower portion of the glacier of the crater.

The PRESIDENT said he judged from the applause that the meeting was more pleased with Dr. Meyer's success on his third attempt than they would have been if he had succeeded at first. The determination he had shown in returning again and again was evidence of the same high qualities which had placed his countrymen in so magnificent a position with regard to all that concerned the advancement of knowledge. On behalf of the Society, he wished to express to Dr. Meyer their cordial thanks for the excellent paper which he had read. He trusted that as they had listened to his account of his ascent of Kilima-njaro, so they would on some future occasion hear his description of the great English-African Mountain, Kenia, an expedition to which he was preparing to undertake next winter.

Notes of a Journey through Mashonaland in 1889.

By the Right Rev. G. W. H. KNIGHT BRUCE,
Bishop of Bloemfontein.

Map, p. 372.

WHILE sending to the Royal Geographical Society a route-map of the journey that I made last year from Inyati, in Matabeleland, through Mashonaland, to Zumbo on the Zambezi, I regret that there is much information omitted which would have made the map more useful; more especially along the Zambezi for the 60 or 70 miles between Zumbo and the mouth of the Umsengaisi river. This is caused by the books containing my survey and sketches having been stolen from a waggon while on their way to the Surveyor-General's office in Bechuanaland, so that I have had to compile the survey from rough notes. In some details it is probably inaccurate. The names, however, I was able to reproduce; and, as I had taken considerable trouble to get them accurately from the natives, they may possibly be accepted as representing, as nearly as possible, the places as the natives pronounce them. They are spelt phonetically. In the neighbourhood of Zumbo some of the names were obtained from the Portuguese, and it is on their authority, or on that of the natives, or, as in the case of the Ruangwa river, on the authority of both, that I have ventured to alter the spelling of certain names in my map, since I have retained phonetic spelling throughout.

It will be unnecessary to give any notes regarding the road up to the Hanyani river in Mashonaland, as I took the same road as that followed by Mr. Selous to his camp somewhat to the north of lat. 18°. On account of the tsetse-fly I left my waggons there, and with six men whom I had brought from the south, who were half-castes and natives, walked westwards first, to reach Lo Magondi's village. Ten donkeys carried the greater part of the things which we needed. It would be unnecessary to give the details of the journey to Zumbo, as travelling with carriers in Africa has been sufficiently often described. Possibly the carriers in this case were somewhat more troublesome than they generally are, as they seldom, if ever, carried for more than one or two days; and although prepaid before starting, they were not always careful to carry out their agreement.

At Lo Magondi's town I found the only instance that came under my notice of a man called a "God" among the Mashona. One of these men lives not far from the chief's town in Matabeleland, but he seems to have no authority. The "God" at Lo Magondi's has, however, considerable power, and the people have to ask his permission before starting on a journey. But he is not the teacher of the tribe; the chief, apparently, has that function, for when asked as to what they believe as to a future existence, they seemed to think it sufficient that their chief knew about

such matters. At Sinoia's town, farther to the north, I was told that they had had a God, but that the Matabele had driven him away; they did not say when. This place is much too far to the north to be within distance of the ordinary raids of this tribe.

On arriving near Kurusu, a mountain of great height in the shape of a sugar-loaf, we found the whole population had gone to the summit where they could scarcely be seen, sitting on the topmost rocks, and for some time they would not come down. I was told that they had not seen a white man here before. This village, like many other Mashona villages, is most picturesque: They are almost invariably built on hills, for protection; nearly every hut has its separate rock as a foundation, and therefore no two seem to be on the same level. The huts themselves are of wood and grass, and above and below, and around them, trees and shrubs spring out of the cracks in the mountains.

Shipuriro's town had been moved from where it was when Mr. Selous saw it; it is now somewhat nearer Chusu's town. The great range of mountains to the south of which Shipuriro lives, divides the high uplands of Mashonaland from the wide Zambezi plain immediately to the north of them. The country is broken and hilly before arriving at Shipuriro's, but immediately after leaving it, when travelling northwards, a mass of mountains are crossed. To the east the range seems to be broader and higher than further westward. Among these mountains, as in other parts of Mashonaland, the air is most bracing, and in winter the climate is well adapted to Europeans and the tsetse-fly is seldom seen. But in the plain to the north there is a great change; in July and August—the winter—the air is oppressive and sultry, and the heat is great; the tsetse-fly exists in swarms, and while travelling through it nearly all our donkeys died from their bites. Beyond slight inconvenience, we did not find that they affected ourselves. This, however, was not I think, Mr. Selous' experience. Large tracts of this plain must be submerged during the rainy season, and the grass is coarse and rank, but water is very scarce at times, especially where the ground lies a little higher. In these drier tracts the mopani tree grows to a fair size, while in the grounds that lie lower the baobab is most prominent. Along the smaller rivers in the northern part the fertility of the ground is very great, the mabele or Kaffir-corn growing ordinarily to a height of 15 feet.

At Namfukadza's town, which is about two days' walk from the Zambezi, signs of Portuguese influence begin to show themselves, though evidences of trade with the Portuguese commence much further to the south. Though Namfukadza is a son of Shipuriro, who lives among the mountains, he is far more civilised than his father. He wears the long white calico cloak instead of skins, and the women of his town all wear calico skirts. The huts are better built; the behaviour of the people is better; and there is a general appearance of approaching

civilisation. This may be considered the last town towards the north that is inhabited by the Mashona people.

At Kanyemba's town, which is about two hours' walk from the Zambezi, almost a new world begins. He and Matakenya, whose town lies near the mouth of the Hanyani, are joint chiefs of the Mutandi. The chiefs are not Mutandi, but are called Ba-Nyungwè, i. e. people of Nyungwè (or Tettè), and have come from there to rule the Mutandi. Somewhat to the south of Kanyemba's town is one belonging to Chipunzamongo: here the people are Chacunda; but it is difficult to ascertain where the Chacunda end or the Mutandi begin. I am stating what I ascertained from the people along the river after very careful investigation. The Mutandi live along the south bank of the river eastward as far as Perizengi's town, at the mouth of the Umsengaisi river; and, mixed with them between Matakenya's and Perizengi's towns are some Banyai. The people of Perizengi's town are Banyai and Chacunda. The Banyai also live along the Umsengaisi river almost up to the mountains on the south of the plain.

Zumbo is occupied by the Portuguese. The people of the country on the north bank of the Zambezi near Zumbo are Basenga; a name which is not to be confused with Basungu, which is the native name for white men, and denotes the Portuguese. The Basenga women wear the lip ring in *both* lips. The Vapendi live farther down the river, opposite Perizengi's.

The people on both sides of the river recognise the authority of the Portuguese; there is no chief of the Basenga, and Kanyemba and Matakenya are chiefs under the Portuguese. The Portuguese place "captains" at the different places of importance along the river. The most westerly one is at Niabakobe, I think, which is up the river; and it is about four days' travelling by boat from there to Zumbo. Perizengi is another "captain;" there is another called Chimbung, at Chabonga, farther down the river. Kanyemba and Matakenya both act as "captains." To the west, however, there seem to be some tribes who do not recognise this authority; for in May 1888, the Valenghi, under a chief called Buruma attacked Zumbo with about 2000 men, but were repulsed; and the Portuguese were negotiating with them when I was there, the commandant of Zumbo and the chief Matakenya following them into their own country. Kanyemba, who is a most civilised chief, told me that he owed his civilisation to the Portuguese. The Ba-Nyungwè chiefs and their sons use the education which they have obtained from the Portuguese for the good of their people. At Matakenya's, large houses have been built, and tiles are made; sugar-making is also an industry of the place.

The flatness of the plain stretching between the Zambezi and the Mashonaland mountains is very striking. Looking down from the higher parts, the plain below presents almost the appearance of the sea,

and, with the exception of Chanda, Motemwè, and possibly Kanyemba's mountain, which can just be seen on a bright day, it seems to be boundless. As there are low ridges and an occasional hill on the southern bank of the Zambezi, it is quite possible that any one going down the river in a boat might imagine the whole to be mountainous; as the plain itself would never be seen, and the country on both sides of the river above Zumbo is most mountainous—indeed, nothing can be seen from the summit of even Mazansôe mountain towards the west but a sea of mountains; and to the east of Perizengi's town, Chanda and Matemwè mountains are but prominent features in an extensive range.

It is reckoned to be a two months' journey from Quilimane to Zumbo. The route taken by the Portuguese from Zumbo is to descend the river by boat to Cachumba, which is near the mouth of the Dakè river, and a short distance above the beginning of the rapids; they then disembark and carriers are employed in the portage to Tettè, where they again take boat.

The Shidima country lies to the east of the Umsengaisi river. I was told at Perizengi's town that it was inhabited by Atavara; though at Chabonga the Chacunda are said to live. The presence of Chacunda and Mutandi at the larger towns, while the Varendi, Banyai, and Basenga live in the villages, is to be accounted for by the Chacunda and Mutandi being superior to the others; and the distinction is made still greater by the civilisation brought by either the Ba-Nyungwe chiefs, as at Matakanya's or Kanyemba's towns, or by the Portuguese "captains," as at Perizengi's town. The Seshona language, as spoken in Mashonaland, is perfectly understood by all the people on this part of of the Zambezi; the Banyai farther up the Umsengaisi river speak almost the same language as the Mashona.

The Portuguese at Zumbo knew of the death of Mr. Thomas, who, they said, was killed by the Mashukulumbwè, after killing eight of them himself. At Matakanya's town I received from Matakanya's son the first information as to Mr. Foster.* At the end of 1887, hearing that he was again going to the Zambezi, and thinking that it might be well to have a white man with me, if he were one of Mr. Foster's ability and experience, I offered to engage him to accompany me through Mashonaland. This he did not agree to; but said that he intended to go up the Zambezi as far as Zumbo, and thence to Lake Bangweolo, to establish a trading station. He then offered to come back to Zumbo, and over the plain to Mashonaland and Matabeleland, and to meet me at Buluwayo; so I engaged him to travel to Lake Bangweolo with me, I paying him a certain sum each month. The last letter that I had from him was written at Tettè. When I reached Namfukadza's town on the great plain, I heard from the chief that a white man had been seen, and

* A short account of the adventurous journey of Mr. Foster, whose real name was Mr. F. Monks, is given in the 'Proceedings R.G.S.,' 1889, p. 608.—[Ed.]

that he had been robbed of his goods. I imagined that he was referring to Mr. Selous, as I knew of no other white man who had crossed the plain anywhere in this part; but at Matakanya's I found that Mr. Foster had been there in his little boat (which is still lying at Matakanya's), and after a journey of five days up the Ruangwa river, had returned because he could get no food, and had been given some men by Kayemba, or Matakanya, to enable him to come down and meet me. The men returned, as did a boy whom he had brought up the Zambezi, saying that they had taken him towards Shipuriro's town; the boy, I think, said that he had been sent back. The chiefs seem to have had no doubt that the men had done as they said; but when they described the journey, I found that the men had, in all probability, never been near the place they described. Their geography was at fault, which never happens with a native, if he has once seen a country. No further information of any value could I get. He was heard of near Namfukadza's; he was robbed of his goods and he never passed Shipuriro's, or came south. If he had wandered far to the west, Mr. Selous would have heard of him when in the Mashukulumbwè or Barotse country. If he had gone eastward, he would have arrived at Tettè. I imagine that if he had died of fever the chief would have had his gun, and I should have been told about it: nor would there have been any reason for the Zambezi men to have lied, as I think they did. I fear that there is but one solution—that he was killed by his men for the sake of his goods. At another part of the plain I saw a skeleton, and asked some of the carriers whose it was; they told me that a native had been killed for some little property that he had. Mr. Foster was a man of admirable courage. On his first journey he started with one donkey, which he eventually exchanged for a canoe, and went from Matabeleland to the Zambezi, and round the bend of the river to Lake Nyassa and Quilimane, travelling by land when he could not go by water—a bold undertaking with such slender means.

The plain to the west of the Umsengaisi river is almost uninhabited, and though there is communication at intervals between the different villages, the native population along the banks of the Zambezi are not only cut off from Mashonaland proper by the great plain and the mountains, but are different in customs, appearance, and mode of living. They seem to be daily learning from the Portuguese. A Mashona chief in the south may be described as nothing better than an inoffensive savage; but Kanyemba, near the Zambezi, is as good a gentleman in his manners as Khama, the well-known Bechuanaland chief. Whether he has the same high character as Khama I had no opportunity of ascertaining; but his courtesy and hospitality were boundless.

The name of the Matabele seems scarcely to be known in this part of the Zambezi; but many years ago Matakanya once travelled into Matabeleland. The Valenghi, under a chief called Buruma, with six

under-chiefs, are the disturbing element of that part of the country. After being repulsed from Zumbo on the north, last year, they attacked Matakanya's, on the south of the river, but were repulsed. After I returned through Mashonaland into Matabeleland, I heard of a number of canoes being built by the Matabele, but this was very much farther up the river, and far more to the south.

At Zumbo there are ruins of what was said to have been an ecclesiastical building belonging to the Roman Catholics, who were killed by the people some years ago. I found a bell that may have belonged to it, but it had no inscription.

As to the people of Mashonaland, to the south of the mountains, the information collected by Mr. Selous will be very much more valuable than mine can be. I found them easy to deal with, especially if plenty of meat is shot for them. They will work hard for meat. The chief reason for their burning the grass yearly seems to be that this makes the digging out of mice for food easier; but then, on the north of the Zambezi, eight tribes consider dogs a great delicacy. They seemed to have but a very slight conception of a God, but usually said that they would be glad to have teachers. At Unyamwenda's town, near the source of the Hanyani, the people said that they would build a teacher a house if one would come among them. To the south-west of Mount Wedza live a portion of the Barotse tribe. Mr. Selous supposed that they were a portion of the tribe now settled north of the Zambezi, and the son of their chief Sipiro told me that this was so, and that the Matabele, when they drove one part of the tribe northwards drove the other southwards. The southern section have abandoned their own language and speak Seshuna. Both these and the people round Mount Wedza are subject to the "Gaza" people. They are the most westerly people that are subject to them. The next town, Umtigeza's, is subject to the Matabele. At both Umtigeza's and Sipiro's towns I saw the respective representatives of the two nations collecting the yearly tribute. At Sipiro's town the chief hid me and my servants for nearly two days behind a mountain, so that I should not be seen by the tax-collectors. The country of the "Gaza" people is sometimes called Umzila's country. According to their own tradition, the first chief in this region was called Gaza, who fought with Chaka; according to them, Mankosa, his son, was the father of Umzila. At present Umzila's brother, Guzana, and Umzila's son Umdugaza, are joint-chiefs. Their relations with the Matabele are very friendly. Lobengula married four of Umzila's sisters. My informant on this point is one of the Gaza chiefs. He was very communicative till the subject of their old buildings was mentioned, and of these he would say nothing. However, he thinks that he could take me into the country.

I feel that I owe an apology to the Society for presenting them with these disconnected notes, but other calls upon my time prevent me, at

present, from drawing up a more elaborate paper. I have not alluded to the political question that has lately arisen in connection with the country, nor to the supposed mineral wealth. It may be better for others to give their opinions on these subjects.

P.S.—I have omitted to mention that the distance travelled during my journey from Kimberley and back was about 2500 miles. My route is marked on the accompanying map by a red line, except down the Zambezi from Zumbo to Perizengi's town. No places are inserted except such as I have visited myself; or, as in the case of tribes, those which have been pointed out to me. The map cannot be relied on for accuracy to the immediate east of Romwè mountain for five miles or thereabouts, nor as to the exact position of Rusunswè, near Mount Wedza. In cases where there was no possibility of reconciling serious discrepancies the place has been omitted.

I have this morning received information from Mr. Sawyer, who has been engaged on the railway near Delagoa Bay, that the Gaza people have raided over much of the country to the north of Delagoa Bay, and that their chief Gungunyan, whom I suppose to be the same as Guzana (already mentioned), has moved his position from near to "Umzila's Kraal," to a spot not far from Delagoa Bay.

G. W. H. KNIGHT BRUCE,
Bishop of Bloemfontein, Kimberley, and Bechuanaland.

May 24, 1890.

GEOGRAPHICAL NOTES.

The Fly River, New Guinea.—Sir William Macgregor, Governor of British New Guinea, has quickly followed up his feat of successful exploration in the Owen Stanley Range by another enterprise of equal interest and importance, viz. the navigation of the Fly river up to the boundary line between British and German territory in the centre of the island. He started on this expedition in November last, reaching the mouth of the river in the steamer *Merric England* on the 21st of that month, and after visiting various places in the estuary with a view to ascertaining their suitability for administrative or trading settlements, commenced his journey up the river on the 26th December. At a point which he says is beyond D'Alberti's farthest, in 5° 54' S., he found the river divides into two branches of equal size. One of these, named by him the "Palmer," he followed up for eight days to the frontier. The whale-boat stopped at 605 miles from the mouth of the river. The first mountains met with in the ascent are on the frontier, and were not explored. The ascent and descent were accomplished without firing a shot at a native, and peaceful relations were established with the natives

nearly the whole way. Five weeks and four days were spent on the whole tour; the climate was found good, and the health of the party remained fair throughout. The country, however, proved disappointing, and the natives were not numerous.

Detailed reports of the river voyage have not been received, but others relating to his visits to the native villages in the estuary are to hand, and give much information regarding the country and people. With regard to the climate, he says (in the month of December):—"The heat has not, on the whole, been oppressive for this latitude. The average day temperature in the shade has been about 85° Fahr., but, of course, it is a moist heat. Each day there have been showers and squalls, and it generally rains heavily at night. The members of the expedition who have landed for collecting purposes suffer from scrub-itch, mosquitoes, and especially from sandflies. The flora is extremely limited and unattractive. The health of the men has been fair, some having suffered from fever—short, sharp attacks." At a point (not far from Ellangowan Island) above the estuary, the river was found to be 599 yards wide, the rate of current midstream about 3½ miles an hour, and at 50 yards from the banks about 2½ miles; the depth was 5 to 6 fathoms. The influence of the tide was not observed above 120 miles from the mouth. "As a waterway," the report continues, "the Fly river will supply excellent means of transport, as there is probably no part where at least three or four fathoms cannot be found, although the deepest channel is sometimes crooked. Owing to the rapidity of the current and the width of the river, a moderate breeze against the current sets up a troublesome short sea in the lower stretches of the river, which will make navigation always difficult for small undecked vessels."

Sir W. Macgregor does not report very favourably of the prospects of the lower reaches and delta of the Fly as regards trade and settlement. He says:—"The river from a little above Tagota to the place where we formed our coal depôt, about 180 miles from the mouth, and thus embracing a distance of some four score miles, is very monotonous. The islands in the river (except the very recent ones on which the fresh-water mangrove is the only tree), and the banks, are covered by a dense vegetation consisting of a ground work of large trees with lawyer canes and other creepers, forming an all but impenetrable undergrowth, which often runs over the tops of the tallest trees. There is little if any of all this country (except a few small mounds of red clay) more than a foot above the river. It is, therefore, as a rule, too low for human occupation. The forest produces no food for man. There are many breadfruit trees, but they have no fruit: there are, as far as I have seen, only two sago trees on the river between our coal depôt and Howling Point, a distance of about sixty or seventy miles, and there is not even one cocconut tree. For European settlement, such a country, as far as can be judged, is quite unsuitable—but, of course, no man can speak of the country

beyond a mile or two from the river, the greatest distance to which we could penetrate. It may be doubted that such forest and swamp could be surveyed at less than 10*l.* or 15*l.* a mile; and it is hardly probable that any Government or private company would expend that on such an unpromising speculation. In short, it may be stated generally that wherever the country is sufficiently high and dry for human occupation it is already in the possession of a numerous warlike race of agriculturists whom it would take an adventurous, extensive, and wealthy lot of European settlers to displace. I am not, however, prepared to say that a rice-growing population might not be settled in many parts of this great delta; on the contrary, it is probable that people from the rice-growing regions of India, for example, might be able to cultivate many places on this river that now produce only bush and scrub, and eventually it may be turned to account in that way. But the day is probably far distant when the experiment will be tried, as it would be costly and attended with great risks."

Of the natives of the large island of Kiwai, in the delta, notwithstanding their ill-repute, apparently not very well founded, as cannibals, Sir William Macgregor speaks favourably. The island is about thirty-six miles long, and two and a half broad. Sir William went round it twice and walked across it once, visiting all the villages, and was everywhere treated with great friendliness. The total population he puts at 5000. As agriculturists he considers they deserve great credit; they produce large quantities of vegetable food, which may in future create a considerable export trade. The cultivation of the banana receives from them much attention. In a vocabulary of their language which he compiled there is a list of not fewer than thirty-six different varieties of banana; and from personal experience, he could testify that the distinctions were not fanciful, but indicate real substantial differences. Some of the varieties he says are very good, and he recommends these products of Papuan skill to the attention of the banana-growers of Queensland. They also plant and cultivate sago trees, of which they distinguish twenty-five varieties; of yams they grow twenty kinds, three of which are remarkably good; and of sweet potatoes ten, two of which are suited for exportation. It is strange that a people so far advanced in this respect should be very deficient in other industries common in races at a similar stage of culture. They possess, for example, no knowledge of pottery. The sole utensil, used as bucket, basin, bowl, and plate, is a large slipper-shell. Its name is "wedere," and the consequence is that the Kiwai native has no other name than "wedere" for all our pots and pans and different kinds of dishes.

The Course of the Lower Sangpo River.—The new Indian Survey Report, which has just arrived in this country, contains a revised sketch-map of the course of the Lower Sangpo, as re-plotted from native information obtained last year by Sub-surveyor Rinzin Nimgyal at Sadiya.

The original survey was made by Kinthup (K—P), and a description of the route appears in the Indian Survey Report for 1886–87. It will be remembered that Kinthup claimed to have followed the Sangpo to a point named Onlet, about 60 miles from the British frontier. The exploration of this unknown tract was considered very desirable, and under the orders of the Surveyor-General, Rinzin Ningyal, accompanied by the guide K—P, repaired to Sadiya to wait on Mr. Needham, who proposed to undertake the journey, with the view of clearing up all the doubtful geography. Unfortunately Mr. Needham's project was negatived on political grounds by the Chief Commissioner of Assam, but Rinzin Ningyal obtained some valuable notes from Abor and Mishmi traders whom he met at Sadiya. The result has been, speaking roughly, to straighten out the course of the Sangpo, giving it a more generally south-easterly direction than before, and to assign a good deal of the supposed drainage of the Zyl Chu to the Sangpo. The route of the explorer Kinthup proves to have diverged for the last 20 miles eastward from the river, and the Abor mart of Dhamro Padam, or Miri Padam, lies about the same distance north of the point where the river enters British territory. Kinthup says, if two or three inhabitants of Upper Assam, capable of reading and writing, were taught route-surveying, the geographical details could be easily obtained, as the Assamese are accustomed to travel up the Sangpo for trade.

The Klerksdorp Gold-fields, Transvaal.—Mr. P. Gower Poole, Mining Engineer in the Transvaal, sends us the following account of the Klerksdorp Gold-fields, accompanied by a map compiled by himself, which we may utilize on a future occasion. He says:—“The Gold-fields are situated in the Potchefstroom district of the Transvaal, and are bounded on the south by the Vaal river, which divides the Orange Free State from the South African Republic. The fields are about 200 miles north-east of Kimberley, and 120 miles south-west of the Witwatersrand Gold-fields. The area of the fields extends over some 400 square miles. There are auriferous lodes in the Orange Free State across the Vaal river, which are the southern extension of the reefs running through these fields, the strike of which can be traced for miles. There are two townships in the district, one of them being the oldest village in the Transvaal; the newer one is, however, the seat of business. It was planned and laid out only two years ago, and the sale of stands brought into the Transvaal Government the handsome sum of 30,000*l.* The population of the district must be at the least 8000. It is made up of people from all parts of the world, and all languages are spoken, though English predominates. English must be the language of the future, though at present in all the public offices Dutch is rigidly adhered to. On the whole the climate is very healthy, the air being fine and bracing. Camp fever prevails during the months of September and October, but this is owing to the very bad sanitary arrangements.

The geological formation is very mixed, consisting of greenstone, quartzite, schist, sandstone, slate, and chert. The auriferous lodes are for the most part conglomerate (Banket). Quartz lodes are found, but in this district they are generally barren. The lodes are as a rule very wide, but are nearly all low grade, and their payability or otherwise will depend on their being worked on a large scale. There is an abundance of wood, water, and coal within a few miles. The people are at present agitating for a railway, and if that is granted there is no doubt as to the future prosperity of these fields."

REPORT OF THE EVENING MEETINGS, SESSION 1889-90.

Tenth Meeting, 5th May, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.C.S.I., President, in the Chair.

This was a special meeting, held in the Albert Hall, for the reception of Mr. H. M. Stanley, and to hear an address from him on the Geographical Results of his Expedition across Africa for the relief of Emin Pasha.

Mr. Stanley's Address and the Proceedings of the Meeting are given *ante*, pp. 313 *et seq.*

The usual Election of Fellows took place at the Council Meeting of the previous Monday, April 28th. The list is as follows:—

ELECTIONS.—*Thomas Robert Ames, Esq.; Major Arthur F. Burrow (Bengal Staff Corps); H. L. Churchill, Esq.; H. B. Darby, Esq.; James Gwyther, Esq.; Robert P. Heilgers, Esq.; T. S. Milroy, Esq.; Bertram Mitford, Esq.; Joseph Oppenheim, Esq.; Captain Rigaud; Edward H. Thompson, Esq.; Emile Victor F. Ulm, Esq.; Joseph Eyres Wadsworth, Esq.; Harry de Windt, Esq.*

Eleventh Meeting, 12th May, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.C.S.I., &c., President, in the Chair.

ELECTIONS.—*Herbert Weld Blundell, Esq.; Jessie Chance, Esq.; W. Brodrick-Cloete, Esq.; John H. Dauber, Esq.; Geo. Chardin Denton, Esq.; Geo. Draper, Esq.; William George Elder, Esq.; Rev. John Rolfe Fisher; H. E. Sir Blandford Griffith, K.C.M.G. (Governor of the Gold Coast); Alfred Knox, Esq.; Cumming Macdonald, Esq.; Admiral Francis Marten; Howard Payn, Esq.; Sir Sidney Shippard, K.C.M.G.; Thomas Thompson, Esq.; Major F. R. Wingate, B.A.; Walker Wood, Esq.*

The paper read was:—

The Karun River and the Commercial Geography of South-west Persia. By the Hon. G. CURZON, M.P. Will be published, with map and discussion, in a subsequent number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—March 21st, 1890 : **COMTE DE BIZEMONT** in the Chair.—M. E. Blanc intimated that he had received news of M. Deflers, who is travelling in Arabia. M. Deflers started from Aden about the middle of last December, with the intention of exploring the mountains of Yafia and then proceeding eastwards. After reaching the Turkish frontier at Ka'taba, he was obliged to retrace his steps, as he found it would be impossible to deviate from the ordinary caravan routes without being exposed to almost certain plunder. He set sail from Aden on the 23rd February for Makalla, whence he intended to advance as far as possible northwards across the mountains of Hadramaut.—A communication was read from M. Venukoff, stating that Captain Grombtchevsky was continuing his explorations in the mountains of Central Asia; he had made an ascent of the celebrated Mustagh peak (Depeang or Godwin-Austen), the highest mountain in the world after Gaurisankar. M. Venukoff was not able to say whether the traveller (who would continue his work in that region for another year) had attained the actual summit of the mountain. M. Venukoff also referred to the remarkable landslip which occurred at the beginning of February last in the valley of the upper Zerafshan, the effect of which was to block the river at a point about 28 miles above Piandjkend. The landslip of rocks, mostly conglomerates, was about three-quarters of a mile in length, more than a quarter of a mile in breadth, and about 300 feet in depth. A lake 7 miles long had been formed above the barrier, threatening to inundate the whole valley of the Zerafshan, in case the dam was broken through.—M. Aymonier wrote to the effect that M. Fontaine, who had returned from Laos, had recently made a voyage up the river Mekong, the result of which was to show that the Kong rapids were not impassable, as had been supposed; the river was now found to be navigable for steamers up to the embouchure of the Mwa.—The question of the formation of the great sand-dunes of the Sahara was again brought before the Society, M. G. Rolland replying to the theory advanced by Captain Courbis at a recent meeting. M. Rolland supposes that there is a connection, direct or indirect, between the dunes and the relief of the soil, and that the latter has been the cause of the aggregation of the sand at given points. He states that M. Courbis, in supposing the formation of the dunes to be due to the presence of wells making the sand damp, has mistaken the cause for the effect. It is true that the sand is damp, but it is because these dunes act as great reservoirs of water.—Some observations were made by M. Ed. Blanc upon the project for a Trans-Sahara railway, which had been discussed by M. G. Rolland at a previous meeting.—In conclusion, M. Abbé Desgodins, who has been a missionary on the confines of Tibet for the last thirty-seven years, read a paper, describing the people and physical features of the country.

Geographical Society of Berlin.—April 12th, 1890 : **BARON VON RICHTHOFEN** in the Chair.—After the reading of a paper by Herr F. Rosen upon his journey from the Persian Gulf to the Caspian Sea by way of Shiraz, Prof. O. Simony, of Vienna, addressed the Society on the subject of the Canary Islands, which he had visited with the special object of taking photographs of the ultra-violet part of the solar spectrum from the summit of Fyde (Teneriffe). Provided with a photographic apparatus of special construction and quality, the traveller on this occasion managed, at great personal labour, to take a number of excellent photographs, which are of exceptional value for the study of the geological conditions of the islands, the points of view being for the most part some of the very inaccessible and little frequented parts of the islands of Teneriffe and Palmas. The explanation of these

photographs, which besides being geologically of special interest are of exceptional beauty, occupied the greater part of Prof. Simony's lecture. He contemplates shortly undertaking an ascent of Mount Ararat or Demavend, with his special photographic apparatus, for the purpose of continuing his investigations upon the invisible ultra-violet portions of the solar spectrum. By taking his photographs from this still higher standpoint and in this very dry climate, he hopes to avoid those obstacles which are presented by the humidity of the atmosphere and the consequent absorption of the ultra-violet parts of the spectrum.

— May 3rd, 1890: BARON VON RICHTHOFEN in the Chair.—Dr. Zintgraff read a paper upon his journey from the Cameroons to the Benue.

THE CAMEROONS AND THE BENUÉ.

The interior of the Cameroons is one of the last spots in Africa into which Europeans have penetrated. All those conditions which, in other parts of the African continent, both on the east and west coasts, allow of a comparatively easy advance into the interior, are wanting throughout the Cameroons region, viz. open caravan routes and waterways. On the other hand, there is a coast population, as numerous as they are jealous for the protection of the interests of the carrying trade in their hands, who have hitherto resisted all the attempts of Europeans to open up the unknown interior from this point. Under these circumstances the course taken by the German Colonial Administration was a very proper one, viz. first of all to confine all efforts for the opening up of the interior lands to reconnoitring excursions, with the view of becoming better acquainted with the coast region. With this task Dr. Zintgraff was entrusted in the year 1886, and he undertook five journeys in different directions round the Cameroons mountains, within a circle of about 75 miles, viz. along the Wuri, up the Memgo to Elephant Lake, to Dibombe, to Lake Kotto, and to the Memé; on these occasions the coast region as far as the zone of the waterfalls on the different rivers flowing from the interior was explored. Upon the basis of the experience thus obtained it became possible for the first time to lay down a definite scheme for penetrating into the interior. It had been ascertained in all quarters that there was in the interior a numerous population which, without having been specially incited by the people of the coast, had adopted from the commencement a hostile attitude towards the whites. To their covetous eyes the European with his small caravan seemed a welcome booty, and jealousy for their interests caused them to regard him as a threatening danger for their carrying trade. Under these circumstances, if military expeditions for purposes of conquest were to be avoided, the desired objects could only be attained by a slow advance effected by the establishment of stations, by means of which peaceful relations might be entered into with the tribes in the vicinity. Thus, at Christmas 1887, Barambi Station, on the Elephant Lake, was founded, from which three attempts in succession were made to penetrate to the north-east, but of these the last only led to the great journey to Adamaua. The experience of the first two attempts had shown the people of Benjang, whose territory commences about 50 miles north-east of the station, in spite of the peaceful overtures of a small caravan, would never allow the march through their land. It was not until New Year's Day, 1889, when Dr. Zintgraff appeared again among them at the head of a caravan of 200 armed porters and overcame their resistance after a sanguinary conflict, that the route to the north-east was opened; then a march of several days through dense virgin forest brought the expedition to the steep slopes of the West African table-land, where the open grass land begins. Their three months' stay with the powerful chief Karega of the Bali tribe, who has at his disposal upwards of 2000 warriors, was a compulsory one, inasmuch as the crafty chief by friendly advances desired to make his country a kind of

Capua for the porters of the expedition, hoping by this means to get them to desert the traveller on his projected march up the country. But this piece of trickery failed, and the march was resumed to the town of Bafut, which numbers about 12,000 inhabitants. The chief of this place, Gualim, had some time before the arrival of the expedition attacked and killed several Hausa traders, who had been staying with him for a considerable period. He endeavoured to prepare a similar fate for the expedition, but being too much of a coward to have recourse to a regular open attack, he set to work to ruin the expedition by furnishing them with guides who were to lead the party into uninhabited deserts, where, wearied with hunger, they would fall an easy prey to the contemplated attack. Dr. Zintgraff, however, saw through this device, and conducted his people by a series of forced marches through the uninhabited wastes to the north, until at last, after four days' climbing over impassable paths, the first farm village or "ringi" of Mudi, an Adamaua village, was reached. After the great excitement consequent upon the unexpected arrival of a white man with so many armed followers had subsided, the march was resumed by way of Takum, Donga, (where the junction with Flegel's route was effected) and Watrari to Ibi. Here the River Niger Company gave the traveller a most friendly welcome. After four days' stay, Dr. Zintgraff travelled via Gashka to Iola, from there again via Gashka and Ashaku to Takum, whence he by an easterly route again arrived in the Bali country. At the beginning of January 1890, he again found himself in the Cameroons, having been absent exactly one year. With regard to the orographical and hydrographical conditions of the formerly unknown portion of the region traversed, it may be said that the country from the Cameroons up to Barombi station rises only about 1000 feet, and from there stretches away in gently undulating hills of about equal height up to the edge of the West African plateau. Here there is a sudden rise to 4000 feet. Up to the country of the Bali the ground falls but little, and then slopes away to the north-west, particularly in South Adamaua. At Takum the traveller emerges from a mountain range, which stretches from the north-east south of Jola; west of Takum extensive plains follow each other down to the Benué. The grass land in the Bali region is fairly hilly and treeless; only in the valleys of the water courses is bush country found. In the other parts of the grass lands traversed, the savannah is characterised by small trees of about 20 feet high, stunted by the grass fires. These trees at times grow so thickly that they offer a welcome shade for the otherwise sun-scorched lands of Adamaua. With regard to the hydrography of the country, it is to be observed that Mr. H. H. Johnston's representation of the lower Niger territories in the map published in the 'Proceedings' R.G.S. of 1888 requires material correction. The river-valley of the Calabar reaches in fact right up to the foot of the West African table-land. The Katsena-allah has not a northerly but a distinctly north-easterly direction, and is separated from the Calabar by the border lands of the plateau regions. The mountain chains, which are mostly composed of crystalline slates, have a general run from south-east to north-west, with transversal valleys running north and south. The mountain outlines in the southern portion of this region are mostly roundish. But in Adamaua proper there is an abundance of sharp jagged formations, and huge rock-pyramids, cones, and crests projecting 300 feet above their surroundings continually meet the gaze. Alluvial iron ore is plentiful, and the iron industry among the Bali is in a highly developed condition. The country is poor in many places between Jola and Gashka, where the laterite and disintegrated quartz occupy extensive wastes, which vividly recall the lands bordering on the lower Congo. The interior of the Cameroons, like the whole coast region of West Africa, is much poorer than East and South Africa, although not barren. The elephant is the chief characteristic of the country, antelopes are particularly numerous in the lowlands of

the Benue. Monkeys, and above all chimpanzees, are most plentiful in the deserts to the south of Takum, where the tracks made by them are often very similar to the native paths, and on many occasions led the expedition astray. The abundance of domestic animals in the interior, the great buffaloes, maned sheep and fowls, stands in great contrast to the poor condition of the cattle-rearing industry in the West African coast regions, and the same can be said of Adamana. There is no special distinction between the population of the primeval forest districts and that of the grass lands, although the latter is decidedly more developed and freer; it is as if the boundlessness of the savannah reflected itself in the people inhabiting it. All the negro races in the interior of the Cameroons are fully medium sized—indeed, among the Bali for example, the traveller meets with well-proportioned herculean figures. While in the forest region and among the Bali clever frisures of the hair are customary, the men in Adamana mostly have their heads clean shaven, while the women have a great preference for towering chignons. The Bali place great value upon oblong skulls and endeavour to shape the heads of newly born children accordingly—an ethnographical peculiarity which is very seldom met with in Africa.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

ASIA.

Deveria, G.—*La Frontière Sino-Annamite. Description Géographique et Ethnographique d'après les documents officiels Chinois traduits pour la première fois.* Paris, 1886: pp. xviii. and 182.

This first volume of the third series of works issued by the *École des Langues Orientales Vivantes*, of which the author is a corresponding member, furnishes a good specimen of the many valuable publications so admirably edited and turned out by M. Leroux, for a great Institution which, strange to say, has no counterpart in our own land. The comprehensive character of these publications may be accepted, moreover, as a new argument—if such were wanting—in favour of the attempt made by the Imperial Institute to organise a School for Modern Oriental Studies in England. It teaches that if the foreshadowed English school elect to follow the example of its French prototype, attention may be given in its publications to the delineation of trade routes and territorial frontiers in countries likely to contain centres of commerce, as well as to the more immediate question of Oriental tongues. But geography in the abstract owes much to the *École*, and to those who write and otherwise labour under its auspices.

In the volume under notice we learn that M. Deveria, finding the more recent maps of Tong-king incomplete in relation to the Chinese frontier, and wishing to supply the missing places, as far as possible, from native records giving the position of each, discovered so much general inaccuracy in his authorities, that he was led to refer back for enlightenment, to the maps prepared by the Jesuit missionaries for the Emperor of China in the early part of the 18th century. Since that date he maintains that no progress has been made in determining the local geography of the northern boundary of Tong-king, except by M. Kergaradec, with respect to Lao-kai. It may be worthy of note, however, that M. Dupuis was associated with the last-named explorer, in arriving at an accurate definition of the course of the Song-coi.* D'Anville, in

* 'The Hill Slopes of Tong-king,' by J. George Scott: see 'Proc. R. G. S.,' 1886, p. 218.

1729, reproduced the missionary maps on the scale adopted by the original designers, but error was introduced in the process, and that error, we are told, was repeated and exaggerated. M. Deveria has now put forward a simple but interesting map showing, in distinct colours, the original mapping of the Jesuit fathers, the strictly native data, and the information acquired by the War Department in Paris, with the official report of the Count de Kergaradec.

The character of the second, or ethnographical division of the book, will be ascertained from the following statement by which it is prefaced:—

“In the southern parts of the Celestial Empire are certain tribes of non-Chinese race with whose history it is essential we should become better acquainted, as so many of them come in contact with us in Tong-king. Although the names given to them by the Chinese are wanting in ethnical signification, and may possibly vary according to locality, even when applied to individuals of a similar stock, we believe that, in default of more precise means of information, a description of these tribes, obtained from Chinese sources, may possess some interest.

“The accounts that we now publish, with annotations, are taken from an ethnographical collection entitled *Huang Tsing tche-kong t'ou*, or a descriptive roll of the people tributary to the Tsing dynasty. It was in 1751 that the Emperor Khien-long issued a decree to his Viceroys and Provincial Governors to forward to the Privy Council the documents necessary for the composition of this work, which was only completed in 1773, and forms nine books. Each description given is accompanied by two plates.

“This roll of tributary people contains no less than nineteen different tribes in the eight Chinese prefectures the territories of which are contiguous to northern Tong-king. We have not attempted any ethnical classification: at a later period only will their better known history and philology admit of methodical grouping: in classing their descriptions, we have but borne in mind the localities occupied by these tribes on the Sino-Annamite frontier, proceeding from east to west.”

Throughout his pages, not only does M. Deveria express recognition and appreciation of the labours of Mr. Colborne Baber in his own field of ethnological research, but he supplies practical testimony to their value by long extract and repeated reference to that gentleman's writings, notably his *Travels and Researches in the Interior of China*.

One word, in conclusion, in praise of the typography (not restricted to the Roman letter), maps, and characteristic illustrative etchings which distinguish the publication reviewed.—[F. J. G.]

AFRICA.

[**The Emin Pasha Expedition.**]—Mit Stanley u. Emin Pasha durch Deutsch Ost-Africa. Reise-Tagebuch von P. Aug. Schynse, herausgegeben von Karl Heaps. Köln, 1890: 8vo., pp. xxxviii. and 88.

Father Schynse, a Roman Catholic Missionary, accompanied Mr. Stanley's expedition for part of the way to the east coast on the home-journey. This is the journal which he kept; it is a useful contribution to the literature of this great expedition, though the tone is occasionally that of an unfriendly critic.

Giraud, Victor.—Les Lacs de l'Afrique Équatoriale. Voyage d'Exploration exécuté de 1883 à 1885. Paris, Hachette et Cie., 1890: imp. 8vo., pp. 604. Price 11s. 3d.

The main results of Lieut. Giraud's journey are already well known. Lieut. Giraud showed himself a competent traveller and a trustworthy observer. His course was from Dar-es-Salaam, west and south-west to the north of Lake Nyassa. Thence Lieut. Giraud pushed on to Lake Bangweolo, which he navigated, and from which he passed out by the Lualaba. Here he was taken prisoner, but managed to escape, and proceeded north to Lakes Moero and Tanganyika. His observations on Lake Bangweolo and on the river by which it discharges its waters, as well as on the region around, are of original value; while the volume abounds with interest and fresh information. Lieut. Giraud came back from

Tanganyika to Lake Nyassa, and down to the Shiré, making many observations by the way. On the south of the lake he met with the late unfortunate Mr. Montagu Kerr, and together they journeyed down the Shiré and Zambezi. The book, as usual with French works of the class, is richly illustrated.

Selous, F. C.—A Hunter's Wanderings in Africa, being a Narrative of Nine Year spent amongst the Game of the Far Interior of South Africa, containing accounts of Explorations beyond the Zambesi, on the River Chobe, and in the Matabele and Mashuna Countries, with full notes upon the Natural History and present distribution of all the large Mammalia. With nineteen full-page illustrations by Miss A. B. Selous, J. Smit, and E. Whympere. London, R. Bentley & Son, 1890: 8vo., pp. xvii. and 455. Price 18s.

This is (on the back of the title-page) called a second edition of the author's work published in 1881, but is really only a reprint. The preface should have been modified for the present edition, the following passage being misleading:—"I have also incorporated in my work two papers read by me before the Zoological Society at their meetings on the 7th and 21st of June last"—really several years ago. This is not the author's blame; he has not, we believe, had any opportunity of revising the work. It will be unnecessary here to refer to the contents of Mr. Selous' book, a lengthy notice having already appeared in the 'Proceedings' for 1882, at p. 63.

AMERICA.

Vincent, Frank—Around and About South America: Twenty Months of Quest and Query. New York, D. Appleton & Co., 1890: 8vo., pp. xxiv. and 478. Price 21s. [Presented by the Author.]

This is an account of a recent circumnavigation of South America, including visits to all the capitals, chief cities, and important seaports; expeditions into the interior of Brazil and the Argentine Republic; and ascents of the Paraná, Paraguay, Amazon, Orinoco, and Magdalena rivers. On leaving Panama the first place touched at was Guayaquil, the principal seaport of Ecuador, whence a journey was made into the interior to Quito; passing down the Peruvian coast the principal places visited by the author were Callao, for Lima, and Arequipa, whence a journey was made inland to La Paz, the capital of Bolivia; the principal Chilean ports were visited, and the voyage was continued by the Straits of Magellan and the Falkland Islands to Montevideo and Buenos Ayres, from whence the author made a trip up the rivers Paraná and Paraguay to Asuncion, returning by way of the river Uruguay. The remainder of the voyage included an ascent of the Amazon as far as Manaos, a short trip up the Orinoco, and an ascent of the Magdalena river to within a short distance of Bogotá. A number of illustrations and maps add to the interest of the author's narrative, which, on the whole, gives a good general idea of the present condition of things in South America.

Woodward, R. S.—Latitudes and Longitudes of certain points in Missouri, Kansas, and New Mexico.—Bulletin U.S. Geolog. Survey, No. 94. Washington, Government Printing Office, 1889: 8vo., pp. 133. [Presented by the U.S. Geological Survey.]

GENERAL.

Bettencourt, E. A. de.—Descobrimientos, guerras e conquistas dos Portuguezes em terras do ultramar nos seculos XV. e XVI. Lisboa, 1881-1882, pp. xvi. and 420, 4to., map. Price 25s.

A popular account of the discoveries and conquests of the Portuguese during the fifteenth and sixteenth centuries.

Dilke, [Sir] Charles Wentworth, [Bart.]—Problems of Greater Britain. London, Macmillan & Co., 1890: 2 vols. 8vo.; vol. i. pp. x. and 596; vol. ii. pp. 618. Price 1*l.* 16s. [Presented by the Publishers.]

This is not simply a new edition of Sir Charles Dilke's 'Greater Britain' first published in 1868. It is virtually a new work, in which the present con-

ditions of the various sections of the Empire beyond the seas are discussed in all their aspects. While the text is largely social and political, there is also much in it which bears on the practical applications of geography. It is a work which will be studied by all who desire to master the actual condition of the British Empire, and the relations which subsist between its various sections.

Dubrovin, N. T.—Nikolai Michailovitch Prejevalsky. A biographical sketch. With 4 portraits, 3 autographs, 2 phototypes, and a map of his four journeys. St. Petersburg, 1890: pp. ix., 662, and viii. Price 5 roubles.

Within a few months of the death of the famous explorer, this sketch of his life has appeared, in order, as the author says, to satisfy the wishes of many of his friends and acquaintances. Though a colleague of the late General Prejevalsky, both in the Imperial Academy of Sciences, of which he was a member, and in the Scientific Committee of the Staff Corps, M. Dubrovin has depended largely for his materials on private letters supplied by friends, and of these no less than 600 were collected. The funds realised by the sale of the book are to go towards a sum now being raised to erect a bust of the traveller in the garden by the Chernyshóf bridge, facing the building in which the Geographical Society of St. Petersburg holds its meetings.

The subject of this memoir derived his descent from a Cossack of the *Zaporog*, i. e. beyond the rapids (of the Dnieper), whose deeds of daring earned for him the surname *Prjevalsksky*, from *Prje*, Polish for "very," and *valiti*, "to make war." This hero was rewarded by Stephen Batory, the Polish King, with the rank of nobleman and a special badge. But N. M. Prejevalsky was one of those men who look to their own exertions rather than to their ancestry to shape their destiny in life. His earlier years were passed on the family estate of Otradny, in the government of Smolensk, to which in later life he liked to return in the intervals between his exploring expeditions, and from which some of his more recent letters are dated. His school education began at the age of ten, when he and one of his brothers entered the civil gymnasium of Smolensk. Here he was noted rather for physical strength and courage than for attention to books. Yet his memory was even then remarkable, and enabled him to keep his place at the head of his class. This extraordinary gift of memory served him well in after life, when he had to lecture on his travels before large audiences in St. Petersburg, though he was wont to say that it interfered with his proficiency in mathematical studies, and that had his teachers changed the order of the book lesson, he would have been at a loss how to answer. His good genius however always befriended him, and never allowed him to fail in any task he had set himself to accomplish. At the age of 16 he entered the military profession, joining the Riazan regiment of infantry, then at Mosco, on the 11th October, 1855. The stern realities of military life soon forced themselves on his notice, and in one of his letters home he compares the march of his regiment through the Government of Tambof to that of a band of robbers, for usually they paid for nothing they took, whether for themselves or their horses—everything was gratis. After five years of soldier's life, with its routine of drills and musketry practice, Prejevalsky felt the necessity for a wider sphere of usefulness, where his time and industry might be turned to better account. He accordingly asked to be transferred to the Amur, but instead of receiving an answer he was placed under arrest for three days. He then decided on entering the Staff College, and here he worked 16 hours a day, passing his holidays in the Carpathian Mountains, where he refreshed his weary brain in shooting excursions. Having passed his entrance examination one of the first of the hundred and eighty candidates who went up, Prejevalsky found himself in St. Petersburg in bad circumstances, having often to go without his dinner. He was thus prevented from joining any of those circles to which most of the young officers belonged, and he led a somewhat retired life, attending lectures regularly, and reading a great deal in his leisure hours any books, but chiefly those on history and natural science; for military subjects he showed no inclination. When war broke out in Poland in 1863 special privileges were offered to officers at the Staff College who would join their regiments on active service, and Prejevalsky was one of the first to avail himself of these. He was

appointed adjutant of his regiment, in which capacity he made himself much liked among his brother officers for his open and honest character, and his warm heart, ever ready to do a kind action. He only remained a year as adjutant, during which he passed all the time he had to spare from military duties in the chase and in reading. He seldom played at cards, and then only at games of chance, and he went little into ladies' society. The next event in his life was his election to the fellowship of the Russian Geographical Society, in recognition of his work on the Amur country, entitled "A military statistical review of the region lying on the Amur," originally written as a theme for the Staff College. This was in 1864, and he now saw the door opened to him to the much coveted field of exploration in the far East. To prepare himself for this he applied himself seriously to zoology and botany, and the deeper he dipped into these studies the more ardent became his desire to study nature face to face in regions where civilised man had not trod. It is strange that his first idea should have been to seek out the sources of the White Nile, following in the footsteps of Baker, but then came the difficulty of want of means, at that time an insuperable one, and he was perforce obliged to leave the dark continent to others to explore and turn his thoughts and steps towards Asia, where he was to realise to the full his aspirations. But the funds necessary to explore a new country are not easily found, and seeing that parts of Russia much nearer home were then imperfectly known, the best opportunity that presented itself to the future explorer was to join some local centre, where a number of persons interested in the same pursuits collect together, and by their united efforts contribute to raise sufficient funds for special researches. Such a centre was Warsaw, and accordingly Prejevalsky proceeded thither, and obtained the post of lecturer on history and geography in the cadets' school. His life in Warsaw left the most agreeable impressions upon him, and he used to say in after-life that his character was finally formed there. He was very much liked by the students both as a lecturer and personally. In his geographical lectures he was particularly successful, and the other teachers complained that he drew most of their pupils away.*

In March 1866 General Chernitsky wrote to the commander-in-chief of the military schools, strongly recommending the employment of Staff-Captain Prejevalsky for service in Turkestan. "This officer," adds the general, "by his wide knowledge of geography, history, and the natural sciences, will be very useful in the statistical survey of our possessions in Central Asia hitherto so little explored." Eight months having passed without any answer being received to this letter, a second application was made, this time suggesting Eastern Siberia as an alternative field for the special services of Prejevalsky. This was at last followed by his nomination to the Staff Corps for service in Eastern Siberia.

On his way through St. Petersburg he made the acquaintance of P. P. Semeonof, at that time President of the Physical Section of the Geographical Society, and now vice-president of that society. Semeonof could not promise the young explorer any material help, for in those days grants in aid of exploration were very rarely made, but he gave him letters to the Governor-General and to other officials in high positions; and with these, and the promise that if he were successful in doing some good work with his own unaided resources, he might hope for support from the Geographical Society in a more serious expedition in Central Asia, he set out for the scene of his first travels. In May 1867 Prejevalsky was appointed to the Ussuri country, and the following were among the special points to which he was charged to turn his attention:—The collection of information on the numbers and condition of the settlements both of Manchus and Coreans; the exploration of roads leading to Manchuria and Corea; the surveying and mapping his route, and any scientific researches he liked. Moreover, the Siberian section of the Geographical Society charged him to report on the flora and fauna of that almost unknown country, and to form collections of zoological and botanical specimens. His impressions of Siberia

* In 1867 Prejevalsky published a handbook of General Geography designed for the use of his former pupils, the cadets.

and the results of his expedition are told by him in his book, 'Travels in the Ussuri Country, 1867-89,' published in St. Petersburg in 1870, and never yet, as far as I am aware, translated into any western European language. He speaks in it of the valley of the Amur and its tributaries; of the wild beauty of the scenery there, of the gloomy recesses of the great forests in that timber-covered land, of the abundant animal life and luxuriant vegetation; he describes Lake Hanka, with its snow-covered shores steeped in profound silence before the return of spring, when the birds of passage awaken its solitudes with their varied notes; the Ussuri and the trans-Ussuri country, and the shores of the Sea of Japan.

On the other hand, his opinion of the people was extremely unfavourable. In a letter to one of his brothers, he writes: "It may be justly said that the Amur, even all Eastern Siberia, is a dung-heap (of course referring to the people, not the nature), on which is flung all that is low and detestable in the whole of Russia." Before leaving Nicholaïevsk he sent to the Siberian section of the Geographical Society a treatise on the native inhabitants of the seaboard province. This met with the approval of learned geographers, and was awarded a silver medal. Having made his mark in the geographical world, Prejevalsky now offered his services to lead an exploring expedition to Mongolia and the northern parts of China. With these later journeys our readers are more or less acquainted, translations having appeared in English and other languages. Besides the photographs of the traveller contained in this book, there is one of the monument erected to his memory on the shore of the Issik-kul. It represents a block of stone carved in imitation of a rough crag with some steps leading up it. On the face is a round tablet carved with a likeness of the traveller in relief, and the inscription below—"The first explorer of the nature of Central Asia." Above is the name, with the dates of his birth and death, and on the summit is an eagle holding a laurel branch in its beak.—[E. D. M.]

[Gore, J. Howard.]—United States Coast and Geodetic Survey, F. M. Thorn Superintendent. A Bibliography of Geodesy. Appendix No. 16.—Report for 1887. Washington, Government Printing Office, 1889: 4to. [Presented by the Author.]

List of Oceanic Depths and Serial Temperature Observations received at the Admiralty during the year 1889, from H.M. Surveying Ships, Indian Marine Survey, and British Submarine Telegraph Companies. Hydrographic Department, Admiralty, London, Jan. 1890: folio, pp. 22.

Thornton, John.—Advanced Physiography. London, Longmans and Co., 1890: 12mo., pp. vi. and 312. Price 4s. 6d. [Presented by the Publishers.]

The following are a few of the subjects treated of in this work:—The celestial sphere; general survey of the solar system; description of the planets; the tides; motions of the earth; measurements of the surface, size, and shape of the earth; determination of latitude and longitude; celestial measurements; stars and nebulae; atmospheric and oceanic movements; terrestrial magnetism, &c. There are six maps, besides a number of illustrations.

Travel, Adventure, and Sport, from 'Blackwood's Magazine.' No. VII. Edinburgh and London, W. Blackwood and Sons: 12mo., pp. 214. Price 1s. [Presented by the Author.]

This No. contains Albert Smith's Ascent of Mont Blanc; Summer Sport in Nova Zemla, by Herbert Swire, R.N.; A Ride to Magnesia; and, Aland—The Baltic in 1854, by the late Colonel Charles Hamley, R.M.

Verhandlungen des Achten Deutschen Geographentages zu Berlin am 24, 25 und 26 April 1889. Berlin, Reimer, 1889: 8vo., pp. lviii. and 241. [Presented by the Publisher.]

Among the papers given at length in the report of last year's meeting of the German Geographical Congress are the following:—The present available

material for research in terrestrial magnetism, by Dr. Neumayr; On the problems of special geography, and their present position in geographical literature, by Dr. Supan; the final result of erosion and denudation, by Dr. Penck; In how far is the present climate constant? by Dr. Brückner; On the proof of a change of climate in the Mediterranean region within the historical period, by Dr. Partsch; The permanent decrease of moving water on the surface of the earth, by Dr. Götz; The bearings of the Baltic ridges in the ice-age, by Dr. Wahnschaffe; Glacial phenomena in South Africa, by Dr. Schenck; On the changes in the continents during the ice-age, and their bearing on the oscillation of the earth's crust, by Dr. Von Drygalski; On the importance of school excursions in geographical education, by Dr. Hotz-Linder; Geographical pictures, by Dr. Penck: On the methods and objects of different kinds of height measurements, by Dr. Jordan.

Wilson, J. Spottiswoode.—Geological Mechanism; or an Epitome of the History of the Earth. London, John Heywood: 12mo., pp. 138, frontispiece. [Presented by the Author.]

Woodward, R. S.—On the form and position of the sea level, with special reference to its dependence on superficial masses symmetrically disposed about a normal to the earth's surface.—Bulletin U.S. Geolog. Survey, No. 48. Washington, Government Printing Office, 1888: 8vo. pp. 88. [Presented by the U.S. Geological Survey.]

— Formulas and Tables to facilitate the construction and use of maps.— Bulletin U.S. Geolog. Survey, No. 50. Washington, Government Printing Office, 1889: 8vo., pp. 124. [Presented by the U.S. Geological Survey.]

Young, Robert.—The Success of Christian Missions, Testimonies to their Beneficent Results. London, Hodder & Stoughton, 1890: 8vo., pp. viii. and 278. Price 5s. [Presented by the Publishers.]

The following works have also been added to the Library:—

A. A. C.—Impressões de uma Viagem do Pará ao Recife passando por S. Miguel e Tenerife a bordo da corveta "Trajano," por A. A. C. Rio de Janeiro, 1878: 2 large 8vo., pp. 48. [Presented by the Author.]

Chailley, Joseph.—Paul Bert au Tonkin. Paris, G. Charpentier & Co., 1887: 12mo., pp. 404, portrait. [Presented by the Author.]

The Geological Record for 1874–1884 (inclusive). 8 vols. London, Taylor & Francis, 1875–1889: 8vo.

Hayes, A. A. [jun.]—New Colorado and the Santa Fe Trail. New York, Harper & Bros., 1880: large 8vo., pp. 200, map and illustrations. [Presented by the Author.]

Nicholson, John.—An Account of the Establishment of the Fatemite Dynasty in Africa, being the Annals of that Province from the year 290 of the Heg'ra to the year 300, extracted from an ancient Arabic MS. ascribed to El Mas'udi, belonging to the Ducal Library of Saxe-Gotha: with an Introduction and Notes. Tübingen, [L. F. Fues; Bristol, W. Strong, 1840: 8vo., pp. ii. and 138.

NEW MAPS.

(By J. COLES, *Map Curator R.G.S.*)

EUROPE.

Mitteleuropa.—Topographische Specialkarte von —. Scale 1:200,000 or 2·7 geographical miles to an inch. Berlin. Sheets: 178, Osterode in O. Pr. 201, Soldau. 544, Passau. 546, Krems. 560, Tours. 569, Sigmaringen. 598, Schaffhausen. 637, Steinamanger. 656, Lausanne. Price 1s. 3*d.* each sheet. (*Dulau.*)

Russland.—Eisenbahnkarte von —, von G. F. Raab. Scale 1:4,800,000 or 65·7 geographical miles to an inch. Glogau, Flemming. Price 1s. (*Dulau.*)

Sachsen.—Topographische Karte der Königreich von —. Scale 1:25,000 or 2·9 inches to a geographical mile. Herausgegeben durch das königliches Finanzministerium. Bearbeitet im topographische Bureau der königlich. Generalstabes. Dresden. No. 27, Naunhof.—43, Lausigk.—46, Döbeln.—85, Sebnitz.—103, Rosenthal.—124, Ebersbrunn.—125, Kirchberg.—144, Falkenstein.—146, Johanngeorgenstadt. Price 1s. 6*d.* each. (*Dulau.*)

Scandinavia.—Geologisk kart over de skandinaviske lande og Finland. Udgivet af Hans Reusch. Kristiania, 1890. Scale 1:8,000,000 or 109·5 geographical miles to an inch. Kristiania, H. Aschehoug & Co. (*Dulau.*)

This is a very handy geological map of Scandinavia, on which nine insets are given. The colours used to indicate the different formations are well chosen, and the registering is excellent.

Schleswigschen Westküste.—Die Seehafen-Projekte an der —. (Röm und Emmerleff.) Mit Benutzung des Materials der Eisenbahncomitees in Hadersleben u.s.w. sowie eigener Aufnahmen entworfen u. gezeichnet von Paul Langhans. Massstab der Hauptkarte 1:400,000 or 5·5 geographical miles to an inch. Massstab der Nebenkarten, 1:200,000 or 2·7 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Taf. 10. Gotha, Justus Perthes. (*Dulau.*)

Serbien und Montenegro.—Generalkarte von —. Scale 1:600,000 or 8·2 geographical miles to an inch. Von F. Handtke. Glogau, Flemming. Price 1s. (*Dulau.*)

Tirol.—Karte von —, und angrenzenden Ländern. Scale 1:850,000 or 11·6 geographical miles to an inch. München, H. Petters. Price 1s. 6*d.* (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued during the month of April 1890.

25-inch—Parish Maps:—

ENGLAND AND WALES: Anglesey: XIX. 8, 4*s.* Cardiganshire: XXXVIII. 12, 4*s.* Carmarthenshire: XXXIX. 6, 7, 5*s.* each. Carnarvonshire: V. 6, 13, VI. 8, 4*s.* each. Devonshire: III. 16, 4*s.*; V. 1, 5*s.*; VI. 3, 4*s.*; XIII. 8, 5*s.*; XVI. 11, 4*s.*; XXIII. 4, 3*s.*; XXIV. 2, 4*s.*; LX. 6, 3*s.*; LX. 13, LXXXII. 11, LXXX. 6, 4*s.* each; LXXX. 9, 10, 5*s.* each; CIII. 1, 8*s.*; CIX. 12, CX. 7, 5*s.* each; CXVI. 10, 8*s.*; CXXVII. 8, 4*s.* Dorsetshire: XLIII. 16, 8*s.*; XLIV. 15, 5*s.*; LIII. 6, 4*s.*; LIII. 7, 5*s.* Pembrokeshire: XII. 12, 4*s.*; XXVII. 8, 5*s.*; XLI. 13, 4*s.* Somersetshire: XXXV. 1, LXVII. 15, 4*s.* each. Staffordshire: LXVIII. 1, 8*s.*; LXVIII. 5, 11*s.* 6*d.*; LXVIII. 10, 8*s.*; LXVIII. 14, LXIX. 13, 11*s.* 6*d.* Warwickshire: VIII. 13, 11*s.* 6*d.*; VIII. 14, 8*s.*; XIV. 1, 20*s.* 6*d.*; XIV. 2, 6, 11*s.* 6*d.* each; XIV. 10, 13, 8*s.* each. Worcestershire: II. 14, 11*s.* 6*d.*; VI. 10, 13, 8*s.* each.

Town Plans—10-foot scale:—

ENGLAND AND WALES: Batley and Dewsbury (Yorkshire), CCKXXIII. '11, 8, 13, 18, 19, 20, 23, 24, 25. CCKXXII. 15, 3, 4, 5, 8, 9, 10, 13, 18, 19, 20, 22, 23, 24, 25; CCKLVII. 3, 8, 14; CCKLVII. 4, 1. Batley and Dewsbury is now complete in 39 sheets, 2*s.* 6*d.* each. Birstal (Yorkshire), CCKXXIII. 6, 20; CCKXXIII. 7, 16, 5*s.* each. Chowbent (Lancashire), XCIV. 12, 21, 22; XCIV. 15, 5; XCIV. 16, 1, 2. Chowbent is now complete in 5 sheets, 2*s.* 6*d.* Hindley (Lancashire), XCIV. 9, 5, 4*s.*

coloured; XCIV. 9, 14, &c. coloured. Sowerby Bridge (Yorkshire), CCXXX. 12, 16, 17, 21, 22, 23; CCXXX. 15, 5; CCXXX. 16, 1. Sowerby Bridge is now complete in 7 sheets, 2s. 6d. each. Tyldesley (Lancashire), XCIV. 18, 12, 13, 17, 19, 20, 21, 24, 25. Tyldesley is now complete in 9 sheets, 2s. 6d. each.

(*Stanford, Agent.*)

ASIA.

Indian Government Surveys:—

Skeleton Map of the Punjab and surrounding countries, 1874, 1 inch to 32 miles. Corrections and additions in Railways up to November 1889.—Punjab Survey, 1 inch to a mile. Sheet No. 267, Districts Jullundur and Hoshiapur. Preliminary edition. Season 1886–87. No. 270, District Ludhiana and Sikh States. Seasons 1885–86–87. No. 291, District Umballa, Patiala, and Kalsia States. Season 1886–87. Preliminary edition. No. 292, District Umballa and Patiala State. Season 1886–87. Preliminary edition. No. 314, District Umballa and Kalsia State. Season 1886–87. Preliminary edition.—North-West Provinces and Oudh Survey, 1 inch to a mile. Sheet No. 162. Districts Basti, Gonda, and Fyzabad. Seasons 1864–65, 68–69, and 83 to 85. Preliminary edition. No. 180, Districts Jaunpur and Benares. Seasons 1878 to 80 and 1882 to 84 (second edition). No. 197, Districts Benares and Mirzapur. Seasons 1880 to 82 and 1882 to 84. Preliminary edition. No. 216, District Gorakhpur. Season 1883–84.—Oudh Revenue Survey, 1 inch to a mile. Sheet No. 107, District Unao. Season 1860–61. No. 147, Districts Bahraich, Gonda, and Bara Banki. Seasons 1865–69.—Lower Burma Survey, 1 inch to a mile. Sheet No. 188, District Bassein. Season 1876–80. No. 280, Districts Hanthawaddy and Pegu. Seasons 1883–84.—Triangulation Sheets: No. 61, 62, and 63, Preliminary Chart of the Burma Coast (between Cape Negrais and Sandoway) showing the positions of beacons and other points fixed, 2 miles to 1 inch. Seasons 1888–89.—Chart of Triangulation of the Country adjoining the Chittagong Hill Tracts. Lushai Expedition, 1889, 1 inch to 4 miles.—Panoramic Profile of the Hill Ranges seen from Landour (at No. 1. H.S.), 7533 feet.

Kleinasien.—Specialkarte vom westlichen —, nach seinen eigenen Reisen und nach anderen grösstenteils noch unveröffentlichten Routenaufnahmen, bearbeitet von Heinrich Kiepert. Scale 1:250,000 or 3·4 geographical miles to an inch. Erste Lieferung. Inhalt: Prospekt mit Übersichtskarte. Begleitworte. Bl. 1, Gallipoli. 2, Constantinopel. 7, Smyrna. 10, Samos. 14, Rhodos. Berlin, 1890. Verlag von Dietrich Reimer. Price 12s. (*Dulau.*)

This is the first part of a large-scale map of Western Asia Minor in the compilation of which the most recent and reliable material has been used. The five sheets contained in the present issue include the greater portion of the country bordering on the sea, and are, so far as the coast-line is concerned, based on the British Admiralty charts, and where other material has been used, it is duly acknowledged by the author in the letterpress which accompanies the map. In the years 1841–42 Dr. H. Kiepert visited Asia Minor for the special purpose of collecting material for the map which he published on a much smaller scale than the present one in 1844. In 1870, 1886, and 1888 he revisited the country and greatly extended his researches, which have also been supplemented by those of Dr. E. Fabricus, Professor of the University of Fribourg. As the routes followed by both of these two gentlemen are laid down on the map, it is at once seen what portion of it has been compiled from their personal observation. The heights of mountains, which are given in metres, have in many instances been fixed by triangulation by officers of the British Navy, and as regards the portion of Europe that appears in the map, by Russian officers; while the heights given in the interior are derived from barometric observations. This map will be completed in three parts, each of which is to contain five sheets, and the author intends, if possible, that the two remaining parts shall be issued during the present year. The manner in which the map has been

produced leaves nothing to be desired; the hill shading is very effective, the lettering clear, while great pains has evidently been taken to make the map as complete in its details as possible. All ruins, villages, convents, and places whose positions are uncertain, are distinguished by symbols, and an explanation of these is given in German, English, and French. In the letterpress which accompanies each issue a detailed account of the authorities used in its compilation are given, a perusal of which will show the great care which Dr. Kiepert has taken to obtain the very best material for the important work that he has undertaken.

Lesbos Island.—Die Küstenlinien nach der an einigen Stellen berichtigten Aufnahme von Cpt. Copeland (1834), das Innere nach den Winkelmessungen und Wegaufnahmen von Heinrich Kiepert, 1841, 1886, 1888, und Robert Koldewey, 1885–86. Scale 1:120,000 or 1·6 geographical miles to an inch.—Vertheilung der Vegetationsverhältnisse und des Bodenbaus der Insel Lesbos, nach den Beobachtungen von Robert Koldewey 1885–86, und Heinrich Kiepert, 1841, 86, 88. Scale 1:210,000 or 2·8 geographical miles to an inch. With letterpress. Berlin, Dietrich Reimer. (*Dulau.*)

The first of these maps exhibits the physical features of the Island of Lesbos, the topography having been plotted from the observations of Dr. H. Kiepert in 1841, 1886, and 1888, and Herr Robert Koldewey in 1885–86. The hills are shown by a combination of shading and contour lines, and the heights, which are given in metres, have been fixed by triangulation, and barometric observations. The depth of the sea is indicated by five different shades of blue, commencing with depths under 20 metres, and ending with those above 200.

The second is a very nicely drawn map of the island, showing its vegetable products, the more elevated portions being indicated by faint contour lines.

These maps are accompanied by a pamphlet containing descriptive notes of the country traversed by the two gentlemen from whose observations they have been compiled.

Syrien.—Karte des nördlichsten Theiles von —, nach den Zeichnungen und Reiseberichten von Dr. Carl Humann, D.Dr. O. Puchstein, M. Hartmann, und B. Moritz, gezeichnet von H. Kiepert. Scale 1:300,000 or 4·1 geographical miles to an inch. Berlin, Dietrich Reimer, 1890.

Dr. O. Puchstein's Routen mit Sester zwischen Euphrat und Tigris, 1882. Anschliessend an den östlichen Rand der Hauptkarte. Scale 1:300,000 or 4·1 geographical miles to an inch. Berlin, Dietrich Reimer, 1890. (*Dulau.*)

In delineating the topography which this map exhibits, use has been made of the surveys of Messrs. Humann, Mansell, Brooker, and Pressel. The physical features are well shown, and the routes of all well-known travellers are laid down, those of Humann, Puchstein, and Luschan being distinguished from the others by coloured lines. The ancient as well as the modern names of all places of note are given, all sites of ruined cities are indicated, and the elevations above sea-level are given in metres. The map is very clearly drawn; and as the routes between all the principal places are shown, it cannot fail to be of service to persons visiting the northern part of Syria.

AFRICA.

Central Africa.—By T. B. Johnston. Scale 1:10,300,000 or 141 geographical miles to an inch. W. & A. K. Johnston, Edinburgh and London, 1890. Price 1s.

The boundaries of the several "Spheres of Influence" embraced within the limit of this map have been correctly indicated; in other respects it has received correction, and Stanley's route during his last expedition for the relief of Emin Pasha is accurately laid down; it will, therefore, no doubt be useful for reference where maps on a larger scale are not available.

Zeila-Ankober.—Die Karawanenstrasse —, und die Grenzgebiete der Somali, Afar u. Galla. Auf Grund der neuen astronomischen Bestimmungen von Martini

u. Paulitschke, sowie mit Benutzung der im Italienischen Kartographischen Institut in Rom ausgeführten Neukonstruktionen der Itinerare von Cecchi, Chiarini, Martini u. A. bearbeitet und gezeichnet von G. E. Fritzsche. Scale 1:1,000,000, or 13·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1890, Taf. 9. Justus Perthes, Gotha. (*Dulau.*)

AUSTRALIA.

Brisbane.—New and enlarged Map of —, compiled February 1890. Issued with Pugh's Almanac. Brisbane, Gordon & Gotch. (*Dulau.*)

Queensland.—Map of —, compiled and lithographed from official maps. Scale 1:1,000,000 or 41·6 geographical miles to an inch. Issued with Pugh's Almanac for 1890. Brisbane, Gordon & Gotch.

This excellent map of Queensland has been published by the proprietors of "Pugh's Almanac." It is compiled from the official maps, brought up to date, and for the purposes of reference is, for its scale, as good as any map of Queensland that has been published.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in March and April 1890.

No.		Inches.	
1090	m =	0·5	England, east coast:—Blakeney to Flamborough head, 3s. 0d.
1820	m =	0·32	Spain, south-east coast:—Cape San Antonio to Cape Tortosa, 2s. 6d.
1405	{ m = 1·8 } { m = 7·3 }		Italy, west coast:—Agropoli bay, Scario anchorage, Port Palinuro, 1s.
1402	m =	14·5	Italy, west coast:—Ports Maurizio and Oneglia, 1s. 6d.
1085	m =	0·35	Mediterranean, Archipelago:—Negropont to gulf of Kassandra, including gulf of Saloniki, 2s. 6d.
1412	m =	9·0	West Indies, Curaçao Island:—Sta. Ana harbour, 1s. 6d.
1421	m =	1·0	Africa, east coast:—River Chinde, 6d.
1821	m =	4·0	India, west coast:—Porbandar, Navibandar, 1s. 6d.
1379	m =	various.	Australia, east coast:—Port Macquarie, Clarence river entrance, Richmond river entrance, Cape Byron bay, 2s.
2363	m =	2·0	South Pacific, Tonga islands:—Tongatabu, 2s. 6d.
1825b			Irish channel:—New plan, Holyhead bay.
219			Acheh head to Diamond point:—Plans added, Balken and Sand bays, Krang Raja bay, Kluang bay, Saban bay.
1117			Anchorage in Russian Tartary:—New plan, New Djigit bay.

(*J. D. Potter, Agent.*)

CHARTS CANCELLED.

No.	Cancelled by	No.
1455	Cromer to Trusthorpe New chart.	
1190	Trusthorpe to Flamborough head ..	1190
157	Plan of Port Maurizio on this chart	1402
160	Plan of Agropoli bay on this chart	1405
2736	Plan of Pur Bunder on this chart	1321
2363	Tongatábu New plan, Tongatábu	2363

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2593. North sea :—Ameland to Jade river. 1121. Norway, west coast :—Bergen. 2252. Baltic sea :—Gulf of Bothnia. 2300. Baltic sea :—Stiernö point to Fiäderäg, and Stor Fiörd to Gamla Karleby. 790. Denmark, east coast :—Approaches to Copenhagen. 2531. North America, west coast :—Cape Mendocino to Vancouver island. 644. Africa, east coast :—Delagoa bay. 2736. India, west coast :—Gulf of Kutch to Viziadurg. 1342. Cochin China :—Fan-rang bay to Tong-king gulf. 1199. China, east coast :—Kweshan islands to the Yang-tse-Kiang. 1030. Australia, east coast :—Great Sandy strait, southern portion. 2763. Australia, east coast :—Coral sea and Great Barrier reefs, sheet 1. 214. South Pacific :—Solomon Islands. 1380. South Pacific :—New Caledonia, New Hebrides, and Loyalty islands. 2421. South Pacific :—Tonga or Friendly islands. 1060. South Pacific, Society islands :—Huaheine to Marna or Manpiti.

(*J. D. Potter, Agent.*)

United States Charts.—No. 1192, South Bay. (Cerro Island). West Coast of Lower California. 1890. Price 1s. 1d.—No. 1194, San Benito Islands. West Coast of Lower California. 1890. Price 2s. 1d.—No. 1197, Sketch of Herschel Island. Arctic Ocean. Dominion of Canada (North-west Territory). 1890. Price 1s. 1d.—No. 1198, Guano Islands in the Pacific Ocean :—Baker Island (New Nantucket Island)—Howland Island. 1890. Price 1s. 1d. Published at the Hydrographic Office, Navy Department, U.S.A. Henry F. Picking, Captain U.S.N., Hydrographer.

ATLASES.

Hachette et Cie.—Atlas de Géographie Moderne, édité par ——. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, figures, diagrammes, etc. Par F. Schrader, F. Prudent, et E. Anthoine. 12^e Livraison. Paris, Hachette et Cie., 1890. Price 10d. (*Dulaeu.*)

The present issue of this Atlas contains an excellent map of France, on four sheets, drawn to the scale of twelve statute miles to the inch, on which there are nine plans of the principal cities and their environs, and a map of Corsica on the scale of four statute miles to an inch. The accompanying letterpress has been written by M. Anthyme Saint-Paul, and is full of valuable information with regard to the political and physical geography of France. There are the usual number of diagrams, some of which are worthy of special commendation.

PHOTOGRAPHS.

Alaska and Behring Strait.—Nine photographs of ——. Taken by Mr. J. D. Nicholls in 1889.

This is a series of photographs of Esquimaux, taken by one of the officers of the s.s. *Thetis* while on a whaling cruise in the Arctic Ocean north of Behring's Straits.

British Columbia and Vancouver's Island.—25 photographs of ——. Taken by Messrs. Wm. Notman & Son, Montreal.

This series of twenty-five photographs includes views of some of the rising places in British Columbia and Vancouver's Island, and serves to illustrate the rapid progress that has been made in that Province since the opening of the Canadian Pacific Railway. It also contains several photographs of natives.

Guatemala.—Nine photographs of ——. Taken by Mr. Edward Gledhill in 1887.

These are a very good set of photographs taken by Mr. Edward Gledhill, and presented by him to the Society. They consist of a panoramic view of the city of Guatemala on three sheets. A panoramic view of the city of Antigua, Guatemala, on two sheets. A view of the city of Antigua with the volcanoes,

"El Agua" and "El Fuego," in the distance. A street in Antigua, Guatemala, and a panoramic view of the city of Cartagena, Colombia, on two sheets.

Niger and Benué Region, West Africa.—75 Photographs of —. Taken by Capt. A. F. Mockler-Ferryman, Oxfordshire Light Infantry. July to November, 1889. [Presented by Capt. A. F. Mockler-Ferryman.]

This valuable set of photographs was taken by Capt. A. F. Mockler-Ferryman, Oxfordshire Light Infantry, during the tour of inspection of Major Claude MacDonald, H.B.M.'s Special Commissioner, West Coast of Africa, in the Niger and Benué Rivers, July to November, 1889.

The series commences with two views of the French Possession, Goree Fort and Island; then comes the Nun mouth of the Niger river, with a large river steamer lying at anchor, in which H.B.M.'s Commissioner ascended the river at the end of July.

The next photographs of interest are two groups of chiefs of Abo, and some views of the river scenery about the trading station of Idah and the Lower Niger south of Lokoja. No. 81 gives a good idea of the Mahomedan villages on the banks of the Niger, and No. 190 shows the important town of Lokoja at the confluence of the Niger and Benué rivers. A panorama, in three pieces, taken from Mount Pateh, at the back of Lokoja, discloses the rivers Niger and Benué meeting a little below the town; in the foreground of this view is seen the actual site of the Model Farm which was established in 1841 by the British Government, but which had eventually to be abandoned.

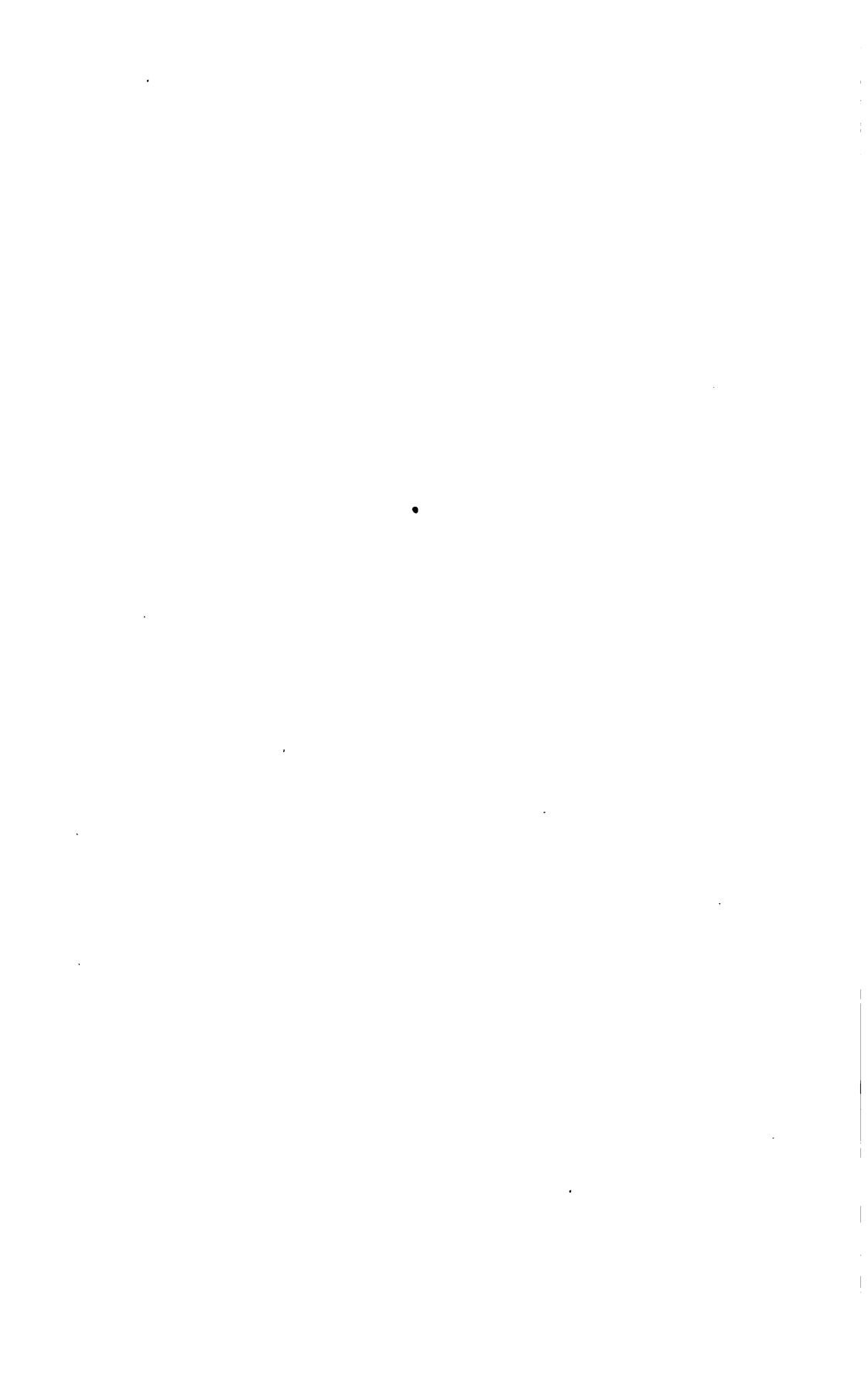
Leaving Lokoja and ascending the Benué river, there are views of Loko and Amaran, both important villages, and at the latter may be seen a fine sample of the huge bombax trees, which are scattered throughout the country; the stem of another fine tree, the *Adansonia digitata*, is shown in No. 79. There are two groups of women and warriors of the Djuko tribe inhabiting Ibi, and some natural and artistic groups of Mahomedans on the banks of the Benué at Lau, and of pagans at Djen.

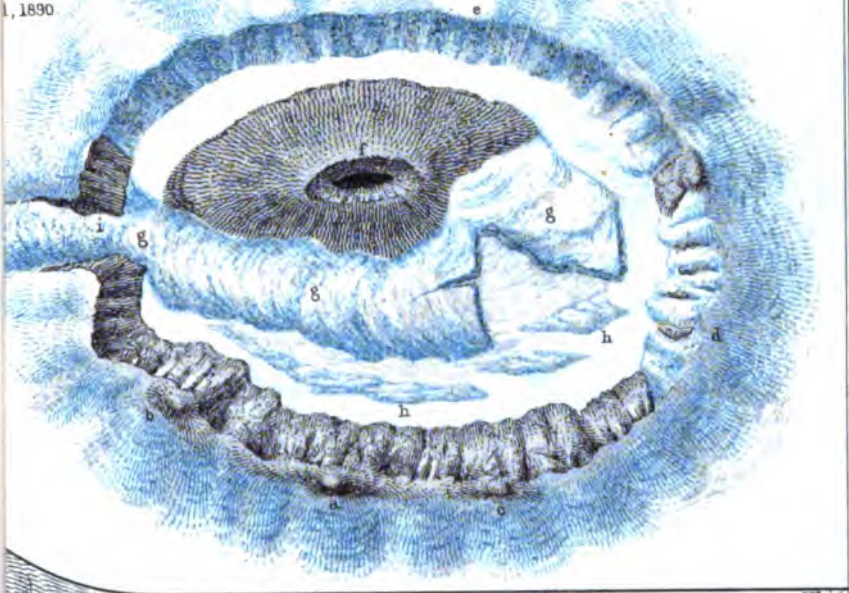
Two views of Numan show the style of villages inhabited by the natives of the upper parts of the Benué, and the nature of the country may be seen in the views of Yola (the capital of Adamawa), and the landing place at Ribago, which is the farthest point up the Benué where English traders are at present established; beyond this point the river is not navigable for large steamers, but the small steam launch shown in view No. 129 took H.B.M.'s Commissioner some 50 miles further, ascending the Kebbi river as far as Bifara.

Descending the Benué to the confluence, the Upper Niger is shown in several views, the best of which are, perhaps, two of Rabba, taken from mid-stream; they are very clear, and give an excellent idea of a Nupe town and an English trading station standing side by side; Rabba lies some 100 miles below Bousa, the place where Mungo Park lost his life. There are a dozen views of places in the Yoruba country, south of the Upper Niger, among which are some good groups of the natives, and interesting views of the country; No. 76, representing the ferry over the Asa river near Ilorin, being a most picturesque photograph. A number of groups of natives and their canoes, trading stations and villages in the Niger Delta complete the series.

For the information of travellers it may be useful to state that these photographs were taken with an instantaneous hand camera, $\frac{1}{2}$ -plate size, and an ordinary camera, whole-plate size. The enlargements from the former generally gave the best result. A series of well-chosen photographs, such as these, which have been presented to the Society by Capt. Mockler-Ferryman, are of great value from a geographical point of view, and form a welcome addition to the Society's collection.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

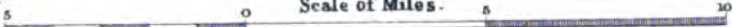




KILIMA NJARO M^{TN}

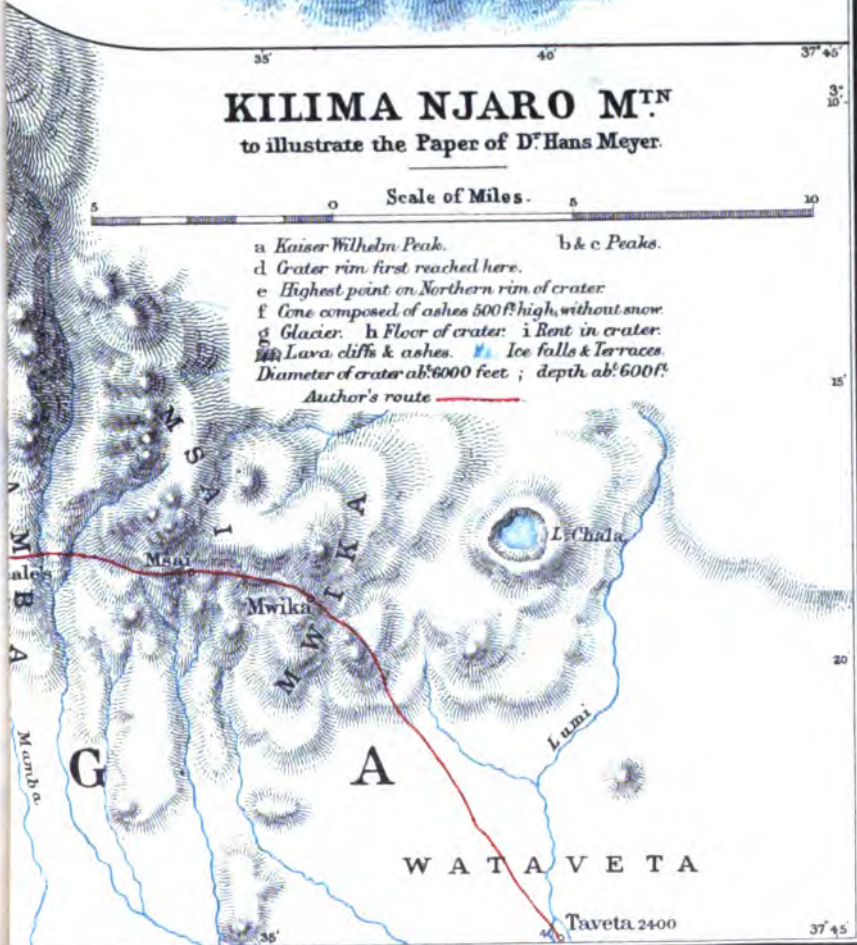
to illustrate the Paper of Dr Hans Meyer.

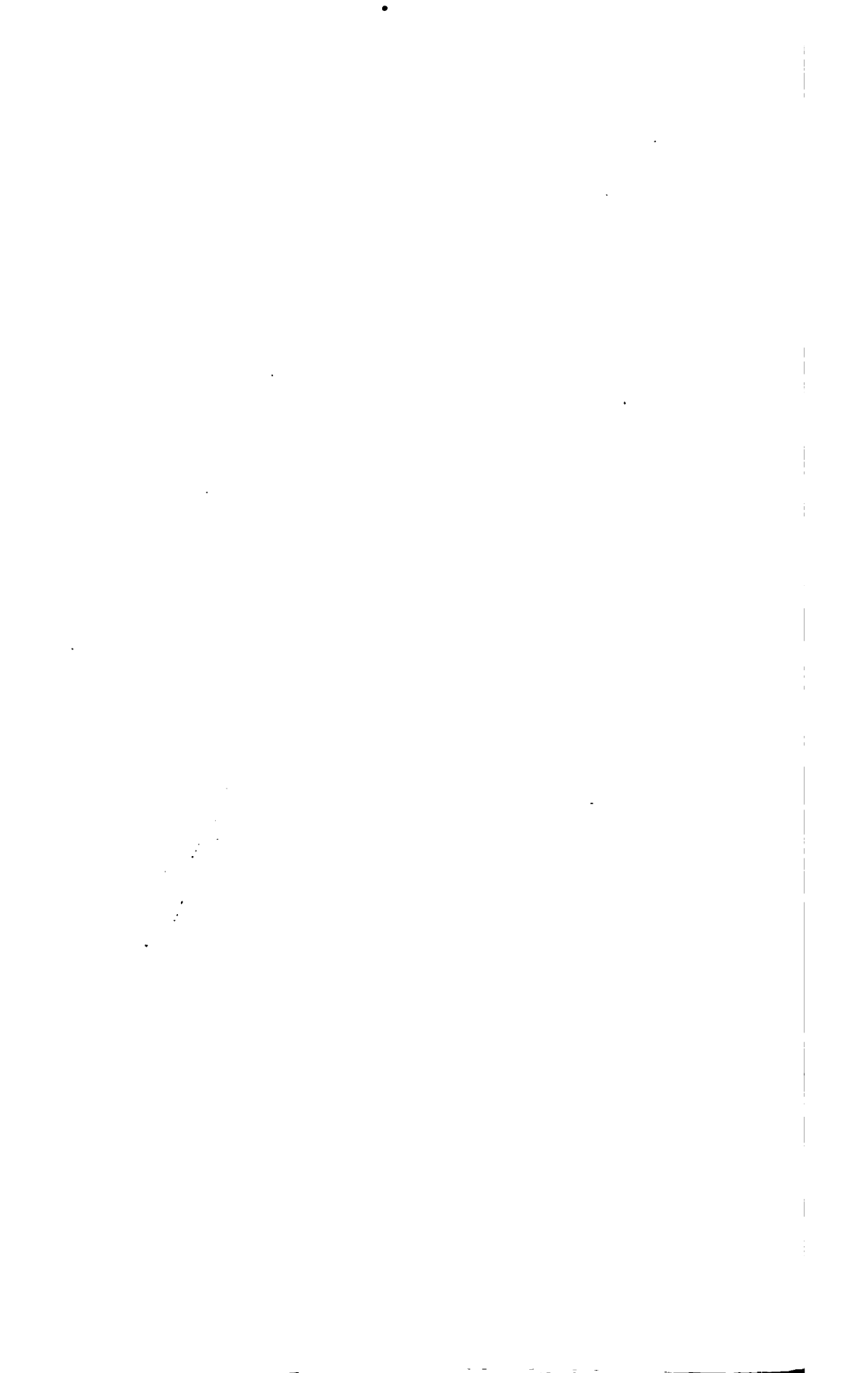
Scale of Miles.



- a Kaiser Wilhelm Peak.
- b & c Peaks.
- d Crater rim first reached here.
- e Highest point on Northern rim of crater.
- f Cone composed of ashes 500 ft high, without snow.
- g Glacier. h Floor of crater. i Rent in crater.
- Lava cliffs & ashes. Ice falls & Terraces.
- Diameter of crater ab: 6000 feet; depth ab: 600 ft.

Author's route





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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

The Annual Address on the Progress of Geography: 1889-90.

By the Right Hon. Sir MOUNTSTUART E. GRANT DUFF, G.C.S.I., President.

(Delivered at the Anniversary Meeting, June 16th, 1890.)

IN this year, when geography has excited more interest in Great Britain than it has ever done before, and when we are at length almost in a position to say that we know the general character of all the larger land masses on the surface of the globe, it seems fitting that I should begin my address by saluting, as your representative, the memory of all the patient workers to whom we owe our present knowledge. The names of many of these have utterly perished, for there were "Fortes ante Agamemnona," geographers before geography or history were thought of. Passing over them, however, with merely this brief allusion, we come to those who, at the dawn of authentic history, had settled, to use a phrase of Plato's, "round the sea, between the Phasis and the Pillars of Hercules, like frogs round a marsh," and amongst them we have to be specially thankful to three classes: first, to the warriors; secondly, to the traders; thirdly, to those who travelled, not to fight, nor yet to get gain, but to know.

Foremost of all, I suppose, we may put the great Egyptian conqueror Thothmes III., who fought the first of the long series of battles which have made famous the plain of Esdraelon, and in reaching it traversed a country singularly unlike his familiar valley of the Nile. He must have taken some trouble to acquaint himself, not only with the political, but also with the physical geography of the land which he was traversing; if it be true, that he not merely inscribed on a monument at Thebes, raised in memory of his victories, many names which can still be identified, but that he was also able to hold his own in a discussion with his commanders as to which was the best line for his advance from the plain of Sharon to the north.

Then, after his time, how many other leaders of men pushed forward geographical knowledge—Ninevites, Babylonians, Persians, some of

them probably consciously; for Tiglath Pileser, I have read, took an interest even in the acclimatisation of plants.

Then following down the centuries we come to the fateful Athenian expedition to Sicily.

“ While the words of Alcibiades yet echoed wide and far,
Where are cornfields and are olive grounds, the Athenians' limits are.”

The conquests and colonisations of Greece lead us on to those of Macedonia and of Rome; till the Punjab in the east and the Spanish Peninsula in the west were added to the domain of geography; till Gaul was subdued, and a network of civilisation thrown over even the remote and barbarous region in which we are now assembled.

Hardly less useful were the traders, from the days of those Phœnicians who, as described by Matthew Arnold:—

“ Snatched their rudders, and shook out more sail;
And day and night held on indignantly
O'er the blue Midland waters with the gale,
Betwixt the Syrtes and soft Sicily,
To where the Atlantic raves
Outside the western straits; and unbent sails
There, where down cloudy cliffs, through sheets of foam,
Shy traffickers, the dark Iberians come,
And on the beach undid their corded bales.”

They were followed by those early Greeks, their young and energetic rivals, whose efforts to find “new markets” and wider “spheres of influence,” to use our modern phraseology, are preserved to us only in the story of the legendary Argo, the same

“ Who hesitated still
To offend the blessed Presences
Which earth and ocean fill;
Whose tongues, elsewhere so eloquent,
Stammered at words of ill”—

and gave, in consequence, the name of the Euxine—the friendly to strangers—to the formidable sea which bathes the southern shores of Russia.

Last, came the explorers, those who travelled to learn; above all, Herodotus, the Father of History, and one of the most interesting characters of whom it makes mention, steeped in religious feeling like a monk of the middle ages, and yet with a burning desire

“ To follow knowledge, like a sinking star,
Beyond the utmost bound of human thought.”

A great Catholic ecclesiastic has commemorated him, in very striking verse, as one of “the four religious heathens,” and yet how wide a chasm

separates his way of looking at life and the world from that of another great Catholic ecclesiastic, the author of the 'Imitation,' of whom Renan has so happily said, "He read of Aristotle only the first line:—'Omnis homo naturaliter scire desiderat,' and closed the book altogether scandalised."

From the far-off days of which I have been speaking to our own, what floods of knowledge have poured in on us! To how many thousand warriors, traders, and explorers, are we not indebted!

With this brief commemoration of founders and benefactors to our science, voluntary and involuntary, I pass to the events of 1889-90.

My predecessor, General Strachey, in the last year's address said, "Great as has been the advance of exploration in Africa during the last twenty or thirty years, the interest of geographers will in the immediate future be more and more centred in that continent." This has proved eminently true for the year that has elapsed, for at no previous time has our own attention, or that of the public at large, been more occupied with Africa than during this period. The interest that has been excited by the later stages of Mr. Stanley's wonderful journey, though, of course, to a large extent, springing from causes outside the domain of science, has for its foundation the novelty and the magnificent features of the wide tracts of Central Africa he has traversed, and the magnitude of the difficulties he and his party had to overcome on their way. To his former discoveries he has now added the course of the Aruwimi and some of its tributaries, and the definition in this direction of the basins of the Congo and the Nile; the unexpected existence of a vast tract of humid forest in the very centre of Africa; a new lake and river in prolongation of what he has proved to be the western branch of the Upper Nile; and a snow-capped mountain mass, which to all seeming must be the famous Mountains of the Moon of the earliest geographers. All these he has defined by measurements as accurate as the time and means at his disposal permitted, and the result has been to complete in its broad features the map of Central Africa.

It is perhaps premature at present to estimate the value and importance of these discoveries to other branches of science. For example, the vast tract of humid forest he has revealed to us, in the centre of what has usually been considered as an arid continent, offers problems of great interest to the meteorologist, the botanist, the zoologist, and the ethnologist, for the solution of which more detailed observations than we at present possess are necessary; and the case is the same with regard to the questions which Mr. Stanley and other Central African travellers have raised respecting the subsidence of the waters of Central African lakes and rivers, and the producing causes, whether erosion or volcanic depression, of the deep, generally meridional, troughs in which many of them lie. The investigation of these phenomena will afford plenty of work for future explorers, and Central Africa, instead of being an

exhausted field, will prove more fertile of discovery and adventure than ever.

Next in interest to Mr. Stanley's achievement may be considered Dr. Hans Meyer's successful exploration and ascent of Kilima-njaro, of which he gave the Society so lucid and graphic an account at our April meeting. Dr. Meyer has shown the true spirit of a scientific explorer, by the pertinacity with which he has worked at his great undertaking, in spite of the difficulties and pecuniary losses it entailed upon him, especially on his second journey, when he was robbed and imprisoned on his way by an Arab chief at the commencement of the revolt against the German settlers. In his third and successful attempt he took with him an Alpine mountaineer, and by camping for days at a great elevation and surveying the summit on successive ascents, was able to give a complete plan of its singular ice-streams and crater.

Mr. E. C. Hore's paper, in our 'Proceedings' for last October, on the Physical Geography of Lake Tanganyika, in which he gives the condensed observations made during his twelve years' residence and travel in the lake basin, is a valuable contribution to our slender stock of knowledge regarding the physical structure, climate, &c., of Central Africa. He shows that the Tanganyika basin is a seat of volcanic disturbance, and gives a record of the earthquakes he has experienced. His account of the changes, which are both annual and perennial, in the level of the lake waters and the varying rate of flow of the Lukuga outlet, are of great interest in connection with the question of secular desiccation in Central Africa, believed in by so many travellers and residents. Among other interesting facts, he records that the annual rainfall at Ujiji, on the eastern side of the lake, is, on the average of years, not far different from that of London. He brings out, too, extremely well the importance of the lake, with its thousand miles of coast, to the ten tribes who are settled around it, and who represent all the different families of Africa.

The German and British territories in East Africa have been explored in various directions during the year. Dr. Hans Meyer has published an account of his observations in the districts east and south-east of Kilima-njaro. Dr. K. W. Schmidt has followed up the careful observations commenced by Count Pfeil on the soil and climate of the different districts, drawing conclusions as to their fertility, trade resources, and suitability for settlement. The result of his studies is to show how curiously and irregularly wide tracts of moist climate and rich soil alternate with other wide tracts of barren soil and arid climate. He singles out for favourable mention the wooded and mountainous region of Usambara, including the western part of Bondei and Nguru, all inland districts; the eastern part of Bondei, nearer the coast, and a wide tract south of the latitude of Zanzibar being arid and unproductive.

Count Teleki's discovery of Lake Rudolf (Lake Samburu), to the

north-east of Victoria Nyanza, was recorded in the last Presidential Address. A further addition to our knowledge of this remote region has been since made by M. Borelli, the traveller in the Shoa country, south of Abyssinia, and Lieut. von Höhnel, companion of Count Teleki. Both agree that the river Omo, traced by M. Borelli to the southward of Shoa, must be the same river as the Niam-niam of the Hungarian traveller, a feeder of the lake from the north. Lieut. von Höhnel has published a map, embodying this conclusion, which throws an entirely new light on the hydrography of this region, until lately forming one of the widest blanks on the map of Africa. Both travellers also agree that there can be no connection between the basin of Lake Rudolf and that of the Nile; the altitude of Victoria Nyanza being about 3800 feet, and that of Lake Rudolf only 1548 feet. Even if it be supposed that the lake discharges towards the north-west by the Sobat or other river into the Nile, the altitudes would negative the supposition.

An exploration of the northern borders of the British East African territory by one of the Company's Agents, Mr. J. R. W. Pigott, was carried out in 1889, and the results communicated to our Society. Mr. Pigott followed for a long distance the river Tana, and returned to Mombaza by an inland route from the upper course of that river. His notes and observations were placed in the experienced hands of Mr. Ravenstein, and the resulting narrative and map form a distinct addition to our accurate knowledge of this interesting part of Africa.

Further south, additional information of interest and value was obtained, during his tour in the interior last autumn, by Mr. H. H. Johnston, our Consul at Mozambique, regarding Lake Rukwa or Leopold, lying to the north of Nyassa. The lake had been previously seen only from a great elevation on its western side by Mr. J. Thomson, and by Dr. Kaiser from the northern end. Mr. Johnston approached it from the south and reached it at the lake level; he found it to extend much further to the south-east than was supposed, and to be only a shrunken vestige of what was once a great extent of water.

Among numerous minor explorations that have been carried out in the Zambezi region, I may mention a journey undertaken by the intelligent traveller Mr. Alfred Sharpe from the Shiré river, directly westward towards the Loangwa, by which one of the blanks on our map of Africa has been partly filled up; and also another exploration in Eastern Mashonaland by the skilful and experienced pioneer Mr. F. O. Selous. The country traversed by the latter, which is now becoming one of great public interest, lies between Tete on the Zambezi and the sources of the Mazoe river. The Right Rev. G. W. H. Knight Bruce, the Bishop of Bloemfontein, has also added considerably to our knowledge of Mashonaland, especially as regards the social and political condition and relations of the tribes, by a journey made by him from Inyati to Zumbo and Perizangi on the Zambezi.

In West Tropical Africa, a journey which a few years ago would have attracted attention as a remarkable geographical achievement, has been made by Dr. Zintgraff, from the German Possessions at Cameroons inland to the distant region of Adamawa, south of the upper Benue, which formed the most southerly part reached by Dr. Barth on his celebrated journey nearly half a century ago. The jealousy of the coast natives, combined with the absence of caravan routes and waterways, have made travelling in these regions peculiarly difficult, and the dogged perseverance with which the Germans, since their occupation of the coast, have pushed their explorations through this difficult country, in the face of hostile natives and physical obstacles, deserves our admiration. Lieutenant Tappenbeck, the companion of Captain Kund on his two dangerous journeys, was wounded in a hostile encounter with the tribes and has since died, and Captain Kund has returned to Europe hopelessly invalided; but his successor, Lieutenant Morgen, has set himself resolutely to continue the task of penetrating to the interior from the Batanga coast.

Whilst the Germans are thus rapidly filling up the great blank inland between the Benue tributary of the Niger and the Congo, the French are pushing their way northward and eastward into the same void from their stations on the Ogowé. Last year M. Crampel crossed the country between this latter river and the Likuala tributary of the Congo, and returned to the coast by a route directly westward, discovering on the way a stream called the N'tem, said to be the original home of the famous cannibal tribe, the Fans or Pahouins. In the Niger region another French traveller, Captain Binger, recently completed an exploration, commenced in 1887, of the wide region lying between the great bend of the Niger and the countries of the Gold Coast. The country was practically unknown, and the result of Captain Binger's exploration is geographically of great interest, as he has found that the southern limits of the Niger basin at this part are extremely contracted, the river Volta, for example, which flows to the Gold Coast, rising not far from the course of the main Niger. He has further demonstrated that the Kong Mountains have no existence, the watershed being a tract of rising ground of no great elevation. The town of Kong was visited, and found to be a great trade centre, with a population of 12,000 to 15,000, all Mahommedans.

Year by year, from all sides, raids are being made upon the least known of the continents, and ere very long it will not have many secrets for the geographer. It is very natural that so much new light should have a little dazzled the public eye, and that hopes should be entertained in more than one country which may not eventually be fulfilled. To us, however, in our capacity of persons who merely wish to know the facts of the planet on which we live, and to teach them to others, this over-excitement can bring nothing but gain. It will be for statesmen and

orators to take care that the nations whose destinies they guide, do not repeat in Africa the follies which were committed of old time in other continents, or neglect in the pursuit of secondary interests there, interests of primary importance nearer home.

Turning now to the continent of Asia, the central portions of which continue to be the scene of much exploring activity, our thanks are due, as in several years past, to the many able Russian travellers who have investigated with scientific objects large stretches of previously little-known country. The most important Russian expedition is that which started early last year under the leadership of the indefatigable Prejevalsky, the fifth of his great journeys, and which was continued on the untimely death of the leader before he had crossed the Russian frontier, under the leadership of Colonel Pievtsoff. The scientific world has been kept well informed of the progress and discoveries of the expedition by the admirable letters, full of pleasant botanical and zoological detail, of Lieut. Roborovsky, to the Russian newspapers, translations of which have appeared in our 'Proceedings,' and by Colonel Bogdanovitch, the geologist of the staff. The large party with its camels crossed the Tian Shan in June, and marched along the narrow belts of oasis near the rivers, with the great sandy desert on the left, to Yarkand, thence to Khotan, and, skirting the northern foot of the lofty mountain range which forms the northern escarpment of the central plateau of Asia, to their winter quarters at Nia. From this place a journey of reconnaissance was made in the autumn by a pass in the range, the Altyn Tagh, to the unknown region beyond, and routes laid out for its exploration in the spring.

Another persevering explorer, Captain Grombchevsky, has repeated this year his attempts to cross the Hindu Kush, taking a more westerly course than that of his previous journey, briefly recorded in the address of my predecessor last May; and an exploration of the kind frequently followed by Russian scientific travellers, namely the thorough examination of some definite and little-known region, has been carried out with good results by M. Paul Venukoff in the Mugodjars, a mountain range south-east of Orenburg, which he concludes to be a southern continuation of the Urals.

The results of Colonel Mark Bell's important journey through Central Asia in 1887, undertaken for the purpose of studying the trade-routes between Russia and India in the west, and Northern and Central China, have been communicated to us during the year. The mass of information, geographical as well as commercial and political, obtained by Colonel Bell forms a great addition to our knowledge of this wide region, and will be appreciated by the merchant and statesman. Our new Gold Medallist, Captain F. E. Younghusband, whose former expedition lay in part through the same region as that traversed by Colonel Bell, has last summer, from love of adventurous travel, employed his

vacation in exploring some of the passes between Chinese Turkistan and Kashmir. He succeeded, we learn, in traversing the Shimshal valley, north-west of Mustagh Pass, and entered Hunza by a route never before travelled by Europeans. An interesting piece of exploration in the same region was carried out by M. Dauvergne, a French gentleman resident in Srinagur, who followed the northern foot of the Hindu Kush from Kilian to the river Zerafshan, returning by the Ishkoman Pass to Gilgit and Kashmir.

In Northern and Eastern Tibet an adventurous journey was undertaken last year by Mr. Rockhill, Secretary to the American Legation at Peking, who, confiding in his knowledge of the Tibetan language, and assuming the garb and adopting the customs of the Tibetans, started from Peking with the intention of reaching Lhasa viâ Koko Nor and the pilgrim road. His disguise, however, was penetrated before he had attained his goal, and he was compelled for safety to diverge when about half-way, and take the route to Tachienlu on the Chinese border. Much new information and important corrections of the topography and nomenclature of previous travellers were useful results of his journey, a fuller account of which we hope will be published.

At our last Evening Meeting we had the privilege of hearing from Mr. G. Curzon some of the results of his visit last winter to Persia, in a geographical paper written from the statesman's point of view, under the title of "The Karun River and the Commercial Geography of South-west Persia." Both the paper and the discussion which followed were listened to with great attention by a large audience. The same interesting region, and particularly the district inhabited by the Bakhtiari people, has been recently explored also by Mr. H. F. B. Lynch, who took an efficient part in the discussion and will shortly publish in our 'Proceedings' an account of his exploration. Further east, a journey through the desert interior of Persia has been made by Lieut. H. B. Vaughan, who made a careful survey of his route, part of which lay through districts not previously visited, as far as known, by Europeans; his map and paper, communicated to us through a great authority on all things Persian, Sir Frederic Goldsmid, will be published shortly in the Society's 'Proceedings.' Regarding the Persian Gulf also, a valuable contribution to our knowledge has been made during the year, by the account of the researches, topographical, ethnological, and archeological, of Mr. Theodore Bent, in the Bahrein Islands.

Explorations and ascents in the Central Caucasus were carried out in the summer of 1889, by Mr. Freshfield and Captain Powell, Mr. C. T. Dent and Mr. Hermann Woolley. The main object of Mr. Freshfield and his friends was to ascertain the precise locality and the nature of the fate that befell Messrs. Donkin and Fox in the previous summer. In carrying this out, which they did most satisfactorily, much new information was gleaned regarding the topography of the high Caucasus, which

added to the explorations of Mr. H. Woolley and the work of the Russian Staff, have enabled Mr. Freshfield to publish a much improved map of the Central Group. During the summer, Mr. H. Woolley succeeded in reaching the summit of Dych-tau (16,880 feet), the eastern peak of Mishirgi-tau (16,408 feet), and Koruldash (14,854 feet). The Signori Vittorio and Erminio Sella also contributed to the effective work of the year by their ascents, but chiefly by the admirable series of photographs obtained by them, a set of which, I am glad to say, has been secured for the Society's rapidly augmenting collection of Geographical Photographs. The Russian Survey Department are now doing excellent work in the Caucasus, under the direction of General Shdanoff. The sketch-maps and memoranda of the officers, MM. Djukoff and Bogdanoff, were placed in the kindest manner and without reserve at the disposal of the English travellers.

In New Guinea, two of the most important geographical achievements of the year have been carried into effect by the enterprising Governor of the British part of the island, Sir William Macgregor. The first was the ascent of Mount Owen Stanley, the principal peak of the Owen Stanley Range, which was accomplished between the months of April and June last year. The difficulties of the task, owing to the rugged nature of the country to be crossed before reaching the foot of the main range, which had foiled all previous attempts, were overcome by patience and foresight and more deliberation in choosing the lines of approach than had been used by previous travellers. The result has been a great gain to our knowledge, not only of the geography of the interior, but of the botany of the great elevations reached, and the peculiarities of the scanty native population of the mountains. The second achievement was the navigation of the Fly river up to the latitude fixed as the British and German boundary in the centre of the island. During this second expedition, carried out between November and February, much time was devoted to the exploration of the estuary of the Fly and the conciliation of the hostile tribes of its shores and islands. The river was ascended to a point 535 miles from its mouth by a steam-launch, where rapids prevented further progress by steamer, the journey thence being continued 70 miles further by boat. From their camp ashore, near the furthest point reached, a distant view was obtained of a lofty range of mountains, remarkable for the precipitous and bare cliffs of its highest elevations.

In Australia, exploring work continues without interruption, but it lies chiefly in the direction of filling up the details of minor areas, and seldom attracts much public attention. Some of the work of the year has been of importance. For example, the western side of the Lake Amadeus, in Central Western Australia, has been visited and surveyed by the well-known explorer Tietkens, and the Upper Gascoyne and Ashburton rivers examined and described by Mr. Ernest Favenc. The

longer journey and extensive surveys of the northern interior by Mr. David Lindsay, of which we have published an account during the year, were the year's work of this able explorer in 1885-6.

With regard to exploration and discovery in other parts of the world, my remarks must be brief. The most salient event of the year has been the daring journey of Dr. Fridtjof Nansen and his little party of Norwegians and Lapps, across the inland ice of Greenland, an account of which he gave us at one of the largest meetings of our last Session in June. The work in which the full details of this remarkable achievement and its scientific results will be given, has not yet, I believe, appeared. In the Arctic regions of North-west America, where the Americans, since the acquisition of Alaska by the United States, have done so much excellent work, the glaciers of the Mount St. Elias group continue to be an attractive field for English Alpinists and explorers. Last session we listened to an interesting paper by Mr. Harold Topham, in which he gave us an account of a visit which he made to that region the previous summer, during which he ascended the mountain to a height of 11,451 feet, and added much to our knowledge of its singular glaciers, which reach to the shores of the Pacific. Another of our countrymen, Lieutenant Seton-Karr, has this year undertaken a second visit to Mount St. Elias, and an American expedition left New York for the same interesting region a few weeks ago.

In the little-known central regions of South America a large addition to our knowledge has been made by the intelligent enterprise of Colonel Labre, a Brazilian engaged in the indiarubber trade of the Purus, a large tributary of the Upper Amazons, for the first exploration of which we gave, in 1866, our Gold Medal to Mr. Chandless. Colonel Labre's object was chiefly to discover a practicable route for a road or railway between the navigable waters of the Bolivian rivers and those of the Upper Amazons tributaries; the great desideratum whereby an outlet would be obtained for the export to Northern Brazil and Europe viâ the Amazons of the products of Bolivia, the more direct road by the Madeira being blocked by cataracts and rapids. The result of Colonel Labre's work has been to fill up the void in our maps between the Madeira, the Aquiry, and the Beni rivers, and to show that a tract of forest-covered and fertile plain, over which roads can easily be made, connects the navigable courses of these great streams. In the same region, further east, Dr. Ehrenreich, following up the work of the previous expedition of Von den Steinen, of which he was a member, accomplished last year a remarkable journey from Cuyaba overland to the Araguaya, and thence to Pará. His object was chiefly ethnological, but much new geographical information was gleaned on the way. In Southern Peru a useful contribution to our knowledge has been communicated to us, as the result of a visit recently made to the interior of that country, by Major H. Leslie; and a German traveller, Dr. A. Hettner, has ascended

and measured the heights of the previously unexplored Andean peaks Sarasara (16,500 feet) and Charchani (19,500 feet). Lastly, I may record that a party led by the Governor of Belize has made an exploring tour in the hitherto neglected interior of British Honduras, with interesting results; the curiously formed hill range called the Cockscombs being visited and mapped, and observations made on the products of the country.

The work of which I have given a hasty and imperfect sketch has brought nearer the time when one of my successors will have to express his regret that the Geographical Society has no more *worlds* to conquer. That event is not very far away, but several generations will pass before it has no more *districts* to conquer. The geographical discovery of the next century, like the agriculture of the most highly peopled countries, will be intensive, not extensive; but there will still be room for the exhibition of the highest geographical aptitude, and the most trained ability, if not for the same physical strength and power of struggling against hardships.

In the meantime our Society will be engaged, along with many similar agencies, in training the public mind to take an always increasing interest in the facts which it will be its province to make known.

We have two duties—first, to aid as much as we can in adding to the knowledge of the surface of this planet, which is possessed by those who know most of it; secondly, to do our utmost to make that knowledge available in the best form to the largest possible number of persons. We have never neglected the first of these duties, and of late years we have been very active in connection with the second. This is not the time to ask how far our efforts to sow geographical knowledge broadcast have been as well supported as they might have been in certain quarters, but “the cake of custom” is hard to break, and when it is a question of altering educational methods, many generations of school-boys have to pass before any very material change in methods of teaching can fairly be expected. Perhaps, since the first Commission to inquire into the Public Schools was issued in 1861, reform has proceeded as quickly as all but the very sanguine anticipated in that year.

In 1869 the Society established examinations in geography, and began to give prizes to the extremely important schools known as Public, and to a certain number of more modern institutions founded more or less on the same lines as these. We persevered in that course till 1884, receiving much encouragement from some and very little from others. In that year the whole subject was reconsidered, and a commissioner was sent to study and report on the position which was occupied by geography in various countries of the Continent. One result of this was an Exhibition of Educational Appliances, and lectures connected with it; a second was an arrangement with Oxford and Cambridge, by

which your Society undertook to pay half the annual expense of a Chair of Geography at both these Universities; a third was the institution of prizes to be given for geography at the Training Colleges of England; while a fourth was the donation, which is still continued, of a sum of money each year towards the expense of geographical lectures in connection with the Oxford University Extension movement.

With regard to the second of these, I am glad to be able to report, thanks to the full information just received from the zealous and able Reader in Geography at Oxford, that there is a large increase in the attendance at his classes, to which a great many young men who are reading for Honours in the History Schools are most judiciously sent. From Cambridge, I much regret to say that I am not, as yet, in a position to lay before the Society any information.

As to the institution of prizes at the Training Colleges, you have seen already some of the results; and all that has happened in regard to that branch of our activity has been very gratifying.

Lastly, I am informed by a most competent authority, that the geographical papers in connection with the Oxford University Extension lectures, into which he had lately to look, were in the highest degree satisfactory. Mr. Mackinder's work in this department also has been most efficient and creditable.

I have long thought, and repeatedly said, that in a country situated like ours, Geography, in its highest sense, "Erdkunde," earth-knowledge, should be the foundation of the education of those who "can have all the chances," those, that is, who can carry on their education up to two and three and twenty, irrespective of preparation for a profession or other special calling. No study is so well suited to form the basis of all other studies as that of the planet which to the dwellers in it must be, from the mere necessity of the case, the "nexus" of all knowledge.

The young start with believing, when they once see that any existing institution is susceptible of great improvement, that the improvement will certainly come in their own time. The old are too apt to fall into the mood of him who said, "There is no woe so great as to see clearly how all ought to be done, and to be able to do nothing." Neither of these views is correct: progress moves, as has been said, in a spiral line, and we may be very well satisfied if at the end of each decade things are somewhat better. That the importance of geographical teaching is better understood in England than it was ten years ago, does not admit of a doubt; and in this, as in other matters, we may

"Wait for the leaven to work, the let to end."

I have only, in conclusion, to thank the University of London for the continuous use of this theatre, and to say that the authorities of the Albert Hall, at the head of whom stands our Honorary President, the

Duke of Edinburgh, did all they could to assist us last month, when we brought together far the largest gathering of which the history of our Society makes any mention. Mr. Wentworth Cole and others, acting under His Royal Highness, spared no pains to arrange every detail satisfactorily, and I take this opportunity of expressing our gratitude to all concerned.

Indian Surveys.—The Report of the operations of the Indian Survey Department contains, as usual, much interesting work. During the year 1888-89 the administration continued in the hands of Colonel H. R. Thuillier, R.E., and the work was carried on by twenty-five parties; of these, one was employed on triangulation, three on topographical, four on forest, seven on cadastral and six on traverse surveys, three on geodetic and tidal operations, and one on geographical surveys.

A commencement was made of the principal triangulation for Upper Burma, by the preliminary steps necessary for the projection of a series of triangles from the Eastern Frontier Series, near Tounghoo, in the direction of Mandalay; and in Baluchistan, a series of secondary triangles emanating from the Great Indus Series, and moving along the parallel of 30° N. latitude, was continued as far as Quetta. The number of topographical parties employed in Baluchistan was reduced from two to one, a matter of some regret from a geographical point of view, considering the large area of country there remaining to be mapped, though it is fortunate that the remaining party continues under the skilled direction of Colonel Holdich. Among the geographical work achieved was a reconnaissance in Western Baluchistan, by Sub-Surveyor Ahmad Ali, by which 19,000 square miles of geographical information have been added to our maps, thus practically completing all that is required in this portion of Baluchistan. Other good work of this class was performed by Lieutenant Mackenzie, R.E., and Sub-Surveyor Imam Sharif, R.E., while accompanying Sir H. Prendergast, during his tour in Zhob and Eastern Toba, in July 1889, and by Assistant-Surveyor Yusuf Sharif, R.E., who succeeded in mapping a very large area of previously unknown country in Persia.

Good progress has been made with the new large-scale survey of the city of Calcutta, a work rendered necessary by the great modifications and extension since the last survey (that of Simms, in 1847-49). The actual field survey and a large number of sheets have been finished, but there is a great deal of house-to-house inquiry, as to names of proprietors and boundaries, remaining to be done, as well as the preparation of a register of proprietors.

Tidal observations for the determination of the mean sea-level, by means of self-registering tide-gauges, were carried on at eighteen stations along the Indian coasts. Since the resumption of systematic tidal operations in 1877, observations have been taken at twenty-nine tidal obser-

vatories, twelve of which have been closed on the completion of their registrations, and seventeen are now in operation. Seventy-one per cent. of the predictions for open coast stations for 1888 were within fifteen minutes of the actual times of high and low water, and ninety-seven per cent. were within eight inches of the actual heights. In the case of riverain stations, where the action of tides is more irregular, the percentage of correct predictions is rather smaller.

Survey work and geographical reconnaissances have been actively pushed forward in Upper Burma since our annexation of the country, but these operations have had the disadvantage of preceding the principal triangulation, and having had to be undertaken in somewhat piece-meal fashion from time to time, as military operations and the gradual pacification of the country have permitted. The superintendence of the party (No. 21), has been in the hands of Major J. R. Hobday, who has been ably assisted by Mr. M. J. Ogle, Captain H. M. Jackson, R.E., and Lieut. T. B. F. Benny-Tailyour, R.E., the total out-turn of the year having consisted of 20,510 square miles of reconnaissance, mostly on the quarter-inch scale, in the Northern and Southern Shan States, the Bhamo district, the Ruby Mines district, the Myingyan, Sagaing, and Minbu districts, and the Chin Hills. During the last three years an aggregate area of 52,290 square miles has been mapped in Upper Burma, and the results, though necessarily presenting a fragmentary appearance on the index map, form a very decided enlargement of our geographical knowledge of this important country.

In the intermediate country between Upper Burma and Bengal, some useful work was done by Lieut. W. H. Pollen, R.E., and Mr. A. J. James, who were attached to the military column despatched into the Lushai Hills in the early part of 1889. Lieut. Pollen was, however, unfortunately attacked by malarious fever, and his reluctance to leave his duties led to an aggravation of the disease, and eventually resulted in the death of this most promising young officer. Mr. James also suffered severely in health. A fair amount of new geographical information, more particularly respecting the course of the Kaladan (Koladyne) river, was obtained. Since then, the despatch of the Chin-Lushai expedition from the eastern and western sides at once, has led to a further and more systematic exploration of the wild and mountainous country separating Upper Burma from Bengal.

Much energy is displayed, as usual, in the preparation of new maps of India and adjacent countries, but it is a matter of great regret to geographers that the long-promised new map of Afghanistan, on the 24-mile scale, is still uncompleted. This compilation, containing all the results of the latest surveys, and other topographical data collected during the Afghan Boundary Commission, is understood to have been for a long time practically completed, and will be found to record considerable changes in our geographical knowledge of the

countries adjoining the North-Western Frontier of India. A new map of Burma and adjacent countries, on the scale of 32 miles to the inch, is also in a forward condition.

The Atlas of India, the standard map on the quarter-inch scale, which was designed to embody all the various surveys in one homogeneous form, is still far from completion, a state of things which is obviously inevitable, when we consider the perfunctory character of many of the old surveys, which it is now desirable to replace by more detailed and accurate work. Of the whole extent of British India, the only regions of which no atlas sheets exist are British Baluchistan, part of Rajputana, and the country to the south, including some important districts of the Bombay Presidency, and the entire province of Upper and Lower Burma. But besides these, there are enormous tracts which, though represented in the Indian Atlas, require to be mapped in better fashion, and the sheets of which will have to be re-engraved from newer and more rigorous surveys. The most important of these regions are Sind, Kashmir, the northern part of the Punjab, parts of the North-west Provinces, nearly the whole of Bengal, Berar, the Nizam's dominions, and practically the whole of the southern part of the peninsula of India. This vast expanse shows that there is a great amount of work still devolving more particularly on the cartographical branches of the Survey Department before the standard Atlas of India can be said to be near completion.

Exploration on the northern frontier of India has been limited to a reconnaissance made by a native explorer, R. N., in the neighbourhood of Sadiya, with a view to throwing some further light on the lower course of the Sangpo river, between Pemakoi and its junction with the Brahmaputra under the name of the Dihong. The information collected by the explorer from Abor travellers has had the result of straightening out the course of the Dihong, and causing it to flow in a more south-easterly direction than previously delineated. The Abors also informed R. N. that the Dibong river, which also joins the Brahmaputra in the vicinity of Sadiya, and about the upper course of which nothing definite was known, rises in a high glacier-covered country, and far more northward than was previously supposed. R. N. concludes his brief report with the suggestion that our present vague knowledge of this obscure region might be easily cleared up if two or three natives of Upper Assam, able to read and write, were taught surveying, and despatched up the Sangpo, which the Assamese ascend for purposes of trade.

Admiralty Surveys.—I am indebted to the Hydrographer, Captain W. J. L. Wharton, R.N., for the following summary of the Admiralty Surveys of the year 1889 :—

Hydrographical surveys, under the orders of the Lords Com-

missioners of the Admiralty, have been in progress on the shores of the British Islands, in Nova Scotia, Newfoundland, St. Vincent Island (West Indies), Africa (east coast), China Sea, Borneo, Australia (north-west, south-west, and east coasts), and Pacific Ocean. The surveying vessels engaged in the above surveys consisted of seven steam ships of war, one sailing schooner of her Majesty's Navy, and two hired small steam vessels, manned by 66 officers and 545 men.

A full report of the work accomplished during 1889 by each surveying vessel has been prepared for presentation to Parliament, in accordance with annual custom. Briefly stated the result is as follows:—

On the shores of Great Britain, a re-survey of Falmouth Harbour in detail was commenced and well advanced. Whitsand Bay, near Plymouth Sound, was re-sounded to meet the requirements of H.M. ships undergoing speed trials there. The north-eastern channels in the Thames estuary, viz. East Swin, Middle Swin, Middle Deep, Barrow Deep, Black Deep (greater portion), part of Knock Deep, also Duke of Edinburgh, were re-examined; and the several shallow banks and sands in their vicinity, comprising the Gunfleet, Buxey, Foulness Sand, Barrow Sand, Middle Sand, Long Sand (north-east and south-west ends), Sunk Sand, and Kentish Knock Sand, were all sounded over and re-defined; this survey of these important channels at the entrance to the Thames pointed out that considerable alterations in depths had taken place since they were previously examined.

A re-survey of Cardigan Bay (west coast of Wales) was commenced, and the northern portion from Bardsey Island eastward to Mochras Island completed; with large-scale plans of St. Tudwall and Pwllheli roadsteads, also of Port Madoc.

In Ireland, Tuns bank at the entrance to Lough Foyle and the North Middle bank within the Lough were re-sounded. The depths on Dublin Bar and entrance to river Liffey were also re-examined.

At the entrance to the English Channel a systematic examination of the soundings westward of the meridian of $7^{\circ} 20' W.$ was begun, and the area within the limits of latitude 48° and $51^{\circ} 20' N.$, and longitude $7^{\circ} 20'$ to $11^{\circ} 20' W.$, re-sounded over, the lines of soundings running about north and south being at an average distance of six miles apart, and the soundings at three miles intervals. The remarkable differences in the conformation of the sea-bottom, as shown by this survey and the existing charts, showed plainly that in the interests of the many ships now using this route, and relying on the depths to check their positions in thick weather, this survey was much required.

On foreign and colonial shores:—

A commencement was made in the re-survey of Halifax Harbour, Nova Scotia. On the southern shores of Newfoundland the coast from Barasway Point westward to Rôti Colombier near La Poile Bay has been charted in detail; and a sunken rock (hitherto uncharted), reported

22 miles southward of Cape St. Mary, was found, and position accurately determined. This rock, now named Lamb rock, proved to have only 33 feet of water over it, and as it lies in the direct track of mail and other steamers entering the St. Lawrence, constituted a formidable danger when there was a heavy sea.

The survey of St. Vincent Island, West Indies, was completed by an examination of its northern portion.

On the east coast of Africa a new chart in detail has been made of Melinda anchorage, with the approaches thereto; and the examination of the shore line from Melinda northward to Ras Gomani was nearly finished. In connection with the boundary between the territory of the Imperial British East African Company and that under German protection, a sketch survey was executed of the course of the Ozi river, from its entrance at Kipini to Kau, thence westward, passing through Belaso Canal to Tjara on the Tana river, and down that river to its mouth; besides determining astronomically the relative positions of Kipini with Kau, Tjara, and mouth of the Tana river.

The survey of the south and east coasts of Pemba Island was accomplished, thus completing the chart of the whole of Pemba.

On the Zambezi, a sketch survey of Chinde river, one of the branches of the Zambezi delta, was made. H.M.S. *Stork* entered the Zambezi by the Chinde river, reaching as far as M'Chenga, about 26 miles from the entrance, her boats then ascended up to Morombala on the Shiré, a distance of about 150 miles.

In the China Sea, when searching for reported shoals north of the Pratas Islands, a bank composed of coral and shells, circular in shape, of about eight miles in diameter, within the 100 fathoms edge, was found and fairly delineated, 39 fathoms being the least depth obtained.

On the shores of Borneo the chart of Marchesa Bay, 60 miles northward of Sandakan, was much improved by additional soundings.

On the shores of the Colony of Western Australia the survey of Cambridge Gulf, begun in 1888, was completed by a detailed examination of its outer or more exposed portion, with its seaward approaches. Princess Royal Harbour, King George Sound, was also surveyed on a large scale, in consequence of reports that considerable silting and changes had taken place in the harbour and entrance, which, however, proved not to be the case.

In Queensland, the coast between Cooktown northward to Cape Flattery, with the water area fronting this portion seaward to the inner edge of the Great Barrier reef, was charted.

In the inner route, along the east coast of Australia, a survey of the several channels between Lizard Island and the mainland of Australia was made, and small detailed examinations were executed of the localities assigned to several reported isolated dangers in various parts of this frequented highway.

In the Pacific Ocean the systematic examination of the bed of that ocean between New Zealand and the Sandwich Islands, commenced in 1888, was carried on during 1889, deep soundings being obtained between New Zealand and Tonga, Tonga and Samoa, Union and Phoenix groups, Union group and Fiji, with a few serial temperature observations. Between Tonga and Samoa one cast of 4530 fathoms, in latitude $17^{\circ} 4' S.$, longitude $172^{\circ} 14' W.$, is worth recording, as it is the deepest yet obtained south of the Equator, and exceeds the depth taken the previous year by 102 fathoms, which I alluded to in my former report. The assigned positions of the following reefs were well examined, and their non-existence established, viz. Olozenga Rock, Alfred Reef, and Calinon Reef.

The Union and Phoenix groups were visited for the purpose of surveying them, and also to hoist the British flag in those islands not under the protection of any other power. Takaofu Island (Union group), and Canton, Phoenix, and Sydney Islands, of the Phoenix group, were each surveyed in sufficient detail.

Gente Hermosa Island was also visited, and a plan made of it.

In the Tonga group a survey was executed of Namuka and Faloon Island. The latter island appeared in October 1885, after a great eruption; and in October 1889 it was estimated that two-thirds of the island (which is a vast heap of ashes) had been washed away since its appearance above water.

On the west coast of Africa a surveying officer was specially engaged in obtaining the longitudes of Port Nolloth, Mossamedes, Benguela, St. Paul de Loanda, and San Thome, direct with Cape Town Observatory, using the submarine cables for time signals. Unfortunately, this expedition, so successful in its results, terminated by the death of Commander T. F. Pullen, the experienced surveying officer engaged, from malarial fever.

In addition to the above, naval surveying officers are also engaged, with the sanction of the Admiralty, under the Indian Government, and Dominion Government of Canada. Their labours during 1889 may be thus described:—

Under the orders of the Indian Government, the survey of the Orissa coast, Bay of Bengal, from Mahandi river southward to Gopalpur, has been completed, with large scale plans of Devi river entrance, Puri and Gopalpur anchorages. Diligent Strait, Andaman Islands, was also charted. Underut Island, Lakadirh Archipelago, was visited, and a sketch survey made of this small islet, only $2\frac{1}{2}$ miles long and about one-quarter of a mile wide, upon which 4050 people support themselves solely by the cultivation of coco-nut tree.

The assigned position of a reef reported to exist in the Nine Degrees Channel was closely examined, but no danger or indication could, however, be found.

Under the Dominion Government of Canada, the survey of the northern shores of Lake Huron was continued; and resulted in charting that portion of the north-east shore of Georgian Bay, between Byng Inlet and McCoy's Island, Indian Islands. The narrow waters of St. Joseph Channel, separating St. Joseph Island and the mainland of Algoma, was also surveyed in detail.

The Hydrographic Department during the year has published 47 new charts, and improved 15 charts by adding 20 new plans. 4210 corrections have also been made to the chart plates.

OBITUARY OF THE YEAR.

Our losses by death during the year ending April 30th have been seventy-seven, besides one Honorary and three Honorary Corresponding Members. Detailed notices of many among this number who had specially distinguished themselves as geographers or travellers have appeared in the pages of our monthly 'Proceedings,' according to the system we have followed for some years of issuing memoirs of our more eminent members as soon as practicable after their decease. Of all these, the two most closely connected with the work of this Society were Mr. John Ball and Colonel Sir Henry Yule. The memoir of the first of these was written by Sir Joseph Hooker, with whom his love of botany brought him into the most close relations, and an appendix was added to it by Mr. Freshfield, than whom no one could appreciate better his feats as a mountaineer. Mr. Ball entered Parliament early, but retained his seat for so short a period that few of his countrymen know how likely he at one time was to take a very conspicuous position in the political world. Probably what appeared in 1857 to be a great misfortune will be an advantage to his fame, for he has written his name on the Alps far more enduringly than he could ever have done on the shifting sand of popular favour.

The biography of Sir Henry Yule was written by General Maclagan, another eminent Engineer officer, and brings out extremely well his extraordinary geographical capacity. General Maclagan quotes with great felicity, in speaking of this, the words used by Bernier with regard to one of his own contemporaries:—"Cet illustre Curieux, qui nous donne tous les jours plus de découvertes sans sortir de son cabinet, que nous n'en avons appris de ceux qui ont fait le tour du monde." To one of the last of Col. Yule's books, his 'Glossary of Anglo-Indian Words'—a volume which should be in the library of every educated Englishman—was paid, I suppose, the greatest compliment that was ever paid to a dictionary. A man highly distinguished alike for his scientific ability and his administrative skill, wrote to me when it first came out:—"Yule's book is a vice: no sooner do I take it in my hands than my letters and all my other duties vanish away." With what keen interest one who seemed at first sight to live only in the tranquil atmosphere of geographical and philological research, watched the events of his own time, and what extremely striking judgments he sometimes passed upon the actors in them, will, I suppose, not be known beyond the circle of his private friends until the struggles of to-day have become matters of history.

Records have likewise appeared in our 'Proceedings' of:—Major E. A. DE COSSON, the traveller in Abyssinia; Mr. W. W. McNAIR, of the Indian Survey; Sir EDWARD STRICKLAND, Bart., the active promoter of geography in our Australian Colonies; Commander T. F. PULLER, R.N., who made his mark as a Naval Surveyor; Colonel Sir EDWARD SLADEN; Admiral Sir B. J. SULLIVAN (by Mr. H. N. SULLIVAN); Lord NAPIER of Magdala (by Colonel GRANT), and the Rev. G. G. BUTLER, D.D., Canon

of Winchester (by Mr. FRANCIS GALTON). Memoirs of Sir J. H. LEFROY and Mr. FRANK JAMES, whose deaths occurred within the period under review, are in preparation, and will shortly appear in our 'Proceedings.' The Honorary Member whom we have lost is H. M. DOM LUIZ I., King of Portugal. The Honorary Corresponding Members are: General L. FAIDHERBE, who, as Governor of the French possessions in Senegal from 1854 to 1865, distinguished himself by the numerous works he published on the geography and statistics of the Colony, and on the ethnic relations and languages of the native races; Senhor JOSE DA SILVA MENDES LEAL, the distinguished Portuguese writer who served as Minister in Paris during the Delagoa Bay arbitration; and Herr T. T. von TSCHUDI, the Austrian savant who acquired fame by the attractive narrative of his travels in Peru in 1838-42, and in subsequent years took an active part in the affairs of the Austrian Geographical Society. Among the remaining are many who, if not specially distinguished for their services to geography, were eminent in other walks of life. The list is as follows:—

Sir FRANCIS OTTIWELL ADAMS, K.C.M.G., of the Diplomatic Service, who died in July last, in Switzerland, where he served for seven years as British Minister. He had filled posts at St. Petersburg, Paris, Washington, and Yeddo, was the author of a descriptive work on Japan, and, conjointly with Mr. C. D. Cunningham, a treatise on the Swiss Confederation, which attracted much attention; JAMES ALEXANDER; The Right Hon. Lord ADDINGTON; Chevalier BUCKER-COARTEN; JOHN BARING; Captain JOHN BORLASE; PETER HENRY BETHON; P. P. BOUVIERE; STEPHEN BOOTH; J. B. BROWN; ISAAC BRAITHWAITE; ROBERT WIGRAM CRAWFORD; JAMES CRISPE; Major L. M. CARMICHAEL; Sir EDWARD COLEBROOKE, Bart., the biographer of Mountstuart Elphinstone, and for nearly forty years a much respected member of the House of Commons. He was President of the Royal Asiatic Society in 1864-67, and in 1873 was created Honorary Doctor of Laws by the University of Glasgow; DAVID CARNEGIE; WALTER COOTE; General Sir DUNCAN A. CAMERON, G.C.B.; Lord DE BLAQUIERE; GODFREY DARBISHIRE; D. FOSTER GRANT DALTON; CHARLES J. ELEY; General Sir HOWARD C. ELPHINSTONE, V.C., K.C.B., Treasurer and Comptroller of the Duke of Connaught's Household, whose recent death by accident on his way to the Canary Islands, has been so universally regretted. He had been a Fellow of our Society since the year 1858; G. K. FAIRHOLME; ANDREW GRAHAM, Staff-Surgeon, R.N.; JOHN H. GURNEY, for many years Member of Parliament for King's Lynn, and well known in scientific circles as an Ornithologist, who accumulated a collection of birds of great scientific value; JAMES FREDERICK HUTTON, WILLIAM HENRY HOMFRAY; HENRY BRET INCE, Q.C., M.P.; Sir LOUIS STEWART JACKSON, a well-known Indian Judge; FRANK L. JAMES, the Somali-land traveller, news of whose death at the Gaboon, by the attack of an elephant, has recently been received. A memoir will be published in a subsequent number of the 'Proceedings'; Staff-Commander W. W. KIDDLE, R.N.; Hon. W. F. LITTLETON; HENRY P. LE MESURIER; JOSEPH LAING; General Sir H. E. LONGDEN, K.C.B., who, during his long and active military career in India, was for three years employed making a survey of the forests of the Himalaya, a special duty for which he was selected by Lord DALHOUSIE in 1849, the result being a report which altered in a material way the whole administration of this department. He was elected Member of our Society in 1876; Captain W. MAN; Major J. L. L. MOBANT; G. J. J. MAIR; Hon. RAO SAHIB VISHWANAH NARAYEN, C.C.I.; Sir JAMES MARSHALL, K.C.M.G., who had seen much service, civil and military, on the West Coast of Africa. He was chief justice of the Gold Coast Colony in 1879-82, and of the British Niger territories in 1887; Dr. CHARLES MORRISON; Major COLIN MACKENZIE; JUNIUS S. MORGAN; J. NORMAN LINDLEY NORMAN; J. G. PRICE; JAMES PILKINTON; Admiral Sir ROBERT SPENCER

ROBINSON, K.C.B., F.R.S., a recognised authority on many subjects connected with the Navy, who died on the 27th of July last; Mr. Serjeant ROBINSON; General W. F. RENWICK, R.E.; ROBERT P. SPICE; CONWAY M. SHIPLEY; SIR CHARLES FARQUHAR SHAND; W. CASTLE SMITH; Alderman DAVID H. STONE; JOHN SILTZER; JOHN TEMPLETON; ARCHIBALD TRAVERS; GEORGE TURNBULL, F.R.A.S.; P. G. VANDER BYL; G. N. VICKERS; WILLIAM WAKEFORD; THOMAS WALKER, J. P.; SIR JAMES WATSON; FOVEAUX WEISS; JOHN ROBERT WILLIAMS.

Further Explorations in the Solomon Islands.

By C. M. WOODFORD.

(Read at the Evening Meeting, February 24th, 1890.)

Map, p. 444.

NOT quite two years ago I had the honour to read a paper before this Society giving an account of my two former visits to the Solomon Islands. Since then I have paid the islands a third visit.

Leaving London on the 8th June, 1888, in the Orient Line steamer *Ormuz*, I arrived in Sydney on the 23rd July, and was fortunate enough to find a schooner sailing for the islands on the 6th August.

We left Sydney with a southerly wind which we carried with us until August 11th, when we ran into the south-east trade, and on the evening of August 16th we arrived off Rubiana, at the south-west end of the island of New Georgia.

The following morning we passed the reef which extends without interruption for miles, except at one place where there is a gap perhaps 300 yards across, over which there is at its deepest part two fathoms of water. With a man at the masthead to look out for patches with which the lagoon is studded, we ran down about three miles and anchored off the village of Sisieta. Along the coast as far as the eye can reach stretches a thick fringe of coco-nut palms; behind them the deep green of the virgin forest, on the shore among the palm-trees the villages of the natives, each with its large canoe-house conspicuous above the others for its size. At every village a neatly built jetty of blocks of coral, planted on the top with grass, projects for some distance into the sea. Around us is the pale blue water of the lagoon, where we are anchored in 15 fathoms. To seaward, numerous small islands, each with its centre of tall forest trees and fringe of coco-nut palms, and beyond them to seaward a white line of foam on the coral reef whence the roar of the surf falls upon the listening ear.

At Rubiana I found things without much alteration since my last visit. A few old people had died and some had been killed. I noticed also that some new heads ornamented the rafters of the canoe-houses. An old acquaintance, a chief named Paravo, had met with an untimely end. He was an inhabitant of the Maravo lagoon, about 30 miles from

Rubiana. At the beginning of the year (1888) he, with a canoe-load of his companions, had gone from Maravo to the west end of Guadalcanar to get heads. Their expedition met with reverses, and instead of getting any heads they lost some of their own men. On their return they were detained by bad weather at the uninhabited Murray Island for some weeks. Food was scarce, and Paravo first sickened and then died. His faithful followers turned him to good account by eating him, and preserved his head, which they left behind them at Murray Island. At the time of my arrival they had made overtures to a trader resident at Rubiana to fetch the head home for them.

Leaving Rubiana on the 4th September we passed through the passage known as Hathorn Sound leading from the Rubiana lagoon into the sea to the north of New Georgia. This is a narrow channel of coral formation, like a river or canal. In places the banks are so steep that a ship can lie alongside as if at a wharf. The depth is from 15 to 20 fathoms. A dense growth of forest-trees fringes the passage on either side and their branches overhang the channel.

On one occasion when drifting through this passage with the tide our yards became entangled among the branches of the overhanging trees. Something was bound to give way; fortunately it was the branches of the trees that came crashing down on deck to the imminent risk of our heads. They were soon thrown overboard, but the legacy of ants that they left behind them was not got rid of until the ship reached Sydney.

The scenery in this passage is most romantic. The trees tower on either side high above the ship's masts, overhanging and dropping their ripe fruit and blossoms into the water. Along the banks the branches of dead timber are often noticed covered with the white blossoms of an orchid, a species of dendrobium. Below these, half in and half out of the water, looking itself like a dead log, may frequently be seen the ugly carcass of a crocodile, apparently asleep, but as the ship approaches it will slide off quietly into deep water. Cockatoos scream defiance from the trees at the invaders of their solitudes, and startled fruit-pigeons take to flight with a great clatter of wings as the unwonted appearance of the ship disturbs them from their repast among the nutmegs.

Crimson lorries in flocks of half a dozen fly across high in the air with ear-piercing screech on their way to a honeyed feast from the bright crimson blossoms of a coral-tree (*Erythrina* sp.), a conspicuous object among the uniform green of the surrounding forest, rivalling in brilliance of colouring the plumage of the lorries themselves. Great ornithoptera butterflies flap leisurely across the channel from tree to tree, seeking for the fragrant white blossoms of which they are so fond; and a sapphire flash that the eye can scarcely follow is seen for a moment as a kingfisher disappears round a bend of the channel.

Down among the deep blue depths of the clear water may be seen

the branching stems of the growing coral, with quaintly shaped and brightly coloured fish passing in and out. Once, when going through this passage, a couple of whales kept us company for some time, passing and repassing us as though they thought the ship was one of themselves. The clearness of the water allowed us to trace their course beneath it, and watch them as they sank into the depths or came to the surface to blow.

I can conceive no more delightful surroundings for a yachting cruise than the scenery presented by the archipelago of small islands adjacent to this passage, among which a vessel might wander for weeks borne in whatever direction the wind or currents listed, finding each night a fresh anchorage where the vessel might be moored almost among the branches of the overhanging trees, and where tropical nature might be studied in all the exuberance of its botanical and zoological wealth. But these low-lying islands, elevated but a foot or two above the water, are the chosen haunt of fever and ague, and the deadly mist that rises after sunset among the trees and spreads in white wreaths over the surface of the water, warns the voyager to seek with as much speed as may be, the fresh breezes of the open sea. Another possible source of danger exists in the fact that this passage is the highway used by the head-hunting canoes from the Rubiana lagoon and the islands adjacent on their expeditions to Yasabel. Personally I should not care to meet a canoe-load of these gentry returning unsatisfied from one of their expeditions, while wandering alone and separated from my companions among the islands surrounding Hathorn Sound.

I believe that pigeons have never been sufficiently credited with the important part they take in the distribution of plants from island to island. Throughout this part of the western Pacific there are numerous small islands of coral formation and sand-cays, many of them probably of recent formation, frequently at considerable distances from other land, but covered with a dense growth of large forest trees. Among the numerous groups of islands of coral formation that are removed by many hundreds of miles of sea from islands having a heavy forest growth and an indigenous avifauna, the vegetable productions are found to be such as have seeds that float and retain their vitality for a long period in salt water, such as *Casuarina* sp., *Tournefortia argentifolia*, *Scaevola kœnigii*, *Guettarda speciosa*, *Calophyllum inophyllum*, some species of pandanus, and the mangrove (I, of course, purposely exclude such as may have been introduced by human agency). These, with a few others, are the first vegetable productions of a coral island or sand-cay so soon as it is sufficiently elevated to support vegetable life. If such an island is too far removed from other islands having a more varied flora, to admit of the visits of land birds, the flora will remain confined to such plants as I have mentioned above with some others that have been similarly transported by the action of waves and currents.

If, however, the island happens to be within reach of land birds,

especially pigeons, from an island covered with a forest growth, it will of course be first covered with the plants resulting from the floating seeds above mentioned, after which it will be resorted to by pigeons and other land birds, that will bring with them the seeds of forest trees from which the island will speedily be covered with a dense forest growth. Favouring the dispersal of seeds to small islands, I have noticed a singular habit among the large fruit-eating pigeons of the Solomon Group: this is their propensity for leaving the mainland at night to roost on the small islands lying off the coast. Should one happen to be in the neighbourhood of one of these small islands about four or five o'clock in the afternoon, the pigeons will be noticed arriving singly or in pairs, and in parties up to eight or ten in number, until the trees are crowded with birds. I can assign no very satisfactory reason for this habit, unless it is that upon these small islands the pigeons find themselves freer at night from the disturbance of the large monitor lizards. I am aware that the reason assigned is an unsatisfactory one, but it is the best I have to offer.

The pigeons arrive gorged with figs and other fruits, and especially with the fruit of the canarium nut. Of these nuts the pigeons are especially fond. It is a nut in size and shape not unlike a green walnut, and it appears at first sight almost incredible that the pigeons could swallow them. The soft outer husk is rapidly digested, and the intensely hard nut is then disgorged. The natives take advantage of this habit of the pigeons to search for the disgorged nuts beneath the trees where the birds are in the habit of roosting. That wide ranging handsome species *Calenas nicobarica*, better known as the Nicobar pigeon, crossed boldly long distances of sea. On one occasion, when approaching the Solomons from Sydney, one of these birds flew on board the ship, and rested for some minutes. We were at the time more than forty miles from land, the nearest islands being Rennell and Bellona, outliers of the Solomon group.

Passing into the sea to the north of New Georgia we turned eastward, and on the 16th September reached the small island of Gavotu, off the coast of Gela, or Florida Island, where was then living Mr. Lars Nielsen, a trader. I decided to take up my residence with him for some months, as I was anxious to make collections upon the island of Gela, and the place was centrally situated for visiting Ysabel, Guadalcanar, and other islands.

In Nielson's small trading vessel, a ketch of about five tons, I made several voyages; among them being one round the coast of Gela, and through the Boli Passage, a passage not unlike Hathorn Sound above described, several voyages along the coast of Guadalcanar, a visit to the island of Savo, and lastly, a visit to the island of Ysabel, on which occasion I made a compass survey of about sixty miles of the north-east coast of the island.

It is with deep regret that I have to record that since my return to England, Nielsen and three of his boys have been killed and eaten by the natives, but where this occurred I am at present without information. Since last June, no less than six white men have been murdered by the natives of the Solomon Group, out of a total white population fixed and floating that I estimate at about thirty.

My principal object in visiting the islands mentioned above was for the purpose of endeavouring to identify the places visited by the Spanish expedition, under Mendaña, that discovered the Solomon Islands in the year 1568. In this I think I may say I have been entirely successful.

The Spaniards relate that when they were between Florida and Guadalcanar they passed an island in the centre of which was a burning volcano. This island is now conclusively identified with the island of Savo.

One morning I left Gavotu with Nielsen in his vessel to pay a visit to this island. The following morning at daylight we anchored off Sisipi, a village on the south-east coast of the island, my object being to explore the crater. Savo is an island roughly circular in shape about four miles in diameter, the highest point rising to a height of about 1800 feet.

The volcano is now in a state of quiescence, no eruption having taken place for a period of about forty years. Soon after anchoring I landed and made arrangements with some natives to guide me to the *biku* or fire, as the crater is called. We immediately started, and a walk of a few minutes brought us to a boiling spring, in which the women of the village were in the habit of cooking their vegetables. After inspecting this for a few minutes I told my guides to proceed. They assured me that this was the *biku*. I said it might be so, but it was not the *biku* I wanted to go to. They said that natives never visited the other, as it was haunted by some enormous devils, who would be certain to take offence at any one trespassing upon their dominions.

I represented to them that native devils had no power over white men. They then urged that they were at war with the natives from the other side of the island, and they were afraid of meeting some of them. I pointed out that if the *biku* was a locality habitually avoided by natives, we were not at all likely to meet any of the enemy. Having grasped this fact they said they must at least return to get their shields and spears. To this I assented and walked on, and they soon afterwards overtook me.

Passing some native gardens the track ascended steeply through some undergrowth that had sprung up on the sites of former plantings, with here and there a clump of two or three coco-nut trees. Looking back across the sea, the coast of Florida from Vati Lau to the Boli passage appeared on the left, and on the right the mountain-tops of

Guadalcanar loomed indistinctly through the haze. At our feet, our tiny vessel at anchor, upon a sea of the intensest blue, and at one place a cloud of steam rose from the hot spring that we had just left. As we climbed higher signs of previous cultivation disappeared until we entered a growth of wild ginger with stems eight or nine feet high that effectually prevented an extended view. Through this the boys had no difficulty in slicing their way with their long heavy knives.

Following the top of a ridge that sloped steeply down on either side, we presently came to a spot where a small landslip had taken place, carrying with it the vegetation, and leaving an open space. At this point the aneroid indicated a height of 1000 feet, and I was able to see that I stood on the edge of a circular depression about a mile in diameter. This was evidently the crater. On the north side a blunt cone, the highest point of the island, rose several hundred feet above my point of observation. Scrambling down the bed of a steep dry watercourse, I found myself on the floor of the crater at a height of 800 feet above the sea.

Near the western side an immense heap of blocks of stone rose to a height of 200 feet, about level with the edge of the crater; but with this exception the floor of the crater was quite flat. I can compare this heap of stones to nothing better than to a gigantic load of broken stone shot out of a cart for mending the road. A somewhat winding track led across the crater to the western side, and here, at the base of the crater-wall, the natives pointed out to me two spots whence a little steam was issuing. A white incrustation covered the surrounding stones, and the ground felt hot to the touch. Some lovely little creeping ferns (*Lygodium* sp.) were growing almost in the steam, and apparently revelling in the warm moist atmosphere.

Accompanied by three of the boys, as the others were frightened, I then forced my way through the undergrowth to the base of the stone heap. From one place at the base of the heap quite a respectable puff of steam was rising, the stones around being covered with the same incrustation previously observed. The heap appeared to be circular and about 500 feet in diameter at the bottom. A peculiarity about it was that the stones increased in size towards the top. At the base they were about a foot in length, but at the top they were great irregular blocks weighing several tons.

Two only of the three remaining boys ventured to approach the heap, and when I announced my intention of climbing it, they tried to dissuade me. Finding that their remonstrances were of no avail, the whole party took up a favourable position for watching my movements. Scrambling over the blocks of stone, and through the growth of thick ferns and shrubs that covered the upper part of the mound, I soon stood on the top, but found no sign of any smaller crater or even any issue of steam. At the extreme apex I found growing a pretty little yellow orchid, a dendrobium, which I brought away with me.

Floundering among and over the huge blocks of stone I made my way back to my companions, who, I firmly believe, never expected to see me again; and, as it was, assured me that I should eventually suffer in health for having trespassed upon the domain of the spirit presiding over the biku. The whole crater, except in a few places, is so covered with undergrowth that it is difficult to ascertain from a cursory examination of what it is composed. I looked unsuccessfully for signs of lava streams, but although I saw none, it is possible that a more careful examination might discover them. I came to the conclusion that recent eruptions have been explosions of imprisoned steam, rather than molten matter, and the fact that the Spaniards in 1568 mention only smoke and not fire, although they were whole months in sight of the island, lends colour to my supposition. Had there been fire they must have noticed its reflection at night.

We returned the way we came. On our arrival at the village I was anxiously questioned by the old men as to whether in my opinion there was any probability of an eruption in the immediate future. On this point I thought myself justified in calming their fears. Having paid my guides I returned on board, and we left for the other side of the island.

About the same time I made an expedition inland on Guadalcanar, starting from the village of Tasimboko. I was well known by name to the natives of this village through my previous residence at Aola. They tried hard to dissuade me, saying that on two out of the three occasions that I had gone to the interior from Aola the natives had intended to kill me, once at Vale Menga and once on the Bokokimbo river. I was aware of the former attempt but I had no positive information until now of the latter, although at the time I suspected something wrong.

Eventually I persuaded some of them to accompany me, and in company with Nielsen and some of his boys we started early one morning from Tasimboko. I will not here detail the incidents of the trip, which presented no special features of interest, beyond saying that we visited several villages situated on or near the Berande and Balesuna rivers, and I was able to trace the courses of these rivers with fair accuracy.

During our journey we visited the villages of Ipou, Veramusu, Kombebe, Tinabinalu, Tuguruna, and Misua, where we slept the first night. So far all had gone well, and we had endeavoured by paying for our night's lodging and entertainment on a very liberal scale, to leave a good impression behind us. Naturally the bush natives evinced great curiosity as to who we were and the causes of our visit. Nielsen was, of course, described as the trader from Gavotu, while I was said to be the man who previously lived at Aola and ate snakes. (I beg leave here to declare that this was a base calumny. A taste for snakes has more than once been put forward to me as a good and sufficient reason for attacking a native village. I visited the site of a former settlement at Estrella Bay

on the island of Ysabel, and on making enquiry as to why the natives had been exterminated was told "They were no good, they ate rats and snakes.")

I had great hopes of being able to reach Mount Lammas or at any rate the Lion's Head, but shortly after leaving Misua on the second day of our trip our principal guide showed signs of jibbing. From a village named Aroti, 950 feet above the sea, we had a fine view of the mountains, as the village was situated on the edge of an almost precipitous ridge. Immediately beneath our feet to the southward the Berande river wound in a southerly direction, apparently taking its rise from a mountain near the south coast of the island called by the natives Lambugila. Behind another ridge that we were about to cross was the valley of the Balesuna river which flows to the foot of the Lion's Head (called by the natives Popomanisao), and then bending in a westerly direction, rises apparently from the eastern slopes of the Lammas Range.

The view from Aroti was one of the most beautiful that I have ever gazed upon. Close to Aroti is another village called Vatumbulu whence again we had a fine view of the mountains. From here a steep descent to 300 feet and a rise again to 800 feet brought us to the top of the ridge forming the east side of the valley of the Balesuna. We ought to have followed this ridge in a southerly direction, but our guides purposely misled us, and we descended to the Balesuma river near to the village of Koliase. At this point the bed of the river is 300 feet above the sea. Although there had been no rain on the coast for three months, the river was running breast high with a very swift current, and was full of huge boulders. We made several attempts before we found a place where it was possible to cross. I and some of the boys were carried off our legs, but as I was carrying my instruments and revolver fastened to my head nothing suffered damage.

We spent the remainder of the day at Koliase trying to get our guides to reconsider their refusal to proceed. It was useless to attempt to go on without them as we were entirely dependent upon the natives for food, so, much to my disgust, although within about five miles of the Lion's Head, we had to consent to return. I afterwards found that our guide never intended to take us any further than this point, and had made use of us as an escort for himself for the transaction of some native trading in a district which he would have been afraid to enter alone. Sleeping that night at Koliase we left the next morning for the coast.

Following the river down for some miles we came to the village of Linge and shortly afterwards to a river called the Tavithane that joins the Balesuna on its right or eastern bank. Turning eastward from this point along a good track over some open grassy hills, we came to a village with the euphonious name of Ombokonamarassa. A mile north-east from this village we again came to the Berande river, and crossing it we entered a rich alluvial flat country extending to the coast. We

reached Tasimboko late in the afternoon. To any one making an attempt to travel in the interior of Guadalcanar in future I would recommend them to take as the medium of exchange with the natives, a plentiful supply of dog's teeth. They are of course extremely portable, and the natives will move for them when tobacco and even knives and axes will fail to rouse them from their ordinary indifference.

NOTES ON THE DISCOVERY OF THE SOLOMON ISLANDS BY THE SPANISH
EXPEDITION OF MENDAÑA IN 1567-69.

Under orders from Lope Garcia de Castro, Governor of Peru, an expedition, consisting of two ships, the *Almirante* and the *Capitana*, left Callao on the 19th November, 1567, under the command of Alvaro de Mendaña, for the purpose of prosecuting discovery in the Pacific. This expedition discovered and named the Solomon Islands. The published accounts of this voyage have been until very recently of the most meagre description. The most important were an account given by Herrera in his 'Descripcion de las Indias Occidentales,' published at Madrid about the year 1601, and an account by Dr. Christoval Suarez de Figueroa, published at Madrid in 1613.

In endeavouring, by the light of these accounts, to identify the places visited, the French and English geographers about the close of the last century have in some cases been led to erroneous conclusions, but on the whole their inferences have proved correct.

About sixty years ago, however, a journal kept by Hernando Gallego, chief pilot of the expedition, came to light, giving a minute account of the events of the voyage and of the proceedings in the islands. This journal is now in the British Museum, and a translation of portions of it is published by Dr. Guppy in his book 'The Solomon Islands and their Natives.' The charts belonging to this journal have unfortunately been lost.

Another journal of the expedition was kept by Pedro Sarmiento, who was second in command of the soldiers, but this and the charts belonging to it are also missing.

But a third and still more voluminous account of the expedition is extant, viz. a journal kept by Gomez Catoira, chief purser of the fleet, which contains much information not given by Gallego. The original manuscript is in the possession of Mr. W. Amherst Tyssen Amherst, M.P., and has never been published. On my last visit to the islands I had the good fortune to be furnished with a translation of this journal, by the light of which, and by Dr. Guppy's translation of Gallego, I was enabled to satisfactorily identify almost every place visited by the Spaniards.

I propose in this paper to trace the course of the Spaniards in their approach to and passage through the Solomon Group.

The command of the expedition was entrusted to Alvaro de Mendaña, who was nephew of the Governor of Peru. The commander of the troops was Pedro de Ortega Valencia. Second in command of the troops was Pedro Sarmiento, who had already greatly distinguished himself in Peru, and who afterwards was engaged upon a survey of the Straits of Magellan. In the year 1585 he was taken prisoner off the Azores by Sir Walter Raleigh, and brought a prisoner to England, where he was presented to Queen Elizabeth and afterwards set at liberty. Hernando Gallego, the chief pilot, was one of two brothers who, ten years before, had taken part in an expedition from Chile to survey the Straits of Magellan, and was perhaps the most able navigator to be obtained at the time on the Pacific coast. The confidence imposed in him was amply justified by the events of the voyage. Lastly, Gomez Catoira, the chief purser and comptroller for his Majesty Don Philip II. of Spain.

Sailing from Callao on the 19th November, 1567, they voyaged to the westward, and on the 16th of the following January sighted a small low island, inhabited and covered with palm-trees, "with a great reef on the north side and another on the south side" (Catoira), and "with a bay of the sea in the middle of it" (Gallego). This description points to its having been one of the coral atolls that dot this part of the Pacific. To this island they gave the name of the Island of Jesus. I pointed out in my former paper* that this island was probably one of the more northern islands of the Ellice Group, nor, on consideration, do I see any reason to change my opinion. Gallego gives the latitude $6\frac{1}{2}^{\circ}$ S.; Catoira 6° barely. It will be found that nearly all Gallego's observations of well-ascertained places in the Solomon group are in excess of the proper latitude, and in only two unimportant instances are they less, the average being about $30'$ in excess,† so that I can see no grounds for attempting to identify Motuiti or Kennedy Island, an island supposed to be in latitude more than $8^{\circ} 30'$ S. (but the existence of which is altogether doubtful, as it was unsuccessfully searched for by a German man-of-war in 1884), with the Island of Jesus of the Spaniards, an island that Gallego declares to have been in $6\frac{1}{2}^{\circ}$. The suggestion of Dr. Guppy that there may be another island at present unknown between 6° and 7° S. and near 172° E. long. I consider equally untenable. This part of the Pacific is too well known at the present day to admit of such a supposition. Not only do traders occasionally visit it, but it is almost in the track sometimes taken by sailing vessels between Sydney and China. On the other hand, both the latitude and the description of the island agree well with one of the northern islands of the Ellice Group, and the fact, mentioned by Catoira but omitted by Gallego, that they fancied they saw another island while they were standing off and on, is consistent with my supposition. There are three islands at the north of the Ellice group, either of which may be the Island of Jesus, viz. Nanomea or St. Augustine, lat. about $5^{\circ} 40'$ S.; Spieden or Niutao, about $6^{\circ} 8'$ S.; and Hudson Island, about $6^{\circ} 15'$ S. I incline to the first one myself.

Some canoes came off to them, but did not approach close. Being unable to communicate with the land the Spaniards stood off and on through the night of January 15th. They saw what they supposed were signal fires. It may have been so, as the natives of this group are in the habit of sometimes using signal fires at night, or it may have been the torches used by them while fishing at night for the flying fish, which constitute the chief part of these islanders' food.

During the 16th, having drifted to westward of the island, they found they were unable to beat up to it again. This was on account of the strong westerly current that prevails in these latitudes.

During the next fortnight they made a westerly course with variable winds, and on the 1st February, sixteen days after leaving the Island of Jesus, they sighted some reefs, to which they gave the name of Candelaria, because they sighted them on Candlemas eve. Gallego gives the latitude as $6\frac{1}{2}^{\circ}$ when the centre of the reefs was bearing west of them; Catoira says 6° . M. Fleurieu, the French geographer, has identified these reefs with the Roncador Reefs, discovered by Maurelle in 1781, and on the present Admiralty chart they bear both names. With this opinion I now thoroughly concur, although I at first felt inclined to agree with Dr. Guppy in identifying them with the reefs of Ongtong Java, lying almost in the same longitude but not extending further south than $5^{\circ} 30'$.

Dr. Guppy, in objecting to the identification of these reefs with the Roncador Reefs, bases his objection upon the description given by Gallego, who estimated them

* See 'Proceedings R.G.S.,' 1888, p. 351.

† See comparative table of latitudes at end of paper.

to extend more than 15 leagues. Catoira says, "There did not appear to be anything but some reefs, which might be six leagues in extent . . . the sea appeared to be breaking over them in all parts." There is no mention of islands, as there would have been if the discovery had been Ongtong Java. I may here mention that throughout the journals of both Gallego and Catoira, their estimated distances in the Solomon Group, given always in leagues, prove to be little more than miles.

By dead reckoning the Spaniards had only gone 165 leagues from the Island of Jesus, but they had been sixteen days about it. Now the distance from the Ellice Group to the Candelaria Reefs is, roughly speaking, 1000 miles. Those who have sailed in these latitudes, as I have, are well aware of the strong westerly current that prevails, and as the Spaniards had no means of calculating longitude, a westerly drift of only two knots per hour would in sixteen days have put them more than 750 miles ahead of their reckoning, and (supposing the Island of Jesus to have been in the Ellice Group, and I entirely fail to see where else it could possibly have been), would have brought them somewhere near the Candelaria Reefs.

Leaving these reefs on the 2nd February, they steered south-west, but with the wind westerly, and thunder squalls, they made but little way, and at night furled all sail. The same wind continued for some days. They had on the 5th, as Catoira says, seen signs that made them think they were approaching land. "Coco-nuts and palm-branches and sea-snakes and toads and crayfish and oranges, things of the land from which we derived much pleasure;" and on this day Gallego makes their latitude $7^{\circ} 8'$. By the 7th they estimated that they had only gone 15 leagues from the reefs, and were still beating first on one tack and then on the other against the westerly wind, or drifting with calms, and at night with furled sails.

At this time of year there would be a strong current running to the south-east off the coast of Ysabel, which probably took them further south than they intended to go. On the morning of that day (the 7th) high land was sighted from the mast-head towards the south. They did not approach it until the evening of the following day, and then sent a boat to try and find a harbour, but it returned unsuccessful. During the night they drifted over or near some reefs which are off this coast. The following morning the boat was again sent to look for an anchorage, but during its absence Gallego determined to attempt the passage of the reef himself. He was fortunate enough to find a passage, though Catoira says that at the place where they crossed they had as little as four fathoms of water.

Both the journals of Gallego and Catoira describe the coast so minutely, that I have had little difficulty in identifying the bay where the Spaniards anchored, and to which they gave the name of the Bay of Santa Isabel del Estrella. It will be seen on reference to the accompanying map, made from my survey, that at this place a barrier reef from two to three miles off shore fringes the coast. At the time I visited the coast there had been a long succession of calm weather, and the reef presented several wide openings where the surf was not breaking, but in rough weather these passages would be very much curtailed, and indeed if, as Catoira says, there was as little as four fathoms at the place where they crossed, the passage would be extremely dangerous. I expect the place where the ships crossed was the passage to the west of the little island of Hakelaki, which is situated upon the reef itself. Once past the reef, the ships found themselves again in deep water. The boat had in the meantime found a good anchorage in the bay, and the ships shortly afterwards cast anchor.

Gallego says, "at the entrance of the port is a rock (or islet) in size larger than the ship." This may refer to the little island of Hakelaki on the barrier reef, near which the ships crossed, or more likely to the rocky islet off the point forming the western side of the bay. The latitude of the bay as given by Gallego is $7^{\circ} 50' S.$, and this is very nearly correct.

The Spaniards found a considerable native population living at the time of their visit round the shores of the bay, but at the present time the neighbourhood is quite deserted, the last inhabitants having been exterminated by head-hunting expeditions.

From the natives Gallego ascertained that the island was known as Camba. Catoira says Camball was the name of the village close to the bay. I could find no trace of these names among the natives that I met near this place. Soon after their arrival the Spaniards landed, and it was determined to build a small vessel to better explore the island while the ships remained at anchor at the Bay of Santa Isabel del Estrella, now known as Estrella Bay. This vessel, which they called a brigantine, was an open boat with one mast. The building was begun February 13th, and finished on April 3rd. It was constructed of timber felled and sawn on the spot.

During the building of the brigantine, Sarmiento was sent inland with sixteen men on February 16th. On arrival at the village, whence had come the natives who had visited the ships on their arrival, he finds the chief, a man named Vylebanara, absent, and is told that he has gone to a place called Baso. This is described as a village in the interior. I found a place named Baso on the coast near the Maringè Lagoon, about 20 miles from Estrella Bay, but it can hardly be the place intended by the natives, still it is interesting to find that the name still survives. During their intercourse with the natives living adjacent to Estrella Bay the Spaniards became familiar to a certain extent with some words of the native language. In a locality like the Solomons, where dialects are confined to tribes occupying but a few villages, and where in, say, 50 miles of coast, it is no uncommon thing to meet three or four different dialects, it is extremely interesting after a lapse of over three hundred years to be able to identify even some of the words recorded by the Spaniards.

On my voyage in November 1888 along the coast of Ysabel, for the purpose of identifying the places visited by the Spanish expedition, it was not until I arrived within 20 miles of Estrella Bay that I found the natives speaking a language in which I was enabled to identify words recorded in the very carefully kept diary of Catoira. Catoira records that during their stay at this port, the natives frequently brought them off certain roots which they called *vinahus*. This word I found still in use among the natives that I met with at the Maringè Lagoon. It is the well-known taro root of the Pacific Islanders. This food is extensively grown, and is the staple food upon the island of Ysabel in place of the various kinds of yam that are more frequently met with upon the other islands of the Solomon Group. From the same natives I ascertained that the name for the conch shell, used by them as a trumpet, is called *hofsis*. In Catoira's journal speaks of the instrument as *cofsis*. The word signifying woman, *gase*, is also in use at the present day.

On the 4th March another expedition, under the command of Pedro de Ortega Valencia, consisting of 30 fusiliers, 15 common soldiers, and 15 carriers, was despatched into the interior. He reached the central range of the island, and so far as to see the sea on the southern side. During their return march they were much harassed by the natives who, as Catoira says, "after they had shot away all the arrows that they had, they threw stones, and when they did not find any, earth, and when there was no earth, their bows, and when they had thrown everything, they spat at us, shaking their heads at us and turning their hinder parts." Two Spaniards were wounded, one of whom afterwards died, and a native was shot with an arquebus.

On the 15th March some canoes arrived from the eastward (Gallego says fourteen, Catoira says eight). They came from the district of a chief named Meta, whose territory I identify as being situated about 10 miles to the eastward of the anchor-

age, commencing at the point that forms the eastern extremity of Estrella Bay and extending to the now deserted village of Kokota. These natives brought with them as a present to the commander, the quarter of a boy. Catoira says it was "the right arm with all the shoulder." The Spaniards expressed their great disgust at this barbarity, and buried the arm on the sandy beach at the head of the bay. The natives retired, with the remainder of the body, to a small island, which I identified with the small reef island Hakelaki, and presently a smoke was seen, from which it was concluded that they were cooking the remainder of the body. The name of this island at that time was Cuis.

On the 18th of March an expedition started from the ships to visit the territory of the chief Meta, above referred to. They proposed to walk along the shore, but on the advice of some local natives whom they took as guides, they took a boat with them to pass certain "arms of the sea." On the first night they slept on an island that I identify as the island of Ninuha. Next morning they left the island, and passing an arm of the sea, proceeded to walk along the coast. They captured four natives, two of whom they retained as hostages, and returned to the ships.

On the 7th April, Ortega, Gallego, and 30 men started in the brigantine on a voyage of discovery. During the absence of the brigantine the Spaniards continued their friendly relations with Vylebanara. Catoira here enters into a description of the birds and certain of the vegetable products of the country. He describes a pigeon that has wings like the wings of the peacock, and on its beak a fleshy substance like a cherry very red. One of these handsome birds, *Carpophaga rufigula*, brought home by me, is now in the gardens of the Zoological Society. He also minutely describes the practice of chewing betel-nut, to which the natives were then, as now, addicted. The brigantine was away from the ships four weeks, and returned about the first week in May. She returned from the westward, and the natives gave the first intelligence of her approach, as they saw her coming from the high ground on which Vylebanara's village was situated.

On reference to the chart, it will be seen how the natives were able to give this intelligence, as from the place where I suppose Vylebanara's village to have been they would have had a clear view to the westward, while the ships anchored in the bay, with the high land to the west of them, would not have seen the brigantine until she rounded the point into the bay.

The brigantine brought the following report. They left the ships in the evening of the 7th April, but because the wind was against them, they anchored at midnight. Next morning with the land breeze they arrived at the little island where they had slept when they went to visit the chief Meta, which I have above identified as Ninuha. Gallego gives the latitude as 8°, which is not far wrong. He speaks of two islets here, Catoira only mentions one, but the latter did not take part in the voyage of the brigantine. The second islet will be Keaba, and the Point of Meta will be the point of mainland between the islands of Ninuha and Keaba. Proceeding on their voyage, they passed many islands. These will be the islands surrounding the Maringè lagoon. Following the coast along, they anchored in latitude 5° 10', and leaving this anchorage, they again proceeded on their voyage. The mast was sprung, and nearly went overboard, but was secured with a tackle, and at night they found themselves off a coast fringed with reefs, with thick weather. Guided by the white appearance of the breakers, they rounded a point, and found themselves in a large bay, where they got safe anchorage. I identify this point as Flokora. The coast from this point to the village of Gau is fringed by a shore reef close under the cliffs, upon which there is a heavy break. The bay is described by Gallego as capacious, and having six or seven inhabited islands. These are now uninhabited.

From this bay they saw another large island, the western extremity of which is said to bear east and west with the Point of Meta. Gallego estimates the latitude of the western end to be in 8° , and says that it has five or six islets off its extremity. It will be noticed that from the position the Spaniards were now in the four small islets marked in the chart would appear to be off the end of the large island, while the island incorrectly called Ramos in the Admiralty chart, would appear to be, as Gallego describes, between the large island and themselves. Gallego speaks of two islets between them and the large island, and the island called Ramos on the chart has the appearance of a double island from this position. From a native they had with them they ascertained that the name of the large island was Malaita. The name by which this island is universally known among the natives at the present day, and by which it is afterwards referred to by Catoira in his journal, is Mala. It has occurred to me that their native companion, pointing towards this island, may have said, "Mala ita" ("There is Mala"), and that Gallego put this down as the name of the island.

The name of Ramos which the Spaniards gave to this island of Mala, because they sighted it on Palm Sunday, has been erroneously applied in existing maps to the two small islets in mid-channel.

They arrived at the end of Ysabel on the 16th April, and gave it the name of Cape Prieto. Gallego says the latitude is 9° , but this is nearly half a degree in excess. He says there are some islets near the point, but makes no mention of the island to which the name of Ortega Island has since been applied. The native name is Mahigi. The islets referred to are some rocks, one of which forms an archway, situated between Mahigi Island and the mainland.

From Cape Prieto they sighted some islands to the south-east, at the estimated distance of nine leagues from the cape. With a fair wind they reached them at nightfall, and anchored off one, to which they gave the name of La Galera, because it resembled a galley in shape. The comparison is, I consider, rather far-fetched, but I identify this with the island called on the present chart North Island. In the morning they proceeded to another island, said by them to be a league distant. To this they gave the name of Buena Vista. The native name they declared to be Pela. The native name of Buena Vista is at present Vati Lau, but the name Gela is applied by the natives to the whole group of islands comprising what is known on the present chart as Florida.

From the natives of Buena Vista they obtained some roots called *panas*, compared by Catoira to truffles or to the "Potatoes of Peru." This is perhaps one of the first references to potatoes. This was some years before the introduction of potatoes into England. The word *pana* is still in use on Gela. It is applied to a kind of yam which is the staple food of the natives. They also got some pigs which they called *namboles*. *Bolo* is the word now in use on Gela signifying pig, *na* being the article. From Buena Vista the brigantine proceeded to an island of about the same size, and described as lying to the east of it. To this island they gave the name of La Florida. I identify this with the island known as Olevuka.

Proceeding further to the eastward they gave the name of San Dimas to the land to the east of the Sandfly Passage, and then finding they could not get any further to the eastward against the south-east trade, they stood to the southward. They supposed they saw two other islands eastward of the land to which they had given the name of San Dimas, and gave them the names of San German and Guadalupe. Now, when at sea off the south coast of this land, it has the appearance of being three islands, as the land is in places low, and it appears to be cut near where is situated the village of Halavo, and again near the Boli Passage. Hence I identify the San Dimas of the Spaniards with the land east of the Sandfly Passage, and

west of the village of Halavo, San German with the land east of Halavo and west of the Boli Passage, and Guadalupe with the land east of the Boli Passage.

Steering to the southward they passed an island in the middle of which was a volcano emitting a great smoke. This was the island of Savo. To this island Gallego gave the name of Sesarga, because it resembled in outline an island of that name situated off the coast of his native province of Galicia.

When cruising off the coast of Spain in his yacht a few years ago, Mr. Amherst had an outline sketch of Sesarga made, and comparing it with outlines made by myself of the island of Savo the resemblance is at once recognised. Gallego records that the native name of this island was Guali. A district on the south-west side of the island is still known as Quoila. During my last visit to the Solomons I ascended to the crater of Savo.

Next day, the 19th April, they reached the great island that they had seen from Florida. They gave it the name of Guadalcanal, Guadalcanar of the present charts. They landed at a river to which they gave the name of Rio de Ortega. From this river Buena Vista bore north, and Sesarga north-west. I have identified this river with the Tu-umbuto river. Gallego gives the latitude as $10\frac{1}{2}^{\circ}$. There is here an error of about one degree, for which I shall endeavour to account later on. From this river the brigantine started to return to the ships.

Sailing along the south coast of Ysabel, they came to an island seven leagues from Cape Prieto, the native name of which, Gallego says, was Veru or Beru. Catoira says Borru. I can find no trace of the survival of any similar name for this island at the present day. To this island the Spaniards gave the name of San Jorge. It is the St. George's Island of the present chart. Here was living a powerful chief named Beneboneja or Ponemonesa, of whose fame they had already heard while the ships were at anchor at the Bay of Santa Ysabel del Estrella. They describe his town as consisting of over 300 houses, with more than 100 canoes. At the present day there is no permanent settlement upon St. George's Island, the natives having been nearly exterminated by head-hunters. The natives brought them some tusks that seemed to belong to some large animal. I have no doubt that these were teeth of the dugong. I am told that formerly these teeth were highly prized by the natives of this part of the group, but have now gone out of fashion.

Proceeding on their voyage along the south coast of Ysabel, they saw no natives. Two islands were seen bearing west from St. George's Island, which they named San Nicholas and Arracises. They could not approach them, as they were hemmed in by reefs. The brigantine appears to have been keeping close to the coast of Ysabel, which at this point has some reefs lying off it. These two islands were the New Georgia Group, which, as the Spaniards rightly supposed, extended much further to the westward than they could see. On account of the numerous reefs, they were forced always to anchor at night.

After sailing for four days they found themselves, on April 26th, among an archipelago of small islands. They saw a large island lying to the W. by N., to which they gave the name of San Marcos. This was, of course, the Island of Choiseul. At this point Gallego gives the latitude $7\frac{1}{2}^{\circ}$. They found a passage leading among the islands, and bringing them out on the north side of Ysabel. This was said to be about six leagues from the extremity of the island, and is doubtless the passage marked on the present chart leading through into Port Praslin.

At this point Catoira records:—"At daybreak they saw a thing worth noticing and a positive fact, which was that at the end of the island, at the other side, they passed on the wing flocks of bats, in numbers about 2000, as large as kites, and the smallest as large as pigeons; and it is a fact that at the entrance of the harbour of La Estrella, where they built the brigantine, a soldier killed one which was four feet

long from tip to tip, and the head larger than a hedgehog, and claws like those of a hawk, and larger, and on each wing at the end a claw larger than the aforesaid, and certainly if they bite like those on the Continent they could depopulate a kingdom."

By Wednesday, the 27th April, they had got clear of the archipelago of islands, and had got into the sea to the northward. They now found the wind dead against them for returning to the ships, and as they were afraid to sail at night with the land breeze, on account of the numerous patches and reefs, they made but slow progress.

Catoira here speaks of:—"Reefs and ledges of rocks which exist all round the island, 2, 3, 10, 20 leagues out at sea, and many points of land jutting out, which is a thing to frighten one coming with ships among these islands."

My own experience on this coast agrees well with this description. Not only is there a fringing reef along the shore, but there are outlying patches, some of which, even in calm weather, occasionally break.

Finding that the brigantine made but little progress, it was determined to send a canoe that they had taken from Ponemonefa's town on ahead to announce the approach of the brigantine at the Bay of Santa Ysabel. Six soldiers, one sailor, and one native were sent in her. With such a crew it is almost needless to say that they came to grief. The canoe was broken to pieces on a reef, and the crew managed to reach a small island. The native, of course, took the opportunity of running away. I expect that this occurred at the place on the map that I have marked (X). At this spot I myself very narrowly escaped having a similar experience. Some of them could not swim, so a raft was made for them out of the broken canoe, and they managed to reach the mainland, and then, barefooted as they were, they started to walk along the coast over the coral to the westward. Next morning they were picked up by the brigantine.

When the brigantine reached the place where the canoe had been wrecked, she went inside the reefs. Reference to the map will show that this is possible from the island where I suppose the wreck to have been, as the barrier reef commences there, and westward of this place it is impossible to pass between the reef and the shore.

Next day, the 5th May, the brigantine reached the ships. She had been seen by the natives at Vylebanara's village the day before and her approach announced, and I have above described how this was possible.

The brigantine brought three pigs and a considerable quantity of roots, *ynames* and *panas*, which Catoira says did not exist on Ysabel, where, as I previously mentioned, the *vinahú* or taro is the staple food. This native food enabled them to economise their biscuits, each man's daily allowance being now eight ounces of biscuit and some native food.

On May 8th the ships left the Bay of Santa Isabel del Estrella, and sailed for Guadalcanar, beating to windward against the south-east trade wind. The brigantine was unable to keep with the ships, so during the second night Gallego decided to turn back for her in the *Capitana*, allowing the *Almiranta* to continue her voyage.

Catoira here relates:—"It was one hour of the night, and the brigantine had not arrived, and to show the *Almiranta* where the chief pilot was going, he took the compass and placed it on the side, because it was very clear moonlight, and whilst they were watching it, he said that he saw the bottom shining white." Gallego says that sounding with the lead he found six fathoms, and that at the time they were six leagues from the shore. They shortly afterwards found themselves in deep water.

This is a most interesting record, as it establishes the existence of some at least of the extensive reefs that have been reported off the coast of Ysabel. Catoira has previously mentioned that reefs existed 10 and 20 leagues out to sea.

A reference to the present Admiralty chart will show a large area of reported

reefs off this coast, and although it is not to be supposed that they are anything like what the chart represents, still the above is additional evidence that reefs do exist. A trader told me that once sailing along this coast they got 15 fathoms at a distance that he estimated as 20 miles from land. Others have told me that they have seen nothing. The natives of Gau told me that reefs did exist, to which they occasionally went for line fishing.

On the 12th May the *Capitana*, with the brigantine in tow, arrived on the coast of Guadalcanar, about two leagues to the westward of the river to which the name Rio de Ortega had been given during the cruise of the brigantine. The *Almiranta* had already arrived. They found the anchorage exposed and insecure, so they went a league further to the westward under the shelter of an islet, as Gallego calls it—Catoira says a point. There is a small coral islet here, connected with the mainland by a sand-spit, so that either description is correct. There is no other islet of any sort upon this part of the coast of Guadalcanar, so that the identification of the spot is open to no doubt. To the westward of this islet is indifferent anchorage, but protected from the prevailing wind. The general landed, and took formal possession in the name of the King of Spain, and erected a cross. To their anchorage they gave the name of the Puerto de la Cruz.

An expedition to the interior found the country thickly peopled and well cultivated, many fields or patches of *panas* and *names* being seen. I have pointed out above that the word *pana* is still in use for one kind of yam; *names* were probably another kind of yam. The natives cultivate two or three varieties. At the present day the neighbourhood near the anchorage is but thinly peopled. There are no natives living now on the coast close to the Puerto de la Cruz. In my book 'A Naturalist among the Head-hunters,' I give an account of the extermination of the last inhabitants.

On the 19th May, after the ships had been a week at the Puerto de la Cruz, the brigantine was again despatched on a voyage of discovery, Gallego again taking charge, under Don Fernando Henriquez. The same day an expedition under Andres Nunez, consisting of twelve musketeers and ten shield-bearers, went inland to prospect the country for gold. They were absent six days.

Catoira describes the country near the coast as consisting of plains covered with grass, and that much smoke was noticed from fires on the plain. From the place where the Spaniards were anchored to Ruavatu, about 30 miles to the eastward, there is a great alluvial flat extending in some places 10 miles inland. This is covered with a rank growth of coarse grass and weeds. Along the coast-line a narrow belt of coco-nut palms and trees gives the coast an appearance from the sea of being well wooded, but the belt of timber is in some places only a few yards wide. In some places patches of timber may be seen, and the river banks are generally well wooded, but unlike most of the remainder of the Solomon Group, this part of Guadalcanar may be described as open country. Either by accident or design, the natives are constantly starting fires among this grass, and the thick white smoke may be seen almost any day from a long distance. These fires, continued, as we here have evidence, for over 300 years and probably long before, have probably brought the soil into such a condition that it will now produce nothing but the rank coarse growth which covers it. I never saw the natives make any attempt to plant on this open land. They probably have good reason for not doing so.

At this time the store of native food brought by the brigantine on her return from her first voyage was exhausted, and the daily allowance for each man was 8 oz. of biscuit and the same weight of salt beef. Sarmiento was accordingly despatched on the 23rd May with 32 men to try and get food. They took a ship's boat and went about a league to the eastward, where there was a small river, to which they gave

the name of San Urbano. They say that it was so small that the boat could not pass the mouth of it. I suppose this to have been one of the two small streams that I have marked between the Tuumbuto river and the Nanago river, though I am surprised that they should have thought it worth naming.

They met the expedition of Andres Nunez returning. They had penetrated to a village called Togla, in the mountains. I have never been inland in this part of Guadalcanar, so cannot say whether the name still exists. Neither Nunez nor Sarmiento brought an adequate supply of food.

On Thursday, 27th May, Ascension Day, the steward of the *Capitana* took a boat's crew to get water. They went to the river to which they had given the name of the Rio Gallego, which I have identified with the Nanago river of the natives. The Spaniards had incautiously allowed their boat to get aground, a most foolish thing, as any one knows who has had any experience with strange natives. While the boat was aground, the natives attacked them and killed nine men, the only person who escaped being a negro slave, who took to the sea and swam off to the island. The natives had been seen from the ships to be collecting on the shore and coming from the Rio San Urbano to the Rio Gallego. A reference to the map will show that from the position of the ships the mouths of these two rivers would be visible to those on board. Assistance was sent from the ships, some soldiers getting ashore in the *Almiranta's* boat, and Ortega and some others reaching land on a raft. The natives had all fled, but they found the bodies of their comrades "cut in pieces, some without legs and without arms, others without heads, and the ends of the tongues of all of them cut off, and the back teeth drawn, and those whose heads were left they left them with the skulls open and the brains eaten." Next day Sarmiento landed with a force to administer chastisement. More than twenty natives are said to have been killed and many wounded. Next day he again landed and scoured the coast to the westward. From a prisoner whom they took they ascertained that the attack was planned and carried out under the command of Nano, the chief of the district of Lunga. The district between the Tuumbuto river and the Nanago river is still known by this name.

On the 6th June the brigantine returned from her second voyage, and reported as follows:—They found the wind strong against them every day from the south-east, but at night it died away and came off the land. This is the usual state of things at this time of the year on the coast of Guadalcanar.

At one place on the coast where they landed they found that near the houses the natives had planted "many herbs of different colours fenced with canes." At the present day the natives plant variegated crotons and coleus near their houses, which are fenced with bamboos and rattans to protect them from the pigs.

They got food from the natives of a village where they say there was a small river. These natives were friendly until the Spaniards attempted to depart, and then tried to prevent them by pulling the rope by which the brigantine was anchored. I identify the village where this occurred with Lango (not the district of Lunga above referred to).

Proceeding at night with the oars, they saw a large river, to which they gave the name of San Bernardino. This I identify with the Nalimbiu. Gallego says "there is a very high round hill here." From off the mouth of the Nalimbiu the high, round mountain of Popomanisao, or the Lion's Head (5000 feet), is a very conspicuous object, and seems to stand out from everything else.

Two leagues further on they came to a great village on the banks of a small river. This was probably the Metepona river. The natives brought them a bundle of grass on a pole in imitation of a pig and placed it on the beach, telling the Spaniards to come and fetch it in exchange for a canoe that they had taken.

The natives followed them along the beach to another large river. This was probably the Balesuna river. They named it Santa Elena. That afternoon they anchored under the shelter of a point probably near the village of Tasimboko. Proceeding on their voyage they passed a large village, where the natives exchanged the canoe the Spaniards had with them for two pigs.

Continuing their voyage for another six leagues, they anchored off a town of more than 3000 inhabitants. The natives here filled their water-jars and brought them food. Gallego here says, "Close to the shore are two inhabited islets half a league to sea, and to the north-west of them an islet of sand." This is quite sufficient for me to identify the town with Aola. The population, as given, is probably much exaggerated. It is a matter of considerable satisfaction to me to find that, upon the three occasions that the Spaniards communicated with the natives of Aola, they were enabled to do so on a friendly footing. Their behaviour to me I have previously described.

The two islets are the small islands of Kokobara* and Vulelua. The islet of sand is doubtless the coral patch that dries at half tide, situated to the north-west of Vulelua. Possibly, at the time of the Spanish visit it was covered with sand from the Kombua river, but the sand off this river mouth may have shifted, and so changed the deposit of the banks.

Proceeding on their voyage they saw two other islets and another islet of sand. These are said to have been then, as now, uninhabited. There is no difficulty in identifying these with the Rua Sura of the present Admiralty chart. This is not correctly named in the chart. There are two islands, one larger than the other. These are known to the natives as Rura Suli and Rura Kiki, or Big Rura and Little Rura. I have no doubt that the word Rura is an abbreviation for Rua nura; Rua, of course, meaning two, and nura doubtless meaning island. A small island a few miles further to the eastward is known as Nura.

From the large village above described to the south-east end of the island Catoira describes it as all high mountain land, and this agrees well with the description of the coast between Aola and Marau, for the flat land that extends along the coast beginning from the Port of the Cross here ceases, and the mountains rise from near the sea.

On the 24th May the brigantine reached the end of Guadalcanar. Gallego says, "we found many islets with shoals between them. Among them is a large island with a good port." Catoira says, "between this island and the mainland there is a great bay." There is no difficulty in identifying this place with Marau Sound, and the large island with Malapa. They found many shoals and reefs, and watered the brigantine at an uninhabited island in order to avoid molestation by the natives. Catoira says that on coming out of this port they saw three islands, one on the south side, the second nearly in the same course with Guadalcanar, and the third on the north. There is here some slight confusion. Catoira's narrative is most carefully written, and in most instances more particular and fuller than Gallego's, but it must be remembered that his accounts of the voyages of the brigantine are only at second hand. The first island here mentioned may probably be the mythical island afterwards called San Urban by Gallego. Gallego says they saw an island to the south east by east, estimated to be distant seven leagues, but they did not attempt to go to it. No name was at this time assigned to it. This was, of course, the island now universally known as San Christoval, but which during this paper I shall refer to as Pauro. The reason will appear further on.

* Kokobara, literally the island off Bara. Kokomo, an island; Bara, a village of the mainland.

Steering to the north-east by east for 16 leagues, they came to the island to which they had hitherto referred as Malaita, but Catoira here says, "which the Indians of Guadalcanal call Mala." Mala is the name by which the island is still universally known among the natives, and I have above pointed out how I suppose the name Malaita to have arisen. Next day (Wednesday 20th May) sailing all the time close hauled, they reached it, and found an anchorage to which Gallego gave the name of Escondido, because it was enclosed within reefs. I personally know little of this part of the coast of Malaita, but the master of a trading vessel who is well acquainted with it, tells me that the description given by Catoira agrees well with a place known as Oho, situated about 5 or 6 miles to the north west of the mouth of the Maramisiki Passage. Catoira describes it thus:—"outside it has reefs, and at the entrance two points make it narrow, although within it widens, and makes itself an islet, without letting itself be seen outside."

Leaving the Port of Escondido they sailed to the south east for four leagues and found an inlet like a river. This was evidently the southern entrance of the Maramasiki Passage.* On account of the strong current running out they were unable to enter. They accordingly went on for another four leagues where they found a good anchorage, to which they gave the name of the Port of La Asuncion, because they were there on that day. Gallego says, "It has an islet at the entrance which should be left close on the starboard hand in entering the port." I identify this place with Tavaniabia, the Ariel harbour of the present chart. Proceeding further along, they put into a small bay close to the extremity of the island. This is probably at the place marked on the chart as Suoroa. I am informed that small vessels can anchor there in the south-east season when there is too much sea at Saa, just round the point. From the extremity of Malaita another island is seen lying east and west, with it, distant according to Gallego's computation 8 leagues. They arrived at it during the night. The native name was found to be Uraba. It remains but little, if at all changed, and is still known among the natives as Ulava. The Spaniards named it La Treguada. Some natives were seen wearing bracelets of bone, and stars of shell in their ears, and others of teeth of fish, and with girdles of shells and beads. A temple is also described having a breastwork of boards like a counter. These descriptions, although written over three hundred years ago, might equally well describe what I saw at Ulava last year.

Leaving Ulava they came to three uninhabited islands, upon which Catoira says they landed for the purpose of obtaining water, but were unsuccessful. Gallego says that these islands were inhabited, and that they obtained water there, but I suspect this to be a mistranslation. These islands are uninhabited and uninhabitable, and there is no water on them. To these islands they gave the name of Las Tres Marias.

Leaving them, they went to another island three leagues away, to which they gave the name of San Juan. From San Juan they sailed towards a very large island that they saw ahead. They found it very thickly populated, and of good appearance. The brigantine approached the shore to try and effect a landing, but

* On reference to the chart it will be seen that this passage goes right through to the north side of the island dividing it in two, and that the part to the eastward of the passage is called Maramasiki. I would suggest that the origin or meaning of this name is probably Mala Masiki, or little Mala. R and l are frequently interchangeable. I know nothing of any Malaita dialect, but from a comparison of some of the vocabularies in Dr. Codrington's 'Melanesian Languages,' I think it quite possible that Masiki may have the meaning, I suppose, in some Malaita language. Compare also the name "Mahigi" applied to the island off the south-east end of Yasabel.

they found such a surf breaking upon the shore that they were unable to do so. Several canoes (ninety-three) came off to them, making a hostile display; a native was taken prisoner.

The coast of Bauro, to the S.S.W. of Las Tres Marias, agrees well with the description. A heavy surf breaks upon a rocky shore, and landing would be certainly difficult for a boat; to a vessel of the size of the brigantine impossible. To this land they gave the name of Santiago. Finding they could not land, they returned to the island of San Juan. There is no difficulty whatever in identifying the island of San Juan with Ugi, the Ile du Golfe of Surville, the French explorer.

Gallego relates that the prisoner they had with them was here ransomed for three pigs. I suspect that he was bought to be eaten.

They remained at the island of San Juan during the night of the 1st June, and on the following morning crossed over and landed upon the large island to which they had given the name of Santiago. They took possession of it in the name of the king, and Gallego here relates that when they had embarked to resume their voyage a violent north-east wind drove them to the extremity of Santiago, whence they saw a large island to the south-east that trended westward, and was said to be only four leagues distant from the island of Guadalcanar.

Gallego here falls into an error, and Dr. Guppy, in endeavouring to explain his meaning, has entirely misapprehended it, and made matters worse. We must not forget that the weather was thick and squally, and at the time Gallego was suffering from a severe attack of fever. The Spaniards were overtaken by a violent *north-east* wind when on the coast of Santiago opposite Ugi, which drove them to the extremity of the island, whence they saw what they thought was another island, to which they gave the name of San Urban. This, of course, must have been the western extremity of Santiago, and near the place marked on the present chart Cape Recherche.

It is evident that with a north-east wind they could not have been driven to the eastward, as Dr. Guppy would seem to suppose when he attempts to identify the land to which the Spaniards gave the name of San Urban as the Cape Surville peninsula.

Whether the Spaniards really saw any land at all after passing Cape Recherche, or whether they thought the land about Hada Bay, or possibly the high land near Cape Henslow, belonged to a separate island, I cannot say. I am inclined to suppose that what they saw was a bank of clouds. I have above noticed that the weather was squally and thick, and Gallego ill. At all events, next morning, running before the north-east wind, they arrived back at Guadalcanar.

They coasted along Guadalcanar with the wind always astern, anchoring one night at the island of Bara, or perhaps Vulelua, where the natives again gave them *panas* and a hog, and filled their water-jars.

Continuing their return voyage, on the 5th June they visited a village on the river that they had named Santa Elena on their previous visit, and the following day, June 6th, they returned to the ships.

On the 9th June the natives made an attack upon some men who were at work upon the small island near the ships making a new top-mast. They were repulsed with loss.

On the 12th June the general landed to inflict punishment for this attack upon the natives living on the Rio de Ortega, but found the place deserted. Several villages were, however, burnt.

At midnight on the 13th June the ships set sail from the Port of the Cross. They found the wind against them during the day, and on the 16th they anchored near the shore, and again proceeded during the night with the land breeze.

On the 17th, at daybreak, they anchored under shelter of an islet. Gallego says

this was half a league to windward of where they had anchored in the brigantine, so I have no difficulty in identifying it with the island of Kokobara. Gallego and a boat's crew went to the other islet (Vulelua) to shoot pigeons for the sick. Again they had friendly intercourse with the natives of Aola.

Leaving this anchorage on the 18th June, they continued to beat along the coast, and the following day had to take the brigantine in tow. They intended to make for the island of San Juan or Ugi, but meeting with continual head winds, against which they beat for a fortnight, they found themselves off the south coast of Bauro, to which they gave the name of San Christoval, as they were in doubt whether or not it formed one with the island to which they had given the name of Santiago during the voyage of the brigantine. Catoira says, "We discovered another great island adjoining that of Santiago, although it did not permit itself to be seen easily, for it seemed to be all one, or to be divided only by a small arm of the sea." (Observe that no mention whatever is here made either by Gallego or Catoira of the island of San Urban, supposed to have been sighted by the brigantine.)

On the 30th June they found an anchorage on the south side of the island, to which they had given the name of San Christoval. Gallego supposes this harbour to have been near the west end of San Christoval and in close proximity to Santiago. On reference to the present chart it will be seen that the name of San Christoval is applied to the whole island of Bauro. Catoira suspected, but was not certain of the identity of Santiago and San Christoval. There is a good harbour near Cape Sydney on the coast of San Christoval which I identify with the Spaniards' anchorage. The native name is Hanono. To their anchorage the Spaniards gave the name of "Puerta de la Visitation de Nuestra Señora." The north coast of the island west of Cape Kibeck, and the south coast as far as Cape Jackson, will consequently constitute the Santiago of the Spaniards. The whole island is now known as San Christoval. Then, as now, the native name for the island was Bauro.

On the 6th July the brigantine again left the ships on a voyage of discovery, and sailed along the coast to the eastward. On the supposition that their anchorage was near the west end of the island, Gallego says, "The coast until the middle of the island trends N.W. and S.E. for 20 leagues and a point nearer east and west, and the other half west by north and east by south. This is very nearly the trend of the coast of Bauro east of Cape Sydney to the east end of the island.

On the 11th July the brigantine reached the end of the island, and discovered two islands lying off the coast. To these they gave the name of Sta. Catalina and Sta. Anna. Next morning they landed upon Sta. Catalina, and scanned the horizon to the south and east, and came to the conclusion that there were no more islands in that direction. In the afternoon they went to the other island to which they had given the name of Sta. Anna, and on the following morning 13th July at 9 o'clock they left for the ships with a fair wind. Some men had been wounded by the natives at Sta. Anna, and they were anxious to make a quick passage. At night they put into a harbour to which they gave the name of La Palma, and left again at midnight. I am unable to identify this anchorage. The following evening they arrived at the ships—14th July. As the ships were in a bad condition, they were careened to fit them for the return voyage.

On the 11th August the ships left the Port of la Visitation de Nuestra Señora, on their return to Peru. They took with them a native with his wife and son, and a tame cockatoo. They beat against the south-east trade for seven days, but at last, on the evening of the 17th August, they got a slant, and were enabled to weather the two islands of Sta. Catalina and Santa Anna. The following morning the islands were out of sight. The brigantine was abandoned at sea because they found it impossible to tow her. After a voyage of incredible hardship and the loss of their

boats they reached Callao on the 11th September 1569, just thirteen months after their departure from the Solomons. It will be interesting here to compare the latitudes of Gallego with the latitudes of the places that I have identified with his discoveries, and to endeavour to account for the discrepancies that exist. The instrument used at this period for taking the sun's altitude, was the cross staff, and I think the wonder is not that the latitudes are incorrect, but that they are so correct as we find them to be.

Gallego's Latitudes.	Approximate Actual Latitudes.	Error of Gallego's Latitudes.
6 15	6 15	0
7 50	7 52	- 0 2
8 0	7 58	+ 0 2
8 0	7 57 and 8	..
8 0	8 18	- 0 18
9 0	8 32	+ 0 28
9 30	8 55	+ 0 35
9 30	8 58	+ 0 32
9 45	9 7	+ 0 38
10 30	9 28	+ 1 7
10 30	8 30	+ 0 50
10 8	9 18	+ 0 50
10 20	9 23	+ 0 57
10 45	9 45	+ 1 0
10 15	9 34	+ 0 41
10 20	9 40	+ 0 40
10 15	9 45	+ 0 45
10 30	9 45	+ 0 45
10 30	10 15	+ 0 25
10 40	10 27	+ 0 18
10 30	10 43	..
11 0	10 43	+ 0 17
11 0	10 40	+ 0 41
11 40	10 54	+ 0 46
11 36	10 53	+ 0 46

The first place on the list is the Candelaria Reefs, and the latitude of Gallego is perfectly correct supposing the reef to be identical with the Roncador or Candelaria Reef of the chart. Next comes the Bay of Santa Ysabel del Estrella, the Spaniards first anchorage and starting-place of their subsequent explorations. This latitude is also almost correct.

I wish to lay particular stress upon the fact of these two observations having had the advantage of being made from the ship; indeed the latter may have been certainly have been made with great care. I believe that the error that appears in some of the subsequent observations was because they were made from the brigantine, a crowded and unsteady small vessel.

Starting from the Bay of Santa Ysabel del Estrella as a determined position, during the first voyage of the brigantine with reference to the observed latitude of the Point of Meta and the two islets near it were given by Gallego that place. From their close proximity to the Bay no great error could arise, and the latitudes given are nearly correct. The position of the N.W. end of Malaita is 18 miles out, but the Spaniards never went there, and only estimated the latitude from its being supposed to lie east and west with the point of Meta. The latitudes

of Cape Prieto, Buena Vista, Florida, and Savo are all in excess by about the same amount, and were probably only reckoned during the first voyage of the brigantine by their supposed position relative to the Bay of Santa Ysabel del Estrella.

The next latitude, that of the Ortega river, on the coast of Guadalcanar, is about a degree in excess of the correct latitude. This error may have been caused in the same way as the last four, but I am inclined to think that Gallego here read his instrument just a degree wrong—a mistake that I can conceive it quite possible for him to make, and which he apparently never found out, for on the arrival of the ships at the Puerto de la Cruz, when the latitude was again observed, almost the same error was recorded, and a like discrepancy exists in the recorded latitudes of the places visited by the brigantine during her second voyage on the coast of Guadalcanar, viz. the Rio San Bernadino and the latitude of the place that I identify with Marau Sound.

The latitude of the island of San Jorge, visited by the brigantine during her first voyage, after leaving the Rio de Ortega, is also about one degree in excess. This latitude is probably relative to that of the Rio de Ortega.

From this place the brigantine voyaged for four days along the south coast of Ysabel until they came to near the west end of the island, but having come too far to compute their latitude relative to any of their former positions, a fresh observation became necessary, and this, viz. $7^{\circ} 30'$, agrees exactly with the latitude of the position where I suppose the brigantine to have been, viz. at the entrance of the channel leading through from the south side of the island into Port Praslin.

The latitudes of the other places visited during the second voyage of the brigantine were merely computed from their supposed relative situations with reference to the Puerto de la Cruz, their point of departure, but whereas they started with an error of 1° , by the time they got to Santiago their computations had been so far wrong that the error was reduced to $18'$.

The latitude assigned to San Urban only makes the mystery and confusion surrounding this mythical island worse and worse. It is said to lie to the south-east of Santiago, and yet Santiago is said to lie in $10^{\circ} 45'$ and San Urban in $10^{\circ} 30'$.

When the ships arrived at the Puerto de la Visitacion de Nuestra Señora, on San Christoval, Gallego had time to make another careful observation, and this time he got it right within $17'$.

The three remaining latitudes, viz. the east end of San Christoval, Sta. Catalina, and Sta. Anna, are of course computed from the observed latitude at the Puerto de la Visitacion, and naturally, of course, the same initial error attaches to them all. The brigantine only paid them a flying visit, but Gallego should not have made an additional mistake of $30'$ of latitude in that short distance.

After the paper,—

Mr. TYSSEN AMHERST, M.P., said it was because of a manuscript in his library that the first discovery of the islands by the Spaniards had been noticed in recent times. Dalrymple's voyages, published in 1770, gave a very good account of this discovery, and reference was made to a log-book of the pilot. That manuscript had, however, been lost. Again, in 1695, the Spaniards sailed out there, but failed to discover the islands. He (Mr. Amherst) showed his manuscript to his friend Don Pascual de Gayangos, who was very much interested in it, and found another copy in the British Museum, which was rather more modern, but evidently taken from the same original. This copy was translated by Dr. Guppy in his recent book 'The Solomon Islands,' but a MS. by Catoira, who accompanied the same expedition, gave a longer account of the voyage, and went more into detail. He mentioned that he would not give any maps or charts of the voyage, because the chief pilot had done

so, but these are unfortunately lost. They sailed from Callao in 1567, and were absent between two and three years. Afterwards they went northwards and touched one of the rocks of the Sandwich group, but evidently saw there neither vegetation nor human beings. Dampier gave an account of the discovery, but he thought the islands were those of New Britain, which lie to the north-westward. He also mentioned the map published by de Bry in 1596, which, he said, must be of the earlier voyage, as the news of the second voyage could hardly have reached England in time, but there had been an earlier map showing the islands published by Ortelius in 1589. He (Mr. Amherst) was sure he expressed the feeling of everyone present when he thanked Mr. Woodford for his paper and photographs. His researches left no doubt that the islands described in Gallego's narrative, and in that of Gomez Catoira, the purser, were identically those that had been shown in the photographs. The description of the canoes, the birds, the natives, and the scenery, proved they were the same. When yachting off the north-west coast of Spain in 1879 he was looking at Gallego's account, where he mentioned that he called the island Sesarga, because it was like an island of that name near the coast of his native country Galicia in Spain. The next day he bore up to Sesarga, and one of his daughters made a sketch of it, which was shown to Mr. Woodford, who, immediately he saw it, said, "That was like the island I visited, and where I ascended the crater." Of course they were all more interested in the discoveries of to-day than in those of the old Spaniards, but he was glad to think that a fondness for old manuscripts and early voyages had helped Mr. Woodford in his search among those islands which so few had visited. He congratulated Mr. Woodford on his marvellous escapes, and commiserated with him on the loss of his friend.

Captain C. BRIDGE, R.N., said he visited the Solomon Islands in 1882, and again in 1883. During his first visit he began at the south-west corner. He was then in command of one of her Majesty's ships, and was sent to investigate a case of outrage that had been committed. He visited the islands of Buks, Malaita, Guadalcanar, and Treasury Island. On the second occasion he first visited Treasury Island at the north-west of the group, and then went on to Aola. He believed he had visited more South Sea islands than any other white man alive, but Guadalcanar was one of only two islands where his companions and himself were in any danger from the natives. He was therefore astonished at the daring exhibited by Mr. Woodford, and the success which had attended his travels in that very little-known part of the world. One of the photographs showed a shell fired by one of Her Majesty's ships. A few days ago he took up a copy of the book published by Mr. Woodford, giving an account of his travels, and was glad to find that he spoke with approbation of a method of investigating cases of murder of white men which was followed with great success during the four years he (Captain Bridge) was in the district. Instead of wreaking a sort of indiscriminate vengeance upon an island in some part of which a white man at some time or other had been killed, for a reason which perhaps was very little known, the new system was to try and bring home to the actual perpetrator of the outrage the responsibility for his act. Although it might frequently happen that it was impossible to discover and bring to punishment the man who committed the atrocity, yet the very fact of its being known that there was a steady determination to find him if possible, and to take no other steps until he was found, had done more to check indiscriminate outrages than anything else since our relations with the natives began. Mr. Woodford had mentioned that when he went to the village in the mountains of Guadalcanar, his guide wanted to go no farther because he had some trade matter to settle. That was a proof of the extent of the trading instinct and practice amongst the inhabitants of those islands. They were nearly all of them born traders, and although they might be head-hunters as well, yet the fact of their wishing to have

trading connections with their neighbours, held out a prospect that hereafter Europeans might be able to conduct business with them on a more stable and friendly footing than had hitherto been the case. It was just the same in the islands farther to the north-east. Although the inhabitants were very nearly all cannibals, yet there were cannibals and cannibals, and the cannibal who was one for the mere sake of cannibalism was a very rare individual. He supposed the ordinary Melanesian ate human flesh as often as the average Englishman did venison. He never went to a single island where cannibalism was practised, where the people were not ashamed of it, with the exception of New Britain. At Treasury Island there was a distinct ethnical division between the Solomon Islanders and the islanders of the next group. The canoes throughout the Solomon Islands had no outriggers, but at Treasury Island there were both kinds, while the islands to the north-west used only outrigger canoes. Mr. Woodford spoke of the pottery found there. Five years ago he (Captain Bridge) brought to England some Treasury Island pottery. It was probably one of the earliest forms. On one or two articles there were some markings, showing the very rudiments of ornamentation. In some places in New Guinea pottery of a very delicate description was made. Further to the north-east the natives used wooden bowls for their cookery, and some of these were beautifully ornamented and inlaid with mother-o'-pearl, but no pottery was used. One of the photographs showed a young man with a sort of frontlet of white shells. Those shells were sometimes used as armlets, and as ornaments to the stems of canoes, but in the Admiralty Islands one of those shells was the only article of clothing used by the men. Towards the south-east group Bishop Selwyn and the Anglican clergy had for some time carried on their operations, and the particular reason which took him to Gaita was to restore the son of the old chief of the island, who had been implicated in the massacre of Lieutenant Bower. There were four people engaged in that massacre, three men and a boy. The boy was taken and kept a prisoner, and he (Captain Bridge) restored him to his father. A great deal of obloquy was thrown on Bishop Selwyn and his clergy, and it was said that the massacre was the result of their teaching; but not so much stress was laid on the fact that the mission teacher, who had a brother engaged in the massacre, lent straightforward assistance in discovering the men, who were publicly executed by the captain of the *Cormorant* in the presence of the natives.

The PRESIDENT said they must all feel particularly obliged to Mr. Woodford for having brought his head back to London, not leaving it to ornament one of the canoe-houses of his head-hunting friends. They were also grateful to Mr. Tyssen Amberst for having contributed to the success of Mr. Woodford's exploration, by lending him a translation of the Spanish manuscript. They likewise sympathised with the enlightened views which Captain Bridge had expressed with regard to the best method of repressing outrages upon white men in the Pacific Islands. On behalf of the meeting he thanked those gentlemen.

GEOGRAPHICAL EDUCATION: THE YEAR'S PROGRESS AT OXFORD.

THE Council have received from Mr. H. J. Mackinder, M.A., Reader in Geography at Oxford, the following Report on the progress made in the higher Geographical Education during the year:—

OXFORD, 12th June, 1890.

GENTLEMEN,—I have pleasure in presenting to you a report on the work done in the third year of my tenure of the office of Reader in Geography at Oxford. My two previous Reports dealt largely with the future, with reconnoitre and preparation. In this one I am happy to be able to announce results of some importance.

During the academical year which is now ending, I have delivered in the University forty-two lectures—twenty-one on the Historical, twenty-one on the Physical Aspects of Geography. With reference to the Historical course, you may remember that in last summer's report I spoke of certain negotiations with the History lecturers. Those negotiations were undertaken with the object of making attendance at a course of lectures on Geography one of the usual factors in the career of a student reading for History honours. The attendance of the past year shows that that object is being to a considerable extent attained. At the first nineteen of the twenty-one lectures, the members of the University were never fewer than 20. At the last two, owing to their unavoidably clashing with examinations, the number fell a little below 20. Of course, the number varied somewhat with the subject. Five consecutive lectures dealing with the British Isles attracted on each occasion an audience of 50 members of the University. Many of the class have attended the whole course with the greatest regularity, among them four or five graduates. Two or three lady-students must be added to these numbers. Over and above this regular audience there has been a small and fluctuating attendance of residents in Oxford not connected with the University, and on them I have felt justified in imposing a nominal fee, with the proceeds of which a syllabus of each lecture has been printed and distributed to the class. I understand that this innovation has given much satisfaction.

The regions dealt with have been those most interesting to Historians—Europe, the Mediterranean, Western Asia, India, and North America.

As soon as I found that I was likely to have a good permanent class, I applied to the Hebdomadal Council for a grant of 100*l.* to be devoted to the illustration of this course of lectures. The Council handed the matter over to the Delegacy of the Common University Fund, by whom the grant was speedily voted in its entirety. I was thus enabled to secure the services of my student, Mr. Darbishire of Trinity College,

who had already become an adept in the construction of diagrams. Mr. Darbishire has made me a series of maps well fitted for their purpose. A portion of the money will be applied to the purchase of a few German Physical wall-maps. At the twenty-one lectures devoted to Physical Geography, the attendance has been small. Four members of the University, however, three of them graduates, also one or two lady-students, have honoured me with exemplary regularity. In my first report I anticipated the extinction of the class in Physical Geography. It is, therefore, a matter even of congratulation that it is now farther from extinction than in the first year of novelty.

May I here refer to a personal matter? I find that my last year's report, laying stress on the development of the teaching of Historical Geography has produced a somewhat false impression. It is being said, apparently, that I have abandoned the programme with which I set out, and am swimming with the Oxford tide into History. This is not the case; I still regard Physical Geography as the basis of the subject. It is still my hope to train a few Geographical specialists. But to take up at the outset a pedantic attitude on these points would be to shut the doors leading into the wider stage of the future. I have waited and watched for opportunities, and the opportunity has come first in connection with History. A year or two more may not improbably bring the chance on the Physical Science side. There will then only remain the welding together of the two in the case of a few men, mostly future teachers, in order to realise the original scheme.

Turning next to the Extension in which also you are interested, I have to report that during last winter I delivered sixty-six lectures in the towns of Altrincham, Knutsford, Runcorn, Shrewsbury, Leamington, Clevedon, Wells, Weston-super-Mare, Rochester, and at the Warrington Training College. By adding together the average attendance at each course of lectures we find that there was a total average attendance at eleven courses, of nearly 2000, among them many teachers. The subjects selected, included topics both from physical and political geography. A certain number of the students were examined by Mr. Bates and Mr. York Powell with, in many cases, excellent results.

At the meeting of Extension students held at Oxford last August, I delivered nine lectures on the "History of Geography." Three of these were in the "first part" of the meeting, and were given to an audience of about 700, including probably 300 teachers. The remaining six were addressed to 50 of the more ardent or more leisured of the greater number.

Not directly belonging to my duties as Reader, but still springing out of my position as such, are certain other matters with which I have been connected in the past year, and of which I may select three or four of the most important for mention.

Together with Dr. Mill of Edinburgh, I have examined in Commercial Geography in the Oxford and Cambridge Board Examination. This was

the second year of the award of Commercial Certificates. After the disasters of the first year, the number of candidates was naturally somewhat reduced, but we had the satisfaction of reporting a considerably higher standard of knowledge displayed.

I have delivered Geographical lectures at Rugby and University College Schools.

Last November, at the invitation of the College of Preceptors, I gave four lectures on the "Teaching of Geography." On the occasion of each, the room was packed with an audience of 400 teachers of all grades. Many came considerable distances, several even from Brighton. A festivity prevented the mistresses of the schools in South London belonging to the Girls' Public Day School Company from attending the last lecture. At the invitation of the Company I repeated it at Clapham. Altogether this short series of addresses produced very striking testimony to the increase of interest in Geography on the part of the teaching profession. I understand that the College have since asked Mr. Keltie to speak to them on the same subject.

Thus the last year seems on the whole to have brought forth fruits not quite unworthy of the Society's great efforts in the past.

H. J. MACKINDER, M.A.,
Reader in Geography.

GEOGRAPHICAL NOTES.

Mr. H. H. Johnston.—Mr. H. H. Johnston, our Consul at Mozambique, returned to England on the 9th ult. He has been engaged for many months, partly in exploring work, in the region between Lakes Nyassa and Tanganyika, and we may hope soon to receive an account of his observations on the physical geography and topography of the Tanganyika Plateau.

Dr. O. Baumann in Usambara.—Dr. Baumann, who is executing surveys in Usambara for the German East African Company, gives, in a letter to Dr. Hassenstein, published in the current number of 'Petermann's Mitteilungen,' a short account of his work up to the present. It will be remembered that Dr. Baumann was Dr. Meyer's companion in his important journey in Usambara in the autumn of 1888. The letter referred to is dated April 12th, 1890, from Vuga. Tanga was the starting-point of the expedition, which consisted of sixty men, and an escort of seven soldiers of the German Protectorate. Proceeding viâ the English mission station of Misosue, the traveller crossed the Zigi and struck into the north-eastern highlands of Usambara, which own the sway of the chiefs Tununtu, Hurgura, and Bereko. The village of the latter, Simbili, lies on a high grassy ridge, at the point

where the name Kigongoi stands on Baumann's former map. From Simbili the traveller passed through the immense primeval forests of Kombola and Handei to Msasa, whence he followed the southern edge of the mountains and reached Korogwe on the Pangani river. It was then his intention to proceed up the valley of the Luengera, but this region, in consequence of war between the two chiefs Kimereri and Kibanga, had become an uninhabited waste; he therefore turned his attention to the unexplored high pasture land of Wugire, which is well watered and fairly thickly populated. The people carry on cattle-rearing with some success. Dr. Baumann states that rain fell nearly every day; towards evening the wind blew strongly from the east. The temperature in the more elevated regions is generally higher than he had observed it in August and September 1888, without being oppressive. He intends next to explore the central and north-western portions of Usambara, and will therewith conclude his surveys of the country.

Ehlers' Expedition to Manjara Lake.—Herr Otto Ehlers, known to geographers through his attempt to reach the summit of Kilimanjaro in 1888, endeavoured last March to reach the rumoured Manjara Lake, south-west of Kilimanjaro, but was forced to return by the natives of Arusha. He speaks with enthusiasm of the grand and clear view he obtained of Kilimanjaro from an altitude of 6000 feet, in the country of Meru.

Progress of Captain Grombchevsky's Expedition.—An interesting account (accompanied with a sketch map) of the progress of Captain Grombchevsky's present journey of exploration in the Kuen Lun ranges has been communicated by M. Venukoff to the Geographical Society of Paris. The journey in question was commenced in July last, from Margilan. After certain minor excursions *en route* to the south-east the traveller intended to cross the Hindu Kush, with the view of entering Kanjut and Kafirstan. In this attempt he was, as we stated in a recent note* upon M. Dauvergne's explorations in this region, frustrated by Afghan troops. The letter received by M. Venukoff from Captain Grombchevsky is dated March 11th, 1890, from Khotan, and takes up the narrative of the expedition from the month of October 1889. He was then in the valley of the Dangnan-bash, commonly called Taghdumbash-Pamir. From there he proceeded along the valley of the Uprang to the banks of the Muz and the Raskem-daria. The first-named of these rivers, which is a tributary of the second, was up to that time completely unknown. It takes its rise among the famous glaciers of Mustagh, flows first of all to the north-west, then north-east, and joins the Raskem-daria, not far from Chun-takai, the position of which has been determined by astronomical observations. From this point Captain Grombchevsky turned to the south-east, and followed the

* 'Proceedings R.G.S.,' 1890, p. 234.

valley of the Raskem-daria, making from time to time excursions to the right and left into the mountains. In this way he crossed over the Karakorum Mountains by the Pass of Aghil-dawan, and visited the sources of the river Muz. Returning into the valley of the Raskem-daria, he, with some difficulty, explored the sources of the river Tiznaf, also unknown up to the present, and pursuing his route to the east, arrived at Shahidulla on the Karakash. In attempting a reconnaissance of the Karakorum Pass, he found himself obliged to retrace his steps. He then wended his way to the south-east, along the Karakash, and reached the lofty, sandy table-land and the mountains which separate it from the sources of the Yurang-kash. This was a toilsome journey, owing to the season of the year (midwinter) and the inaccessibility of the country. The altitude of the ridges which had to be crossed exceeds 16,500 feet; the cold was intense, the thermometer falling to 22° and even 27° below zero Fahr., and the violence of the winds was extreme. After losing 25 out of his 33 horses, the traveller was obliged to quit the high desert, just at the moment when he was in the vicinity of the mines once worked by the Chinese. Leaving some of his baggage under the rocks, he returned to Shahidulla, and thence to Khotan. Here he found M. Bogdanowitch, the geologist of Pievtzoff's expedition, and the two travellers set out together for Nia. At the present time Captain Grombchevsky is continuing his explorations in Central Asia, and is probably somewhere in the vicinity of the lofty plateau of Linzi-tang, i. e. in the same latitudes as Colonel Pievtzoff, but a little farther west than the latter. He is expected to return to Russia in the autumn.—As to the nature of the country traversed, he says that the Kanjuti, who are indefatigable and merciless brigands, have devastated the whole valley of the Raskem-daria from end to end; traces of habitations prove that the region was formerly well populated. The neighbouring mountains are destitute of vegetation, in consequence of the extreme dryness of the air; but in certain parts of the valley there are oases covered with dense brushwood, impenetrable even with axe in hand. In order to cross these districts, the few Kirghizes who venture across from the Taghdumbach-Pamir to Shahidulla, set fire to the vegetation, causing the animals (wild asses, wolves, foxes, panthers, moles, &c.) to retreat into the more remote parts. The vegetation on the slopes of the mountains is almost *nil*; at an altitude of 13,000 feet a few tamarisks of small growth may be found. Captain Grombchevsky states that while he was in this region a small band of these Kanjuti brigands lay hiding in the brushwood to intercept the passage of Lieutenant Younghusband and his caravan, but they were afraid to carry out their intentions. The geographical results of Captain Grombchevsky's journey of 1889 consist of a topographical survey of his journey of about 700 miles, and the determination of several latitudes in the valley of the Raskem-daria, and on the rivers Muz, Karakash, and Yurang-kash.

The Site of Karakorum.—At the meeting of the Geographical Society of Paris held on the 23rd May last, M. N. Yadrintzef, the well-known Siberian traveller, read a paper upon the archæological mission in North Mongolia, with which he was entrusted by the Irkutsk section of the Imperial Geographical Society of Russia. The special object of the expedition was to determine the exact site of the city of Karakorum, the ancient capital of the Khans of Mongolia, a question which has long been in dispute ever since the visit of Marco Polo. M. Yadrintzef started from Kiakhta on the 10th June, 1889, and followed the course of the Selenga to the point where it debouches into the Orkhon. The first ruins were met with on the river Tula, viz. those of the ancient abode of Irkhe-Merghan, son of Altai Khan, which dates back from the thirteenth century; several parts of the ruins were in a very fair state of preservation. On 23rd June, the expedition visited the remains of an ancient Buddhist temple on the river Kharukha, the walls of which are still from 20 to 40 feet high, and nine days later arrived at the celebrated ruins of Kara-Balgassun, situated on the left bank of the Orkhon, about 30 miles south of its confluence with the Urtu-Tamir. A close examination of these ruins convinced the traveller that they formed the remains of an ancient city, which must have covered an area six miles in circumference, and the centre of which, the Kara-Balgassun of to-day, was occupied by the principal palace of the Khan. Canals connected this city with the river Djirmanta; in the vicinity of the hot springs near the latter river the remains of baths were found. The position of the ancient capital of the Mongolian Empire can thus be accurately fixed, thanks to the recent astronomical determination of the situation of Lake Ughei-Nor, made by Colonel Pievtzof. The lake lies in $47^{\circ} 47' 23''$ N. lat. and $102^{\circ} 45' 25''$ long. east of Greenwich, and the position of Karakorum is, according to M. Yadrintzef, 30 miles to the south-east, or in $47^{\circ} 15'$ N. lat. and $102^{\circ} 20' 15''$ long. east of Greenwich. Another result of this expedition is the discovery of remains of the ancient habitations of the Mongols along the whole valley of the Orkhon. Several burial-grounds visited by the expedition were full of stones covered with inscriptions, bas-reliefs, and obelisks. Most of the latter have Runic inscriptions and Chinese hieroglyphics. The tombs bear evidence of great antiquity, and apparently belonged to the ancient nobles of the country. A visit was also paid to the Buddhist convent of Erdenitzan, where an important religious festival was witnessed, in which more than 2000 lamas took part.

The Auriferous Deposits of Peru.—Attention may be called, as the subject has important bearings on geography, to an exhaustive report (No. 167), by Sir C. Mansfield, our Consul at Lima, upon the auriferous deposits in Peru, which has recently been published by the Foreign Office. The report deals in detail with all the known workings, past

or present, in the country, and gives indications as to likely gold-fields in those parts of the country which are as yet wholly or partially unexplored. We extract the following remarks which he makes generally upon the subject. "In the mountain ranges of Peru, in the vicinity of the sea-board, whenever the rocks are of a crystalline character, gold is found in veins of quartz, which have been intruded into the granite and syenite. In this belt almost all the spurs of the Andes are of the above-named formations, and the auriferous quartz is almost invariably accompanied by oxide of iron and mica. On the coast, gold may sometimes be discerned in copper minerals, as well as in those mixed with chalk. In the upland districts, where the formations exhibit the character of aqueous deposits, veins of gold are not only found in crystalline earths, but also in metamorphic rocks, such as quartzites and slaty schist, intruding themselves into the sedimentary and eruptive formations. Gold in the mountain ranges is found in veins and threads, and in the alluvial districts of the same in flakes and grains. In the Cordillera Oriental, in the district called Montana, gold is usually found in quartz veins injected into talc and clay slate by the upheaval of crystalline rocks." The report deals in detail with each gold-field in all the Departments of the country.

Congress of German Naturalists.—The Sixty-third Congress of German Naturalists and Doctors will assemble at Bremen from the 15th to the 20th of September next. The arrangements for the meetings of the Geographical section are in the hands of Drs. W. Wolkenhauer and G. Meyer, and it is anticipated that, as the German "Geographentag" or Congress of Geographers, will not take place this year, the proceedings of this section will be of special interest.

Obituary.

Mr. Frank Linsly James.*—The late Mr. Frank Linsly James, known to the Society for his important journey into the interior of Somali-land, in 1884,† was killed by a wounded elephant on the 21st of April last, during a cruise along the West Coast of Africa in his yacht the *Lancashire Witch*. The accident happened at Benito, about 100 miles north of the Gaboon river, and within a very short distance of the shore.

Our deceased colleague was born at Liverpool on the 21st of April, 1851, and educated at private schools and Cambridge University, where he took the degree of M.A.

His taste for travel was fostered by the ill-health of his younger brother William, which necessitated wintering in warm climates, and the elder brother became the constant companion of the younger in these trips for health. After spending three winters on the Nile, they determined to make a more extended tour the following winter, and go into the Soudan. This they did in the winter of 1877-78, going by

* By J. A. James and W. D. James.

† 'Proceedings R.G.S.,' 1885, p. 625.

the Nile and Korosko desert to Berber, and thence up the Atbara river to the Settite river and borders of Abyssinia, returning by Kassala to Berber again, across the desert to Dongola, and so down the Nile to Cairo. The following winter they visited India, and were fortunate enough, at the invitation of Sir Samuel Browne, to be able to join the troops under his command and march up the Khyber Pass to Jellalabad. His next journey into Africa, undertaken in the winter of 1880-81, was a very short one, starting from Massowah on the Red Sea, and going into Keren and on to the Khor Baraka, on the border of the Basé country, the object of the expedition being to obtain information as to the feasibility and best way of entering that country. During this journey he and those with him made the only ascent ever made by Europeans of Tchad-Aimba, a high and precipitous mountain, on the summit of which is an Abyssinian monastery. The guide was a renegade monk who had lived a long time at the monastery, and the monks when they perceived the party approaching, attempted to prevent them by rolling huge rocks down the mountain, and for some time the travellers were in great jeopardy; however, through the explanations given by an Abyssinian servant, they were allowed to proceed, and gained the summit in safety. The result of this expedition was a successful exploration of the Basé country in the ensuing winter—1881-82—the country being entered by way of Suakim, Kassala, and Haikota, an account of which he gave in his first book of travels, 'The Wild Tribes of the Soudan.' This was a distinct gain to the geographical knowledge of that previously little-known portion of Africa, Messrs. Aylmer and William James—the latter of whom had been trained by the Royal Geographical Society—making a careful map of all the country passed through.

In the winter of 1882-83, he, with his brother William and three other friends, paid a visit to Mexico, crossing to the Pacific, and seeing as much of the country as possible in the time at his command. The winter of 1883-84 was passed at Aden, making a short trip into Southern Arabia, and cruising along the Somali coast in an Arab dhow, making inquiries as to the possibility and best way of arranging an expedition into the unknown Somali country. The advantage of these inquiries was proved the following winter, 1884-85, by the extraordinary success of his expedition into that country, a graphic account of which he gave in his second book of travel, 'The Unknown Horn of Africa.' The great feature of the journey, beyond the fact of so much new ground being explored and mapped, was the feat of taking a caravan of 100 people and over 100 camels across a waterless waste, the camels travelling thirteen days without water; and only once, at the end of the ninth day, was a little dirty fluid of almost the consistency of liquid mud found to replenish their almost exhausted supply of drinking water. Lord Aberdare, in his Annual Address in 1885, on the Progress of Geography, termed this expedition "one of the most interesting and difficult feats of all recent African travel."

The following year, 1886, he took to yachting, and became devoted to it. During the last four years of his life most of his time was spent on the *Lancashire Witch*, R.Y.S., and probably in many ways they were the happiest of his life. He twice visited the Mediterranean, spent one winter in the Persian Gulf and India, visiting Baghdad and Shiraz, another in the West Indies, Central and North America. In the summer of 1888 he went to Spitzbergen, reaching the North Cape of North East Land, in latitude 80° 40' N, and then visited Novaya Zemlya, and traversed the Yugorski and Matoeschin Shar Straits to the Kara Sea.

His capabilities as an explorer and traveller were remarkable; an admirable organiser, patient, but firm, with natives, whom he managed with extraordinary tact, he never would give in to difficulties that to many would seem insurmountable; full of resource, and absolutely devoid of fear. That he was a man of singularly culti-

vated taste is shown both by the library which he himself formed at Great Stanhope Street, containing many rare and beautiful editions of well-known works, English and foreign, and also by a collection, probably one of the best in London, of proof engravings, which he had collected at home and abroad. He was of a most unselfish, lovable disposition, and leaves a wide circle of devoted friends to mourn the loss, in the prime of life, health, and strength, of one of the most generous of men.

Sir W. Warington Smyth, F.R.S.—Our Society has lost one of its most respected members by the death of the eminent mining engineer and geologist, Sir W. Warington Smyth, which event occurred at his residence in London on the 14th of last month (June). He was the son of Admiral W. H. Smyth, who, in the years 1849–51, at a critical epoch in the history of our Society, by his enthusiasm for geography and the vigour of his administration, restored its fortunes and contributed to place it in that high position in public esteem which it has since maintained. Sir Warington was born at Naples on August 23th, 1817, at the time when his father was in command of H.M.S. *Adventure*, engaged in that long series of surveys of the Mediterranean which gave him the high reputation he subsequently enjoyed. His mother was the only daughter of Mr. Thomas Warington, British Consul at Naples. He was educated at Westminster and Bedford Schools and matriculated at Cambridge, taking his B.A. degree at Trinity College. Whilst at Cambridge he distinguished himself as an oarsman, and was one of the winning University crew on the Thames in 1839. Retiring in that year with a travelling Bachelorship, he commenced a journey through the mining countries of Europe and Western Asia, which continued upwards of four years, and during which he made that thorough study of mineral products and mining industries which in after years made him one of the greatest practical authorities on the subject in our country. Returning to England in 1844 he was appointed to a post on the Geological Survey, and in the course of his duties during the five succeeding years, visited and studied the mines of Devonshire, Cornwall, Wales, and Ireland, publishing the results in the *Memoirs of the Survey*. In 1851, on the formation of the Royal School of Mines in Jernyn Street, he became lecturer on mineralogy and mining; about the same time he was appointed chief inspector of the mines of the Crown and of the mineral property of the Duchy of Cornwall. He filled the post of Honorary Secretary of the Geological Society in the years from 1856 to 1866, and was President in 1866–67, and Foreign Secretary from 1874 to his death. The scientific and technical reports which emanated from his pen were numerous, and he was also the author of a volume of travel entitled 'A Year with the Turks, or Sketches of Travel in the European and Asiatic Dominions of the Sultan,' which was published in 1854. He became a Fellow of our Society in 1869, and served on the Council in the years from 1871 to 1874. He was married in 1864 to Antonia, daughter of A. M. Story-Maskelyne, Esq., of Basset Down, Wilts. His title was conferred on him in 1837 in recognition of his abilities and his long career of honourable service to science.

PROCEEDINGS OF FOREIGN SOCIETIES

Geographical Society of Paris.—April 11th, 1890: Comte de BIZEMONT in the Chair.—The programme of the subjects to be discussed at the National Congress of French Geographical Societies, which was to be held in May 1890, at Montpellier, was laid before the Society.—An extract was read from a letter of M. F. Foureau, dated 24th March, 1890, from Tugurt, respecting his journey in the Sahara. He reports his route up to a point about 50 miles from Inssalah, and also that he had taken many observations for altitude, and fixed the latitude and longitude of thirty-five places. In the south of Tademayt there are summits rising 1600 feet above the Ued Massin, which itself, at this point, is at least 1250 feet above the sea-level. The region of Western Erg is not a compact mass of mountains, but is intersected by "gassis" and "feidj," which are only continuations of the "ueds" of Mâder. The traveller found gum trees from 45 to 50 feet high.—The Minister of Public Instruction communicated a letter from M. H. Coudreau, travelling in Guiana. The letter was dated 15th January, from the Upper Inipi, where he had arrived after a wet and arduous journey from the Lower Ogapock. The country traversed is entirely desert. The traveller announced his intention of exploring the whole region during the winter, as far as the Bonis, Tayras, and Secuyânas.—M. G. Rolland informed the Society that he had just received news from Algeria to the effect that the chief of the Tuaregs Hoggar, the important tribe in the Sahara, who had hitherto shown themselves so hostile to the French, had sent his brother and four members of his family to El Ued (Province of Constantine) with instructions to request the French Government to enter into friendly relations with him. The envoys arrived on the 20th March, and were to wait one month for a reply. They were the bearers of a letter to General Rogue, who had for some time been seeking a "rapprochement" with the Hoggar tribe. M. Rolland stated that no one who comprehended the situation would overlook the importance of this mission.—The project of a Trans-Saharan railway, and the best route to be taken, was then discussed by M. Rolland, who replied to M. Blanc's observations made at a previous meeting. M. Blanc subsequently offered some remarks upon M. Rolland's paper.—In conclusion, M. J. Lecocq read a report upon his visit to the island of Tierra del Fuego.

Geographical Society of Berlin.—June 7th, 1890: Baron VON RICHTHOFEN in the Chair.

AMERICAN FORESTS.

Herr Kessler, high forester, gave a description, based upon his own personal observations, of the forests and of disafforestation, on the western continent. The forest, he said, exists only that it may serve the purposes of man in the economy of nature, and its destruction is therefore only to be deplored when, instead of being the consequence of the necessary struggle for existence caused by the expansion of the human species, it is due to a blind and purposeless war of extermination being waged against the forest, which threatens to ruin both country and people. With regard to the forest forms and the most important forest regions of America, we have first of all in the extreme south the dense evergreen foliage woods of Patagonia and Chili, with a few pine forests here and there. The most important kinds of trees in these forests are beeches, alerce (*Fitzroya patagonica*), and lingue (*Persea lingue*). In Bolivia, Peru, and Ecuador extensive primeval forests are only to be now found on the remote eastern flanks of the Andes, and their impenetrability and the want of population render these forests secure for a long time from the inroads of man. Argentina and Uruguay have for the most part the character of woodless steppe lands; while Paraguay, rich in valuable timber, forms the transition to the

great forest region of Brazil, where the Hylæa of the Amazons, measuring over 1100 miles from east to west, and 750 miles from north to south, will furnish for many years to come a perfect mine of the finest and most valuable woods. For here, as in Guiana, equally rich in valuable timber, and in the valley of the Orinoco, swamps, mosquitos, and malaria protect the forest far more effectively than laws and regulations. Venezuela, with its steppes and mountains, may be said to be pretty well destitute of forests. Colombia also contains only in its marshy lands and in the lower mountain regions, extensive forests, furnishing dye-woods, caoutchouc, cinchona, &c. With regard to the four Republics of Central America bordering on the Caribbean sea, it is only on their flat marshy eastern coasts that primeval forests of any extent are found; the western coasts and the mountain ranges being but sparsely wooded, and no longer containing any virgin forests. The east coast, as far as Mexico, is, on the other hand, still to-day the home of the most prized varieties of timber, such as mahogany. But Mexico itself is, unfortunately, so far as those districts known as the "Tierra templada" and the "Tierra fria" are concerned, a very scantily wooded country, and even the marshy forests of the "Tierra caliente" are already, wherever possible, very much thinned. In the "Tierra caliente" there are a great number of economic and dye-woods, which are also common to South America, such as Brazil wood, Pernambuco wood, red-wood, yellow-wood, jacaranda, &c.; in the "Tierra templada," besides the evergreen oaks and firs, there are orchids, climbing plants, and shrubs of variegated blooms, among which may be specially mentioned the "arbol de la noche buena" (the *Euphorbia pulcherrima*), the blood-red blossoms of which give the forest the most beautiful appearance, although the lack of the higher animals renders them dull and lifeless. In the "Tierra fria" species of firs with three or five needles are met with in the highest forest regions, e. g. the *Abies religiosa*, found on the Orizaba Peak. The forest flora of the Southern States of the Union, from South Carolina to Texas, resembles that of Northern Mexico with its endless cactus steppes, where the "mesquite" is the sole representative of the tree world, and where only in some sheltered hollow in the mountains the remains of an oak forest still linger. In North America the most southern part (Florida) of the forest region of the Atlantic side belongs to the forest flora of the West Indies, of which only about 70 species of trees are found still further north. Florida, with the two species of "sabal," forms the transition to the great southern fir territory, of which the first and most important species of tree is known in Europe under the name of pitch pine (*Picea australis* or *palustris*), which is, strictly speaking, an incorrect designation. This region is also the home of fine exogenous trees, such as the evergreen oak, the *Quercus virens*, and the magnolia, which here form woods, especially in Alabama. Adjoining this region of the long-pointed firs on the north is that of the deciduous trees, bare in winter, of the moderately warm region, the home of the numerous American oaks, and species of hickory and hornbeam; in the northern portion the home of the maple also, the variegated foliage of which in the autumn figures conspicuously in the gorgeous season called the "Indian summer." Firs also appear in this territory, which comprises the middle portions of the United States, especially the *Picea rigida*, which the Americans call "pitch pine," thus giving rise to perpetual confusions with the *Picea australis*. Further to the north follows the northern belt of fir, the home of the "Weymouth fir," the "white pine," which in the last twenty years has furnished more timber for the markets of the world than all other kinds of wood on the face of the earth put together. The most northerly forest formation of the eastern half of North America is the pine forest of the moderately cold regions, characterised by such varieties of pines and firs as the *Picea alba* and *Picea nigra*, the *Abies balsamica* and *Abies Fraseri*. West of these great woodlands follows the vast prairie region, which only along the river-courses presents narrow strips of

forest, consisting of tender leaf-woods. Then comes the great desert region up to the Rocky Mountains, which form the boundary line between two important floras, and mark the commencement of the Pacific forest region. The latter is distinguished by a great wealth of pine woods (about 60 species), and by the gigantic dimensions to which individual trees attain, at least in the heart of these pine woods. In the Rocky Mountains the "Engelmann" and "Douglas" firs, besides four other species of firs, are the most important trees of the forest, and at one time formed the beauty of the mountains, while to-day there are only scanty remains, giving evidence of the former forest wealth. The species of the Rocky Mountains are characterised by great climatic hardiness, and generally by the peculiar blue-white (glaucous) colour of their needles, which is produced by a resinous coating which diminishes the evaporation. The steppe-like table-lands lying between the Rocky Mountains and the Sierra Nevada are scantily wooded, and closely resemble the Rocky Mountains in their flora. With the Sierra Nevada begins the narrow forest region of the Pacific coast, one of the most magnificent of the globe. Here is the home of the mammoth tree (*Sequoia gigantea*) and members of the same family, the red-wood (*S. sempervirens*), and again that finest of all species of firs, the sugar-fir (*Picea Lambertiana*), and lastly, the Douglas fir. The flat parts of South California belong to the sub-tropics, and are characterised by evergreen oaks and certain species of firs limited to small territories; further north follow extensive forests of red-wood, then in the moderately warm zone the deciduous leaf-woods, the Douglas firs, the valuable sugar and yellow firs. Further north and higher up in the mountains, pines, firs, and larches are met with, the latter of which, in Alaska, form dense woods. Washington Territory forms the culmination of the forest wealth; here Puget Sound, with its many indentations, presents an abundance of timber which cannot be equalled or surpassed in the world. The Pacific forest region furnishes the greatest mass of wood in the single trunk and in the total number of trees which has ever been known. A medium-sized trunk of the *Sequoia gigantea*, of 335 feet in height, and a branchless stem of 200 feet, which at 112 feet from the ground had a diameter of 12.14 feet, yielded 28,770 cubic feet of wood, an amount which is equal to the produce of an area of nearly five acres of a German fir-wood: two acres and a-half of such trees yield over 210,000 cubic feet. A red-wood trunk, 100 years old, produces about 6300 cubic feet; one of 215 years, 14,700 cubic feet, or 490,000 cubic feet per two acres and a-half. A yellow pine of 380 feet in height, which at an altitude of seven feet from the ground has a diameter of 14.7 feet, yielded 4375 cubic feet of timber for sawing, and a sugar-pine of the same height gave 7700 cubic feet. The Douglas fir yields from 262,500 to 700,000 cubic feet per two acres and a-half. The condition and management of the forests is the worst conceivable; hitherto it has been only mismanagement and destruction. It is evident that in countries rich in forests, with a growing population and advancing civilisation, the forest must gradually surrender all the more favourable places which are well adapted for permanent agricultural purposes; but there are numerous localities in the mountains as well as in the plains, where the forest must be kept in a state of preservation as a necessary covering for vegetation, whether it be to protect the steep slopes of the mountains or to shield the headwaters of brooks and rivers from the sun and winds, or in the plains to serve as a shelter against the cold, dry winds. It is the bounden duty of the Government of a settled country to endeavour to regulate the colonisation of the country which takes place at the cost of the forests, and direct it into certain defined channels. This was the case in America everywhere as long as the government was either central or in the hands of individual persons of intelligence. In Spanish America the reckless destruction of the forests first began after the respective States had

acquired their independence, and individual or party interest had become the only remaining interest when all elevated ideas had vanished. Already Chili, which possesses the most vitality of all the South American Republics, now contains only in the most southern parts of the country any forests worthy of mention. In Central America and in Brazil great stretches of forest have been obliged to give place to coffee cultivation, nevertheless the soil is tolerably covered and kept together by the coffee plant. The axe alone is not generally capable of dislodging the forest from its position if unaided by fire, which is by far the more dreaded weapon of destruction; but fire remains powerless in the evergreen leaf-woods of the tropics, as in the *Hylæa* and on the eastern coasts of Central America. It is true that fire cannot well be dispensed with as a means for clearing the virgin country, but the danger of employing it lies in the fact that it can seldom be confined within the prescribed space and limits. Nowhere is the curse of aimless, insane destruction of forests more evident in its fatal consequences to-day than in Mexico, where, even in the most remote parts of the Sierra, it is a rare thing to find a piece of forest left untouched. Scarcely a single voice, however, in this unfortunate country has been raised in favour of the preservation of the forests. Although in Mexico it is more particularly the Indians who, holding the superstition that maize only flourishes in virgin soil, lay out their fields every year in ground from which the primeval forest has been freshly burnt away, all this is mere child's play in comparison with the truly gigantic extent to which, in the United States, the vaunted country of progress, the war of extermination has been waged against the forest. The firebrand civilisation common in North America has induced two great evils, which have laid waste thousands of square miles of country and destroyed property worth millions sterling, viz. the careless cultivation of soil not adapted for *permanent* agricultural purposes, and the fired forests. A very large part of that which in the Eastern States to-day is still designated with the proud name of "forest" is nothing but valueless bush, which has sprung up again as a second growth on the fields once cleared for cultivation and since abandoned. In the year 1871 more than 10 years' supply of wood for the whole country, amounting in value to 44,000,000*l.* sterling, was destroyed by fired forests. Of the 3000 fired forests recorded in the census year (1879-80), 1350 had their origin in the clearing of forests by fire, 500 through sparks from locomotives, 700 through sportsmen and camp fires, 260 through malicious persons, &c. In the same year about 10,000,000 acres, worth about 5,000,000*l.*, were consumed by fire. The census of 1861 gives the annual yield of the forests at 81,200,000*l.*, that of 1870 at 176,600,000*l.* The reliable census of 1880 returns 25,708 saw-mills, which convert raw material of the value of 28,000,000*l.* into prepared timber of the value of 36,400,000*l.* The quantity of wood manufactured amounted to 1,470,000,000 cubic feet. Altogether for railways, fences, and fuel, about 21,000,000,000 cubic feet were used; the total value of the yield of the forests and of the forests destroyed amounted to 147,000,000*l.* The total area of forest was, at that time, about 190,000,000 acres, while Germany, for example, possesses about 35,000,000 acres of woodland. The way in which wood is squandered is illustrated by the fact that in California, for the restoration of a railway sleeper worth 7*½**d.*, wood of the value of 7*s.* 9*d.*, or from 12 to 13 times as much, is destroyed. Compared with the fearful and gigantic destruction of forest by fire, the amount of forest destroyed for the legitimate purposes of the community, although this is still done in such a crude fashion, is insignificant; the latter, however, takes place upon a scale scarcely comprehensible in Europe. Notwithstanding the fact that the greatest part of this treasure has been squandered away, the trade in wood and wood-products forms, even to-day, the principal line of business of the United States, in comparison with which even the products of agriculture, maize, and wheat take a second place. The disafforestation of the

country has, speaking generally, proceeded as follows: First of all the great north-west forest region, with the Weymouth fir, was worked; then the southern fir territory, with the turpentine firs as the most valuable product; then the Californian coast region with the red-wood. Now Oregon and Washington, with the Douglas fir, form the centre of the timber industry. The feverish accumulation of large stocks of wood injures the producers also, and causes an over-production which forces down prices. The handing over of public Government lands to speculators at under prices is one of the most vulnerable points of American public life, and the well-meant decrees and laws upon the subject of the forest are evaded in the most notorious manner and upon a large scale. In 1888 an action was pending against the Sierra Lumber Company of California for 400,000*l.* in respect of timber felled but not paid for. The consequences of the insane waste of timber, by means of which from ten to twenty times more wood is destroyed than is actually brought into use, are making themselves felt in all directions. Extensive swamps have taken the place of the white pine, and sandy wastes that of the turpentine fir. Inundations are on the increase, the cultivation of the peach has receded southwards to New Jersey under the influence of the increasingly harsh climate of Maine. The Columbia river is now frozen over nearly every year, so that navigation to Portland is interrupted, an occurrence unheard of in earlier days. It is not that there has been lacking on the part of isolated individuals in the United States who are anxious for the interests of their country and nation, an appreciation of the importance and value of the forest, but that they have been unable to carry out their views. The separate Governments and the Federal Government have never troubled themselves at all about the forest until quite recently. For the first time, in 1882, with the formation of the Forest Societies and the meeting of the Boston Forest Congress, a beginning was made towards a better state of things, but the principal measures must proceed from the Federal Government in order that a check may be placed upon those private individuals whose business is conducted on the principle of "après nous le déluge."

Lieutenant Kling then made a short report upon his journey from Salaga by way of Napari, Jerrepa, and Niamvo to Bismarckburg, in the course of which he particularly alluded to the immense wealth of elephants in those mostly uninhabited regions; the elephants rendering the paths almost impassable during the rainy season.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

EUROPE.

Cabrol, Élie.—*Voyage en Grèce, 1889. Notes et Impressions. Vingt et une planches en héliogravure et cinq plans lithographiés tirés hors texte. Paris, Librairie des Bibliophiles, 1890: 4to., pp. 156.*

This work is mainly archaeological, but it also gives by means of its excellent photographic plans and illustrations, as well as in its letterpress, a very accurate and complete idea not only of the present state of the ruins of Athens, but also of the natural surroundings and position of the city, and of the landscape of Attica—as far as Greek landscape can be represented without the colour and atmosphere which distinguish it. Considerable changes have been made of late years in the Acropolis, in the direction of restoring its primitive outline and surface, and these are to a great extent shown in the illustrations to M. Cabrol's handsome volume.

Friederichsen, L.—Die Deutschen Seehäfen. Ein praktisches Handbuch für Schiffskapitäne, Rheder, Assekuradeure, Schiffsmakler, Behörden, etc. Erster Theil: Die Häfen, Lösch- und Ladeplätze an der deutschen Ostseeküste. Hamburg, L. Friederichsen & Co., 1889: pp. ix. and 135, plans.

Sella, Vittorio.—Nel Caucaso Centrale. Note di escursioni colla camera oscura. Torino, 1890: pp. 78, panorama, maps, and illustrations.

This modest but valuable pamphlet is the necessary supplement to the magnificent collection of photographs presented by Signor Sella to the Society. From a geographical point of view its most interesting feature is the key to the Elbruz Panorama, a most important document for the nomenclature of the Caucasus. There are, in addition, a number of illustrations showing the great peaks and the routes by which they have been ascended. Signor Sella adds a very clear and lively narrative of his journey.

Signor Sella calls attention to several matters of interest noted in his high expeditions. On the upper Bezingi Glacier he found numerous bodies of birds, ducks, quails, and thrushes. In September his brother found these quails alive, but too weary and weak to be able to escape from the icy fastnesses. He also saw a large flight of water-birds crossing the Krestowaja Gora. It is clear, therefore, that the migratory birds do not, as some naturalists have supposed, avoid the Caucasus in their flight.

A curious phenomenon noted is the luminosity of avalanches, already remarked by Mr. Dent. Signor Sella adds an account of some curious experiences in the Alps of electrical manifestations. One of the pines in the Neskra forest was accurately measured, and found to be 200 feet in height. The narrative concludes with practical hints, amongst which may be noticed a woodcut of an excellent model of a light "portantina," or porter's framework for holding securely on the back the traveller's luggage. Those who know the time spent in making-up loads will appreciate the importance of such an improvement.

The pamphlet is a valuable addition to Caucasian literature.—[D. W. F.]

Mission Scientifique au Caucase: Études Archéologiques et historiques, par J. de Morgan. Tome premier. Les premiers ages des métaux dans l'Arménie Russe, pp. 231. Tome deuxième. Recherches sur les origines des peuples du Caucase, pp. 305. Paris, Leroux: maps and illustrations, 1889.

The political relations between France and Russia have of late years led to more than one of the scientific missions sent out at the cost of the French Government being directed to Russian territory.

Of one of these missions the two volumes, of which the titles are given above, are the fruit. The first hardly falls within the scope of the geographer. But in his second volume M. de Morgan deals with a subject, the distribution of the races of the Caucasus, which is important alike to travellers and students. The author endeavours to trace from the earliest times the approximate boundaries of the different peoples of the Caucasian isthmus and the adjacent countries. In his difficult task he makes use of the materials that can be gathered together from tombs and inscriptions as well as from historians.

The Georgian race M. de Morgan considers to consist of the Kartalinians, Georgians, Mingrelians, Lesghians, Circassians, and Abkhasians—in fact, of the inhabitants of the eastern and western wings of the mountains and the basins of the Kion and Kur. This people, the Albanians of Strabo, whom he designates alternately Turanians or "allophyls," have held their present seat for hard on sixty centuries, from the dawn of human history. He admits, however, that the connection between the Lesghians of the east and the Circassians and Abkhasians of the west and the rest of the Georgian family is vague and obscure. Here the inquirer who hoped that certain light might be thrown on the affinities of the Circassians, that the Arabic element recognised among them by Mr. Gifford Palgrave and others might be accounted for, will be disappointed: M. de Morgan adds nothing to our knowledge on this point

There is need of a special study of the language and institutions of what is left of these people before they are altogether lost or confused in exile. At present we are dependent mainly on Klaproth and the two or three Englishmen (Bell, Spencer, Longworth) who fifty years ago saw the last of Independent Circassia.

The first invaders of the Caucasian region (700 to 800 B.C.) from the south were the Aryan Ossetes, who settled about the practicable passes in the heart of the isthmus and of the great chain, the Kurds, who occupied what is now Armenia, and the Armenians themselves. By these the original Caucasian race were divided, or rather narrowed in the centre, till their territory resembled the form of an hour-glass, while Greek colonies appeared on the coasts of the Euxine. The Kurds are Phrygians from Asia Minor, the Armenians Iranians from Persia. The Arab power dominated for some centuries all these races south of the Caucasus.

The Karatchai are Turkomen driven into the mountains by the successive waves of Turkish and Mongol invasion. Turkish tribes are found north of the chain.

Speaking generally, M. de Morgan invests the term Caucasian race with a new and limited signification as a branch of that portion of humanity which is neither Aryan nor Semitic. He traces the principal invasions from the south of Aryan tribes, while he leaves very vague the passage of the hordes who may have touched the Caucasus on the north, and left among other relics of themselves the numerous dolmens of the Western Caucasus. The ethnological connection between the Caucasus and Crimea he does not touch on. The more obscure relation between the nomenclature and antiquities of parts of Central Tyrol and the Caucasus, hinted at by M. Chantre, he leaves to others to work out. M. de Morgan appears to be rather an antiquary and a scholar than a student of language or of institutions, his personal researches seem to have been limited to Armenia, and he leaves much to his successors. His work is, as a whole, clear and suggestive, and should stimulate further and more detailed researches by travellers who, like Professor Kovalevsky, have time and energy to investigate the mountain people, their manners and dialects, in their own homes.—[D. W. F.]

ASIA.

Anderson, John.—The Selungs of the Mergui Archipelago. With four plates. London, Trübner & Co., 1890: 8vo., pp. 47. Price 2s. 6d.

This appears to be a very complete account of all that is known of the Selungs, an interesting race of people inhabiting the Mergui Archipelago. The author's visit was made in 1831 and 1882, during which he evidently saw a great deal of the people, his observations being embodied in the present treatise. Appended is a Selung Vocabulary.

Baillie, Alexander F.—Kurrachee (Karachi) Past, Present, and Future. With maps, plans, and photographs. Calcutta, Thacker, Spink, & Co.; London, Simpkin, Marshall, Hamilton, Kent, & Co., Limited, 1890: super-royal 8vo., pp. xx. and 270. Price 21s. [Presented by the Author.]

The author of this handsome publication, which he designates a treatise, states that his main objects in putting it forward have been:—

1. To submit to the public a succinct collection of facts relating to the city and port of Kurrachee, which it might be difficult, at a future period, to retrieve from the records of the past; and

2. To advocate the construction of a railway system connecting the *Gate of Central Asia* and the valley of the Indus with the native capital of India.

As regards the first of these, he has amplified the account of Karachi (the alternative spelling is preferred in accordance with official custom), to be found in the *Gazetteer of the Province of Sind*, prepared by Mr. Hughes about fourteen years ago, and has dwelt much on the past commercial state of the country both at the period of the British conquest, and at a still earlier date. Special pains have been also taken to describe the more modern works of general utility, notably the harbour, railway, and public buildings; information is given on municipal arrangements, waterworks, tramways, travellers' rest-

houses, commonly called "dāk bungalows," sanatory institutions, population; and the reader is conveyed beyond the precincts of the town itself to the home of the alligators at Maqar Pir. The chapter headed "Public Institutions" contains particulars, chiefly of a statistical nature, on the local schools; but only one-third of its eighteen pages can be said to bear upon the heading.

The second division of Mr. Baillie's treatise touches the material question of increased railway communications in India; and as the line which he advocates passes through a country not so well known as are the tracts surrounding it, notwithstanding its many and strong claims to attention, it will not be out of place here to glance at the contents of his penultimate chapter (xiii.), devoted to the consideration of the Desert Railway, statistics of trade, and "postal and telegraphic facilities."

A proposal to place "Delhi 160 miles nearer to the seaboard than it is at present, by means of a direct trunk line of railway from Kotri on the Indus (105 miles from Kurrachee), viâ Hyderabad, Jeysulmere, Bickaneer, Bhiwani and Rohtak . . . a distance of about 620 miles," submitted in the autumn of 1887, induced the Government of India to depute an officer to reconnoitre the route indicated. His report was to the effect that the line contemplated was practicable in spite of physical difficulties, that it would not be directly remunerative, and that it held out advantages in a military point of view, also as a means of relieving famine and affording a stimulus to the import of European goods. Mr. Baillie, supported by trustworthy authorities, combats the notion of pecuniary loss, and appeals to the Secretary of State for India to give the necessary encouragement and aid to the project. Should he do so, he adds, "there is little doubt but that the *Indian Great Eastern*, or the *Indian Great Western*"—he hesitates as to the more appropriate designation—"will become a *fait accompli* even in a briefer space of time than that occupied in the construction of the Indian Midland, for the difficulties to be encountered are immeasurably less."

If the general welfare of Sind and commercial prosperity of Karachi were held superior to all other considerations, the realisation of such a proposal would be indeed all that could be desired. *Au reste*, the railway to Jaisalmer would open out to travellers and excursionists a hitherto insufficiently appreciated city, containing, in its picturesque streets, graceful monuments and noble tanks, specimens of taste, skill, and solid workmanship which have rendered its builders, artificers, and stone-masons justly celebrated throughout India.—[F. J. G.]

Dobson, George.—Russia's Railway Advance into Central Asia. Notes of a Journey from St. Petersburg to Samarkand. Illustrated. London, Allen & Co., 1890: 8vo., pp. xxii. and 439. Price 7s. 6d.

"The present volume," we are told in the preface, "is the outcome of a journey from St. Petersburg to Samarkand in the spring of 1888, on the occasion of the opening of railway communication with the ancient city of Tamerlane, and of a series of letters published in the *Times* in the autumn of the same year, giving the first English description of the Central Asian Railway." Subsequent to the accomplishment of his journey, Mr. Dobson learnt from General Annenkoff that he "had been the first Englishman to traverse the whole extent of the railway" eastward of the Caspian. Taking all things into consideration, and making allowance for undisguised political rivalry, our countrymen have not much reason to complain of special exclusion from privileges accorded to other travellers: for, though France may have been the most favoured nation in some respects, it cannot be urged that the British public has been kept in the dark, or dependent upon foreign explorers for enlightenment on the details of this new and most interesting line of traffic. That the author of the work under notice is not its sole informant on the subject among his compatriots may be certified by reference to recent numbers of the 'Proceedings of the Royal Geographical Society.' Mr. Curzon's name at once suggests itself as that of a traveller whose narrative, though bearing upon a little later period than Mr. Dobson's, is cast much in the same mould, but appeared earlier in the category of published books.

'Russia's Railway Advance to Central Asia' is a welcome addition to the

literature of the Anglo-Russian question in the nineteenth century, as it relates to Persia, Afghanistan, and British India respectively. If more or less conversational and indicative of hasty construction, it is nevertheless a capital "business" book—that is, it is brimful of continuous information and relevant comment. While, however, to be recommended to the attention of readers, the recommendation must be held to apply to that particular class of persons who are interested in the important theme on which it expatiates. The nature of its contents may be briefly set forth. After an introductory chapter, and two somewhat discursive, though instructive chapters—one with the ominous title of "Moscow and India," the other treating mainly of Cossacks—the writer has reached the Caucasus; thence he crosses the Caspian to Uzun Ada and Samarkand, in which city he lingers until the close of chapter ix. Visits to Bukhárá and Merv, on turning homeward, supply material for four more chapters, which withal bring the traveller back to Bákú; and the volume is wound up with a dissertation on the railway and trade, and a chapter of useful summary.

Justice is hardly done to Tiflis by the view of that city at p. 78; otherwise the illustrations are characteristic and appropriate, though not altogether new. The railway map at p. 110 gives the distance from Samarkand to the terminus on the shores of the Caspian at exactly 900 miles, dividing this into sections, viz.:—Bukhárá, Amu Daria, Chárjúi, Merv, Askabad, and Kizil Arvat. —[F. J. G.]

Inagaki, Manjiro, [B. A.]—Japan and the Pacific, and a Japanese View of the Eastern Question. London, T. Fisher Unwin, 1890: 8vo., pp. 265. Price 7s. 6d. [Presented by the Publisher.]

This volume is interesting as containing the views of a Japanese upon an all-important subject. It is of course, mainly political, one of its objects being to call the attention of Englishmen to the important position Japan occupies with regard to British interests in the far East. The author divides his subject into two parts. Part I. deals with Japan and the Pacific Question; Part II., with the history of the so-called Eastern Question from its commencement to its present development. The whole is illustrated with five maps.

AFRICA.

Bechuanaland.—Further Correspondence respecting the Affairs of Bechuanaland and adjacent Territories. [In continuation of [C.—5524] August 1888.] [C.—5918.] London, Eyre and Spottiswoode, 1890: folio, pp. xiii. and 245, maps. Price 2s. 10d.

Cat, E.—Notice sur la Carte de l'Ogooué. Paris, Leroux, 1890: 8vo., pp. 68. Price 2s. 6d.

M. Cat has endeavoured, from the various existing sources, to compile a fair and accurate map of the Ogowé region. In the text he discusses the various sources of information, and brings together a variety of topographical information of real utility.

Colville, [Col.] H. E. [C.B.]—History of the Soudan Campaign. In two parts, with a case of maps. Compiled in the Intelligence Division of the War Office. London, Eyre & Spottiswoode [1889]: 8vo., pp. (Part I.) xvi. and 277; (Part II.) xiv. and 327. Price 15s. [Presented by the Intelligence Division of the War Office.]

Part I.—Events leading up to the Nile Expedition, and its History to the Departure of the Desert Column from Korti. Part II. From the Departure of the Desert Column to the conclusion of the Campaign. The maps accompanying are, 1, Map of the Nile Provinces from the third cataract to Khartum; 2, Sketch of Country between Ambukkol and Shendi; 3, Plan of Jakdul; 4, Action of Abu Klea; 5, Sketch of country about Metemmeh; 6, Position at Gubat; 7, Sketch of Environs of Khartum; 8, Sketch of the River Nile between Merowi and Huella; 9, Sketch of the country adjacent to Suakin; 10, Suakin and Defences.

[**The Congo.**]—Compagnie du Congo pour le Commerce et l'Industrie (Société Anonyme). Exposition de Photographies représentant des Vues et Types du Congo ouverte au Cercle Artistique et Littéraire. Catalogue. Bruxelles, Imp. L. Bourlard, 1890: 8vo., map. Price 1 franc.

[**Flegel.**]—Vom Niger-Binné. Briefe aus Afrika von Eduard Flegel. Herausgegeben von Karl Flegel. Leipzig, 1890: 8vo., pp. 125. Price 2s. 8d.

These letters of the late Herr Flegel, many of them addressed to his brother, are of value as adding still farther to our knowledge of the work accomplished by the German explorer in the Niger region.

[**Gillmore, Parker.**]—Through Gasa Land, and the Scene of the Portuguese Aggression. London, Harrison & Sons [1890]: 8vo., pp. xii. and 349, map. Price 7s. 6d. [Presented by the Author.]

An account of a hunting trip in South-eastern Africa, embracing the region between Lorenzo Marques and Sofala. No dates are given.

[**Italian Colonies in Africa.**]—Atti Parlamentari, XVI. Legislatura—Quarta Sessione 1890. Camera dei Deputati, N. XIV. (Documenti). Documenti presentati al Parlamento Italiano dal Presidente dei Consiglio Ministro ad interim degli Affari esteri (Crispi) di concerto col Ministro della Guerra (Bertolè Viale). L'occupazione di Keren e dell'Asmara. Roma, 1890: 4to., pp. iv. and 92.

[—] Atti Parlamentari, XVI. Legislatura—Quarta Sessione 1889–90. N. XV. (Documenti). Documenti Diplomatici presentati al Parlamento Italiano dal Presidente del Consiglio Ministro ad interim degli Affari esteri (Crispi). Etiopia. Roma, 1890: 4to., pp. x. and 440.

[These Documents were presented by the Italian Minister of Agriculture and Commerce.]

[**Lallemand, Charles.**]—Tunis et ses Environs. Paris, Maison Quantin, 1890: 4to, pp. 245, coloured illustrations. Price 29s. 6d.

The opening chapters of this handsome volume contain a sketch of the history of Tunis from an early period to the present day. The main bulk of the work deals with the city of Tunis, describing in detail its streets, public buildings and other points of interest; the habits and customs of the people are also largely discussed, their religious rites, industries, institutions, condition of women, &c. The chief feature of the volume is the large number of brilliant illustrations, which, apart from the text, convey a good idea of what Tunis is like.

[**Müller, Willi.**]—Die Umseglung Afrikas durch phönizische Schiffer ums Jahr 600 v. Chr. Geb. Rathenow [1890]: 8vo., pp. 110 and xi. Price 2s. 8d.

This is a minute and learned discussion of the evidence which exists as to the circumnavigation of Africa said to have been accomplished in the time of Necho. Herr Müller seems inclined to support the genuineness of the voyage; and the book will be found useful for the copious references which he makes.

[**Zululand.**]—Further Correspondence respecting the Affairs of Zululand. In continuation of [C.—5892], February 1890 [C.—5893]. London, Eyre and Spottiswoode, 1890: folio, pp. 23. Price 2½d.

AMERICA.

[**Bancroft, H. H.**]—The Works of Hubert Howe Bancroft. Vol. VIII., pp. xv. and 776; Vol. XIV., pp. xii. and 760, maps; Vol. XVI., pp. xvi. and 818, maps; Vol. XVII., pp. xxxviii. and 829, maps; Vol. XXIII., pp. xi. and 787, maps; No. VII.—JULY 1890.]

Vol. XXV., pp. xxxii. and 827, maps; Vol. XXVI., pp. xlvii. and 808, maps; Vol. XXX., pp. xv. and 808, maps; Vol. XXXI., pp. xxvi. and 836, maps; Vol. XXXII., pp. xxxi. and 792, maps; Vol. XXXIV., pp. vi. and 808; Vol. XXXV., pp. vi. and 828; Vol. XXXVI., pp. xiii. and 749, plan; Vol. XXXVII., pp. viii. and 772, illustrations. San Francisco, the History Company, 1887-1890: 8vo.

Vol. VIII. contains the History of Central America: Vol. III. embraces the period 1801-1887; Vol. XIV. History of Mexico: Vol. VI., 1861-1887; Vol. XVI. History of the North Mexican States and Texas: Vol. II., 1801-1889; Vol. XVII. History of Arizona and New Mexico, 1530-1888; Vol. XXIII. History of California: Vol. VI., 1848-1859; Vol. XXV. History of Nevada, Colorado, and Wyoming, 1540-1888; Vol. XXVI. History of Utah, 1540-1886; Vol. XXX. History of Oregon: Vol. II., 1848-1888; Vol. XXXI. History of Washington, Idaho, and Montana, 1845-1889; Vol. XXXII. History of British Columbia, 1792-1887; Vol. XXXIV., California Pastoral, 1769-1848; Vol. XXXV., California Inter Pocula; Vols. XXXVI. and XXXVII. Popular Tribunals, Vols. I. and II.

Carstensen, A. Riis.—Two Summers in Greenland. An Artist's Adventures among Ice and Islands, in Fjords and Mountains. London, Chapman and Hall, 1890: 8vo, pp. xxxi. and 185. Price 14s. [Presented by the Publishers.]

This is a record of an artist's experiences during two summers spent on various parts of the Greenland coast. The author's first voyage was made with the Greenland Exploration Expedition of 1884 under the leadership of Lieut. Jensen of the Danish Navy. The second was made in 1888, in company with Mr. Stenstrup and others, who in that year were sent out by the Commissioners for the Geographical Investigation of Greenland. The author's main desire in visiting Greenland, we are told, was to see the landscape and depict the effects of colour and light with truthfulness. That he succeeded in this object will be seen from the many beautiful illustrations contained in his volume, the originals of which were exhibited at the soirée of the Society in 1889. Mr. Carstensen's volume, on the whole, gives a good idea of the places, and the people to be met with in this particular part of Greenland.

Gelcich, [Prof.] Eugen.—Ueber die Materialien zur Vorcolumbischen Geschichte Amerikas. 'Zeitschrift der Gesellschaft für Erdkunde zu Berlin,' No. 146, pp. 99-127, 1890.

Seler, [Dr.] Eduard.—Reisebriefe aus Mexiko. Berlin, 1889: 8vo., pp. 267. Price 6s.

Dr. S. Seler visited Mexico in 1887-88, his main purpose being archæological investigation. In this respect his journal is of considerable value, and at the same time there are many observations on the geographical characteristics of the country through which he passed. There are numerous illustrations, but no map.

OCEANIA.

Imhaus, E. N.—Les Nouvelles-Hébrides. Paris, Berger-Levrault et Cie., 1890: 8vo., pp. xv. and 163. Price 4s.

M. Imhaus has travelled all over the world. In the present volume he embodies his observations on the New Hebrides, but it is mainly a useful compilation of what is known of these interesting islands up to date. There are 6 maps and several illustrations.

GENERAL.

Buonamo, G.—I due rarissimi Globi di Mercatore nella Biblioteca Governativa di Cremona. Cremona, 1890: 8vo., pp. 39. [Presented by the Author.]

Chisholm, George G.—A Smaller Commercial Geography. London, Longmans & Co. 1890: 12mo., pp. viii. and 208. Price 2s. 6d. [Presented by the Publishers.]

Mainly an abridgment of the author's larger 'Handbook of Commercial Geography,' published in 1889, and noticed in the 'Proceedings' for that year, p. 635.

Dictionary of National Biography, Edited by Leslie Stephen and Sidney Lee. Vol. XXII. Glover—Gravet. London, Smith, Elder, & Co., 1890: 8vo., pp. vi. and 449. Price 15s.

Among the notices appearing in this volume may be mentioned the following:—Commodore James Graham Goodenough, by Prof. J. K. Laughton; Major-Gen. Charles George Gordon, c.s., by Colonel Veitch, r.e.; James Gordon, by T. F. Henderson; and William Gourdon, by Miss Bradley.

[**Emigrants' Handbooks.**]—Emigrants' Information Office Handbooks, 1890. London, Eyre & Spottiswoode, 1890: 8vo. Price 2s. [Presented by the Emigrants' Information Office.]

A collection of 12 handbooks, bound together, dealing with Canada, New South Wales, Victoria, South Australia, Queensland, Western Australia, Tasmania, New Zealand, Cape Colony and British Bechuanaland, and Natal. These handbooks, which may be obtained separately, contain a deal of information useful to the emigrant to the British Colonies. Each handbook is illustrated with a map.

Kretschmer, Konrad.—Die Physische Erdkunde im Christlichen Mittelalter.—Geographische Abhandlungen herausgegeben von Dr. Albrecht Penck. Band iv. Heft 1. Wien und Olmütz, E. Hölzel, 1889: large 8vo., pp. iv. and 150.

Meteorological Observations at the Foreign and Colonial Stations of the Royal Engineers, and the Army Medical Department, 1852–86. London, Eyre & Spottiswoode, 1890: 4to., pp. xiii. and 261. Price 23s. [Presented by the Meteorological Office.]

The following are the Stations, returns from which will be found in the present volume: In North America and the North Atlantic—New Westminster (British Columbia), Newfoundland, Quebec, Halifax, Kingston, C. W., and Bermuda; in the Mediterranean—Gibraltar, Malta, Corfu, and Scutari; in Egypt and the Soudan—Assuan, Korosko, and Wady Halfa; in the West Indies—Bahamas (Nassau), Jamaica (Up Park Camp), and Newcastle, Honduras (Belize), and Barbados; on the West Coast of Africa and the South Atlantic, Bathurst, Sierra Leone, and St. Helena; in South Africa, Natal, Grahamstown, and Capetown; in the Indian Ocean, Trincomalee, Kandy, Colombo, Newera Eliya, Singapore, and Mauritius; in China, Hong Kong; in Australasia, Fremantle and Auckland.

The Sacred Books of the East, translated by various Oriental Scholars, and edited by F. Max Müller. Vol. XXXIII. Oxford, Clarendon Press, 1889: 8vo., pp. xxiv. and 326. [Presented by the Secretary of State for India.]

Zapiski Voienno-topographicheskago otdiela glavnago shtaba. (Memoirs of the Military-topographical Section of the Staff Corps.) Parts xlii. and xlii. St. Petersburg, 1889. [Presented by Lieut.-General I. Stebnitsky.]

Part xlii. is divided into two sections: the first contains reports on the geodetic, topographical, and cartographical work done by the Corps of Military Topographers in 1887 and 1888. These include astronomical and other observations in Turkestan, e.g. the determination of the latitude of Tashkend by fifty-six observations of pairs of stars, and that of Verny, for the

purpose of ascertaining what influence the late earthquake has had upon the deviation of the plumb-line. The systematic survey of the Samarkand region has been extended by 843 square versts, and the measurement of 1078 heights. Kerki and Charjui on the Oxus have been surveyed preparatory to the construction of fortresses at these points. The Bokharan dominions have also been reconnoitred, and large salt-mines have been discovered there with galleries wide enough to admit three horses abreast. These salt deposits have been worked from time immemorial, but there are still left untouched entire hills of this valuable deposit. The scientific work at the observatory of Tashkend promises to be of some value, and two or three volumes of its memoirs are already published. The report on cartography contains a long list of new works or old ones supplemented.

Section II. contains instructions for trigonometrical field work (with drawings); on the construction of geodetic signals, by Capt. Baranof; notices on the triangulation of the State of New York (with drawings), by B. Witkofsky; geographical positions of certain astronomical stations in the southern part of the province of Akmolinsk, by Colonel Schmidt; expedition in 1887 to the Sayan Mountains (southern part of the government of Irkutsk) by Col. Schmidt; the first map of Northern Asia drawn from actual observations (with two maps) by Baron Nordenskiöld, translated from the Swedish of Koriander; catalogue of heights between Irkutsk and the Obo-Sarym col, by Lieut.-Col. Bobyr, a member of the expedition to explore the Sayan Mountains; and geometrical levellings by the military topographical section, containing the results for 1881-83 (with drawings and a map), by Col. S. Rylke.

Part xlv. contains the monograph of Major-General Lebedef on the astronomical work done in Bulgaria (another monograph by the same officer in Part xliii. was noticed in 'Proceedings,' 1889, p. 391). This recent work has a special interest, owing to the fact of all the astronomical stations in Bulgaria having been trigonometrically fixed so that this double determination should supply a number of materials for the deviation of the plumb-line from the vertical.—[E. D. M.]

NEW MAPS.

(By J. COLLES, *Map Owrator R.G.S.*)

EUROPE.

Alpen-Karte vom bayerischen Hochlande, Salzburg, Nord Tyrol, nebst Theilen der angrenzenden Länder. Scale 1 : 600,000 or 8·2 geographical miles to an inch.

J. A. Finsterlin, München. Price 1s. (*Dulau.*)

— Westlicher Blatt, Schweiz mit den angrenzenden Theilen von Baden, Württemberg, Vorarlberg, Italien, Frankreich und von Elsass. Scale 1 : 600,000 or 8·2 geographical miles to an inch. J. A. Finsterlin, München. Price 1s. 6d. (*Dulau.*)

Deutschland.—Reise-Karte von —, und den Nachbarstaaten von F. Handtke. Scale 1 : 1,500,000 or 20·4 geographical miles to an inch. Glogau, Flemming. Price 6s. (*Dulau.*)

Deutschen Reiches.—Karte des —, in 4 Blättern. Scale 1 : 1,500,000 or 20·4 geographical miles to an inch. Gotha, Justus Perthes. Price 6s. (*Dulau.*)

Italia.—Carta topografica del Regno d' —. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Istituto geografico militare. Firenze. Sheets:

29, Monte Rosa ; 47, Brescia ; 62, Mantova ; 113, S. Casciano in Val di Pesa ; 126, Isola d'Elba ; 127, Piombino ; 128, Grosseto ; 135, Orbetello. Price 1s. 6d. each.

Scale 1 : 25,000 or 2·9 inches to a geographical mile. Sheets: 11—II. N.E., Monte Marmolada ; II. S.E., Forno di Canale ; II. S.O., Passo di Vallès ; 12—II. N.E., Pieve di Cadore ; II. N.O., Monte Antelao ; II. S.E., Perarolo ; II. S.O., Cibiana ; III. N.E., Monte Pelmo ; III. S.E., Forno di Zoldo ; III. N.O., Selva Bellunese ; III. S.O., Cencenighe ; 13—III. N.O., Lorenzago ; 22—I. N.E., Garès ; I. S.E., Croda Grande ; 23—IV. N.E., Cime di San Sebastiano ; IV. S.E., Monte-Pelf ; IV. N.O., Agordo ; IV. S.O., Gosaldo ; 32—I. N.E., Pasturo ; I. S.E., Lecco ; I. N.O., Bellagio ; I. S.O., Asso ; II. N.E., Oggiono ; II. S.E., Brivio ; II. N.O., Erba ; II. S.O., Carate Brianza ; III. N.E., Como ; III. S.E., Cantù ; III. N.O., Lurate Abbate ; III. S.O., Appiano ; IV. N.E., Castiglione d'Intelvi ; IV. S.E., Moltrasio ; IV. N.O., Lanzo d'Intelvi ; IV. S.O., Cernobbio ; 45—I. N.E., Vimercate ; I. N.O., Monza ; I. S.E., Gorgonzola ; I. S.O., Sesto S. Giovanni ; II. N.E., Melzo ; II. S.E., Paullo ; II. N.O., Lambrate ; II. S.O., Melegnano ; III. N.E., Milano ; III. S.E., Zibido S. Giacomo ; III. N.O., Bareggio ; III. S.O., Gaggiano ; IV. N.E., Barlassina ; IV. S.E., Bollate ; IV. N.O., Saronna ; IV. S.O., Rhò ; 63—I. N.E., Cologna Veneta ; I. S.E., Minerbe ; I. N.O., Albaredo d'Adige ; I. S.O., Legnago ; IV. N.E., Bovolone ; IV. S.E., Sanguinetto ; IV. N.O., Isola della Scala ; IV. S.O., Nogara ; 74—I. N.E. Moglia ; I. S.E., Novi di Modena ; I. N.O., Gonzaga ; I. S.O., Novellara ; IV. N.E., Guastalla ; IV. S.E., Gualtieri ; IV. N.O., Viadana ; IV. S.O., Brescello. Price 6d. each. (*Dulau.*)

Mittel-Europa.—Karte der Jahres-Isonephen von —. Mit Einschluss der Karpatenländer. Entworfen und gezeichnet von Dr. Paul Elfert. Scale 1 : 5,000,000 or 66·6 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Taf. 11. Gotha, Justus Perthes. (*Dulau.*)

Schweiz.—Wandkarte der —, von J. M. Ziegler. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Zürich, Wurster & Co. 8 sheets. Price 10s. (*Dulau.*)

Tevere.—Carta in rilievo della valle del —, e provincia di Perugia, da Col. C. Cherubini. Size, about 2 feet by 3 feet. Price £2 10s. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued since 1st May, 1890.

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SCOTLAND: Sheet 60 (with bills), 1s. 9d.

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ENGLAND AND WALES: Yorkshire, CXLIII. 11, 4s.; CXLIV. 1, 2, 6, 8, 3s. each; CXLIV. 11, 4s.; CXLIV. 13, 14, 15, 3s. each; CLXXI. 9, 10, 11, 12, 14, CLXXXVIII. 2, 3, 4, 5, 6, 8, 10, CXXV. 13, 14, CCKXVIII. 10, 13, CCLII. 7, 8, 11, 12, 15, CCLII. 3, 7, 11, 16, CCLIII. 10, 14, 4s. each.

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ENGLAND AND WALES: Bristol, CCKXXII. 6, 10, 15, CCKXXII. 7, 11, 5s. each. Chorley, LXXVII. 8, 11, 2s. 4s.; LXXVII. 8, 23, LXXVII. 12, 6, 5s. each. Hindley, XCIV. 5, 25, 4s.; XCIV. 9, 8, 13, 5s. each. Morley, CCKXXII. 4, 4, 4s.; CCKXXII. 4, 8, 9, 13, 14, 18, 24, 5s. each. Warrington, CIX. 13, 16, 17, 18, 22, 23, 24, CXV. 4, 4, 5, 9, 10, 14, 15, 20, CXVI. 1, 1, 2s. 6d. each.

(*Stanford, Agent.*)

AFRICA.

Central Africa.—New Map of —, by J. G. Bartholomew, F.R.G.S. Scale 1 : 5,600,000 or 76·7 geographical miles to an inch. John Bartholomew & Co., Edinburgh, 1890. Price 1s.

This is a very nicely drawn map of Central Africa, on which Mr. Stanley's route and the boundaries of the several Spheres of Influence are shown. The latter, so far as England and Germany are concerned, will be considerably altered if Lord Salisbury's proposals are accepted, in which case the map will require extensive correction.

Dahomey, Croquis du — et des Régions voisines. Par le Commt. Koch. Scale 1 : 1,360,000 or 18·6 geographical miles to an inch. Paris, Augustin Challamel, Éditeur. Price 1s. 6d. (*Dulau*.)

This map differs considerably from the map of Africa published by the Dépôt de la Guerre, and appears to have been compiled from the route surveys of recent expeditions.

Deutsch-Ost-Afrika.—Karte von Ungú, Usegua und Süd-Usambóa, zur Veranschaulichung der Reiseroute, Beobachtungen und Erkundigungen Dr. Franz Stuhlmann's von L. Friedrichsen. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Hamburg, Friedrichsen & Co. Price 1s. (*Dulau*.)

AMERICA.

America del Sur.—Mapa del —, por R. Kiepert. Scale 1 : 8,000,000 or 109·6 geographical miles to an inch. 4 sheets. Price 8s. (*Dulau*.)

ATLASES.

Berghaus' Physikalischer Atlas.—(Begründet 1836, von Heinrich Berghaus). 75 Karten in sieben Abteilungen, enthaltend mehrere Hundert Darstellungen über Geologie, Hydrographie, Meteorologie, Erdmagnetismus, Pflanzenverbreitung, Tierverbreitung und Völkerkunde. Vollständig neu bearbeitet und unter Mitwirkung von Dr. Oscar Drude, Dr. Georg Gerland, Dr. Julius Hann, Dr. G. Hartlaub, Dr. W. Marshall, Dr. Georg Neumayer, Dr. Karl v. Zittel, herausgegeben von Prof. Dr. Hermann Berghaus. Einundzwanzigste Lieferung. Inhalt : Nr. 10, Alpenländer, geologisch. Nr. 20, Flutwechsel. Nr. 74, Die Sprachen der Erde. Gotha, Justus Perthes, 1890. Price 3s. each part. (*Dulau*.)

The map contained on sheet No. 10 illustrates the geology of the Alps. The colours indicating the different formations are well chosen, and copious explanatory notes and several sectional diagrams are given. Sheet 20 is a tidal map of the world, on Mercator's projection, on which the height to which the tide rises is indicated by different colours. At the foot of the map three insets are given, one of which appears to have been copied from a small map by Mr. E. G. Ravenstein, published in the 'R.G.S. Proceedings,' January 1886. Although the idea of showing the height of the tide by different shades of colour was originated by Mr. Ravenstein, there is no acknowledgment that his system has been adopted, or that his map has been copied. On sheet 74 there are seven maps, the principal one being a language map of the world on the elliptical projection; the others are of different regions, all having reference to the same subject. All these maps are beautiful specimens of cartography; the number of colours, which of necessity have to be employed, renders their selection a very difficult matter; they are, however, admirably chosen, and the registering is perfect.

Hachette et Cie.—Atlas de Géographie Moderne, édité par —. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, figures, diagrammes, etc. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Hachette et Cie., 1890. Parts 13 and 14, 10d. each. (*Dulau*.)

In Part 13, sheet 17 is a map of Algeria and Tunis, on which the importance of all the principal towns, as regards population, is indicated by the type in which the names are printed. A useful table is also given of geographical terms and their abbreviations. Sheet 23 is an orographically coloured map of the Alps, on which the elevations up to 500 metres are indicated by a dark shade of brown, those between 500 and 100 metres by a lighter shade of the

same colour, and all elevations above 1000 metres are left uncoloured. There is no hill-shading, the direction and form of the different ranges are shown by single lines, the summits and passes being distinctly indicated by symbols, and the elevations are given in metres. The system on which this map is produced is not very effective, and it does not compare at all favourably with the physical map of Switzerland in Andree's Hand Atlas, which is also a cheap publication. Sheet 35 is a physical map of Asia, orographically coloured in three shades, which give a general idea of the topographical features. The heights of the mountains and depth of the ocean are given in metres.

Part 14 contains a physical map of France, on which three insets are given illustrating the river-basins, climates, and the areas of grain, vine, and olive cultivation; a general map of Germany, and one of Central Europe. All the maps are accompanied by letterpress, which is illustrated by numerous physical and statistical diagrams.

Stieler's Hand-Atlas.—Neue Lieferungs-Ausgabe von ——. 95 Karten in Kupferdruck und Handkolorit, herausgegeben von Prof. Dr. Herm. Berghaus, Carl Vogel und Herm. Habenicht. Erscheint in 32 Lieferungen (jede mit 3 Karten, die letzte mit 2 Karten und Titel). Zweiundzwanzigste (22) Lieferung. Nr. 73, Südost-Australien in 1 : 5,000,000, von A. Petermann. Nr. 76, Polynesien und der Grosse Ozean, östliches Blatt, von A. Petermann. Nr. 80, West-Indien, Zentral-Amerika, Bl. 2 in 1 : 7,500,000, von A. Petermann. Gotha, Justus Perthes, 1890. Price 1s. 6d. each part. (*Dulau*.)

The map of South-east Australia, on sheet 73, contains the whole of New South Wales and Victoria, and parts of Queensland and South Australia. County boundaries are shown, and the present state of railway communication is clearly indicated. Sheet 76 forms part of a two-sheet map of the Pacific Ocean and Islands. In the present instance, the west coast of America is shown, with numerous insets of the different groups of islands, drawn on an enlarged scale. Sheet 80 is the north-western portion of a four-sheet map of the West Indies and Central America. The title is somewhat misleading as regards this sheet, which does not contain any portion of either the West Indies or Central America, being in fact a map of North America east of the 88° of west longitude and north of the Gulf of Mexico. A large inset is given of the Atlantic States between Washington and Boston.

CHARTS.

United States Charts.—No. 1193, West Coast of Lower California, San Quentin Bay to Cerros Island. Price 4s. 2d.—No. 1196, El Portillo. South Coast of Cuba. Price 2s. 1d.—No. 1204, Port San Bartolomé. West Coast of Lower California. Price 1s. 1d.—No. 1210, Manzanillo Bay. Island of Santo Domingo. Price 2s. 1d. Pilot Charts of the North Atlantic Ocean for May and June 1890. Published at the Hydrographic Office, Navy Department, Washington, D.C. Henry F. Picking, Captain U.S.N., Hydrographer. 1890.

PHOTOGRAPHS.

Photographs of Fellows of the R.G.S.—One hundred and twenty-four photographs of Fellows of the Society have been presented by Messrs. Maull & Fox during the past month, and will be placed in albums which are kept for that purpose in the Council Room.

Yang-tse Gorges.—24 Photographs of the ——. Taken by Mrs. Archibald Little. January to March 1889.

This set of photographs was taken by Mrs. Little during a house-boat journey up and down the river Yang-tse, and presented by her to the Society.

The series commences with a view of the river-front of the town of Sha-tze, situated 80 miles below Ichang, which place, next to Hankow, is the largest

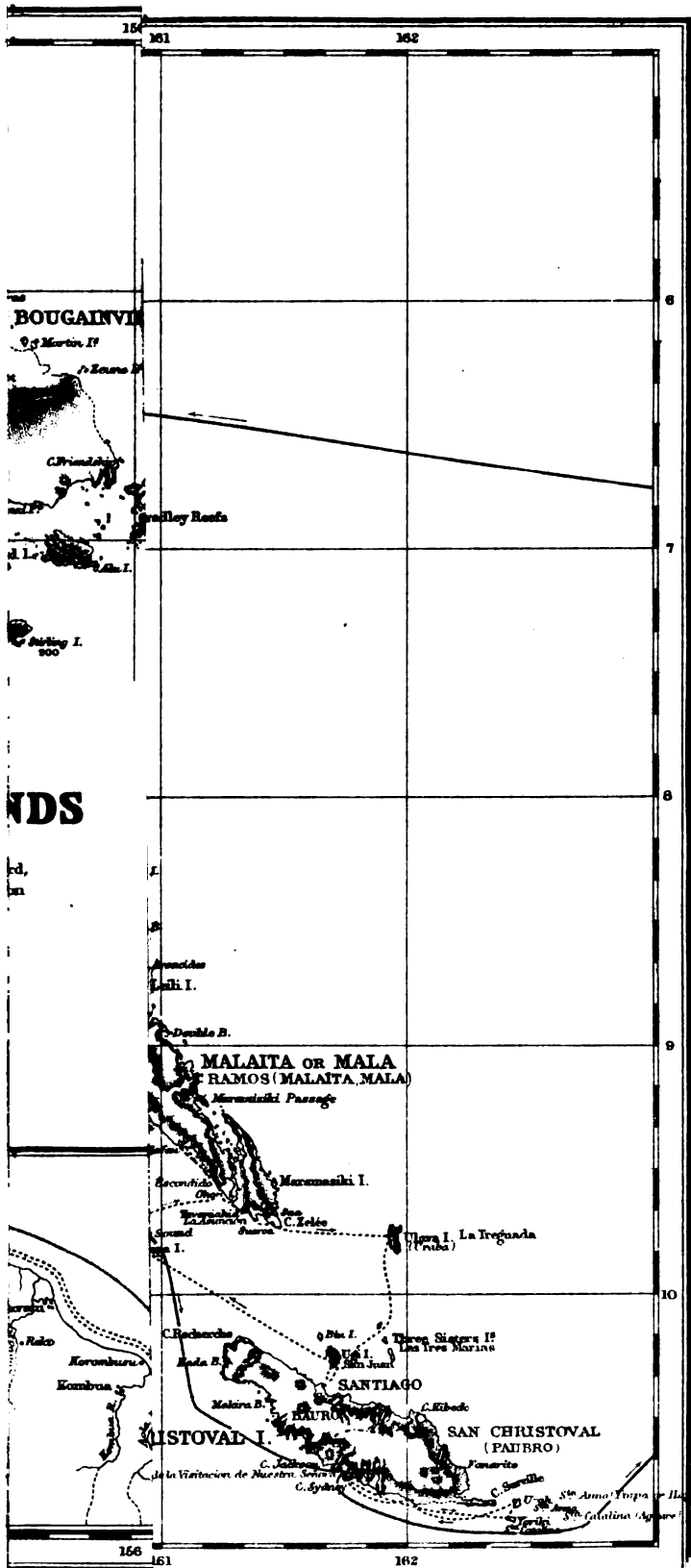
trade emporium in the Hupeh province, and the terminus of the junk traffic over the rapids which have been elaborately described by Mr. Little in his book, 'Through the Yang-Tse Gorges.' Sha-tsze forms the trading suburb of the walled prefectural city of King-chow, once the capital of the ancient kingdom of "King." The next is a view of a Buddhist temple, visible from the river 10 miles below Ichang, built on a precipitous needle of conglomerate rock, 1200 feet high. The two following views are pictures of the curious and wild conglomerate region.

The next four (5-8) are views of the town of Ichang and the cliffs on the river-bank opposite. View 9 looks down the Ichang gorge, and shows the house-boat from which the photos were taken. No. 10 is the entrance to one of the many picturesque side glens that opens out from the main gorges.

View 11 shows the limestone needle, 1800 feet high, called by the natives the Tien-tsz-shan, or Pillar of Heaven, situated in the third of the four almost rectangular bends which together compose the so-called Ichang gorge. No. 12 is a shrine in the Ichang gorge with the enclosing range in the background. Nos. 13, 14, and 15 exhibit the opposite shore as seen from the upper end of the Ichang gorge, where the decomposition of the granitic and crystalline rocks, through which the river breaks its way in a succession of short rapids, has led to an opening out of the river valley and consequently more extended views. The white limestone cliffs towering above their steep talus in the view from the elegant Hoang-ling Miao ("Yellow Mountain Temple") are very striking. Nos. 16, 17, and 18 are views of the dangerous Tung-ling rapid and the grand gateway of the Niu-kan gorge immediately above, which rises 800 feet from the water, and the steep cliffs behind (which, however, have not yet been measured) to between 3000 and 4000 feet. Nos. 19, 20, 21, and 22 represent views on the Shin-tan, or "New Rapid," as it is called. This, the most formidable of all to the native craft, requires large extra gangs of coolies to surmount; a specimen of such a gang attached to one of the three or four tow-lines of bamboo plait, needed to haul up a 70-ton junk, is pictured in No. 22. Of the two last, No. 23 exhibits Koeichow, one of the typical decaying riverside mountain towns of this region, and No. 24 the fierce rapid of the Yeh-tan, second only in violence to the renowned Shin-tan.

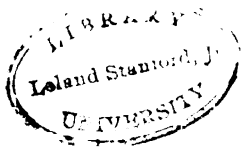
This excellent series forms a valuable addition to the Society's collection; and Mr. and Mrs. Little, who are once more returning to China, have kindly promised to present the Society with a still more complete series of photographs of the highly interesting, and little known scenery of this region.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.



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PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
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Explorations in Cilicia Tracheia.

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(Read at the Evening Meeting, June 30th, 1890.)

Map, p. 508.

LAST spring my wife and I traversed, in zigzag fashion, a small portion of Cilicia Trachela, a district which derives its name from the exceeding ruggedness of its aspect, and which was known in antiquity as the *Tracheiotis*, *Cilicia Tracheia*, or in Roman times as *Cilicia aspera*. The portion we thus passed through is bounded by the Mediterranean on the south, the Karamanian mountains on the north, the Calycadnos and its tributaries on the west, and the Lamas river on the east. Owing to the difficulties of the ground we had to get over, and the object of our search, it took us a little over seven weeks before our exploration of this district was satisfactorily concluded. Small though it may seem on the map, it represents a considerable amount of hard work, especially during the rainy season, and it is a district where the climate is very varied; by the sea, exceedingly hot in spring and summer, and very malarious; in the mountains, exceedingly cold in winter, and almost impassable, hence the early rainy season appeared to us the less of these evils. We had to dwell amidst ruins, to inhabit tombs when we could find them, and to put up with the tents of the nomads when nothing better presented itself, for there are no towns in this district, no villages unless you can designate by such a title small nests of miserable hovels, which the nomads use as storehouses for their grain, and occasionally during the bad season inhabit themselves.

It is now a district given up to almost impenetrable brushwood, forest, and rocks, the intricacies of which are only known to the wild Yuruks who pasture their flocks amongst them. Until the tenth century of our era, it was probably one of the most flourishing corners of the world, as is testified by the innumerable ruins of towns and villages crowded upon it, not only on the coast-line, but up to a height of 6000 feet above the

level of the sea. Before Cilicia Tracheia became a Roman province, this district was called Olba, and was ruled over by a dynasty of priest kings, priests of Jove and dynasts of Olba, as they are styled on their coins,* whose capital was 6000 feet above the sea, and which we succeeded, after many disappointments, in thoroughly identifying from inscriptions. These priest kings only succumbed to the all-consuming power of Rome during the first century after Christ. Our results may be said to have been most productive in the department of ancient geography, and in the identification of ancient sites; but at the same time we were able to collect some new material concerning the nomad inhabitants of this district, and the geographical features also present some points of special interest.

From the mouth of the Lamas river, where ends the Cilician plain, to the mouth of the Calycadnos, which terminates the flat spit of land around Selefkeh, the ancient Seleucia, the Taurus range pushes its spurs right down to the sea, and the whole coast-line is here covered with one long succession of ruins. An aqueduct about nine miles in length brought the water of the Lamas to the ancient town of Elæusa, the ruins of which are now called Ayash, a town which Archelaus, King of Cappadocia, made his capital when the Tracheia was added to his dominions by Augustus, and whose daughter Glaphyra married Antipater, son of Herod the Great; and to Archelaus Elæusa owed many of the buildings the ruins of which we now see. Further on is Corycos, celebrated in antiquity for its great cave where Zeus kept bound the giant Typhon; the name is still retained in the fortified island of Korghos, a few hundred yards from the coast; this town was one of great importance in the middle ages, as a favourite starting-point for the Crusaders, and was the terminus of the main road which, in antiquity, passed through the district of Olba, with the ruins of many towns on its course, and which crossed over into Cappadocia by a pass through the Karmanian mountains. Corycos was the last Armenian stronghold which held out against the Turks, and, thanks to the assistance of the Lusignans of Cyprus, did not fall into their hands until 1448.

Further along the coast, with the assistance of a long inscription, we were able to restore the name of another site, now called Chok Oren, or many ruins, as Corasios. This inscription gave us an interesting epitome of the history of this part of Cilicia during the first centuries of our era; told us how under Valentinian, Valens, and Gratian, the governor of the Isaurian province "re-built this spot, which had become desolate and void of houses, at his own expense," confirming Strabo's account of the ravages of the Cilician pirates, and explaining why we find most of the coast-line ruins to be of a late date, and why the inhabitants of the kingdom of Olba chiefly lived up in mountain fastnesses.

The principal geographical features of the first plateau immediately

* Head, *Hist. Numorum*, p. 609.

above the sea-level are the great caves, or more strictly speaking, great depressions in the calcareous rock formation, caused by the action of water, those underground streams which appear and disappear, and are commonly known in Asia Minor under the name of "*dudens*." Cilicia Tracheia is richer in miocene deposit than any other part of Anatolia, and the limestone gorges above Selefkeh, with their walls of calcareous strata, are crowded with fossilised oysters, coral, and other shells. Within the space of five miles we found three of these great caves, which resemble the deep chasms through which the neighbouring rivers flow, except that they are closed up at either end, and represent the spots where the underground streams have made their way for little distances to the surface.

The first of these in importance is, of course, the anciently famed Corycian cave, about three miles in the hills behind Corycos; this has been frequently described by previous travellers, some of which have doubted its identity, but as we stayed around it for several days, and we were able to add much new information concerning it, including inscriptions identifying it beyond all doubt, I propose to give here a detailed account of it.

It is an oval depression running from north to south, and around it is a level plateau, covered with a perfect sea of pointed calcareous rocks, which prevent its being seen until the edge is reached, and make walking around it almost impossible. Its dimensions are as follows: length 886 feet, mean width, 65½ feet, and height from 98 feet at the northern end, to 228 feet at the southern end. At the southern end of the depression you enter the cavern, which descends over 200 feet into the bowels of the earth. The old road, paved with polygonal stones, may still be followed for a little distance, then there is a covering of slippery earth which makes progression difficult; at the extreme end you hear above you the rushing of water, the dripping from which forms a tiny pool and many stalactites, but the stream is never seen continuing its course in the heart of the mountain. Here it is that the ancients placed the prison of the giant Typhon, and at the mouth of the cavern was a temple replaced by a later Byzantine church. On the walls of the cavern near the entrance we unearthed a hexameter and pentameter Greek inscription couched in weird language, like the utterances of the frenzied oracles here delivered, and over the lintel of the Byzantine Church is another of Christian date, but in language of an equally awe-struck nature.*

The bottom of the outer depression, which, I have said, slopes from north to south, is nearly all covered with a thick jungle of trees, caroubs, pomegranates, myrtle, &c., just as it was in the days of Pomponius Mela, who gave a somewhat timid description of a visit he paid to the

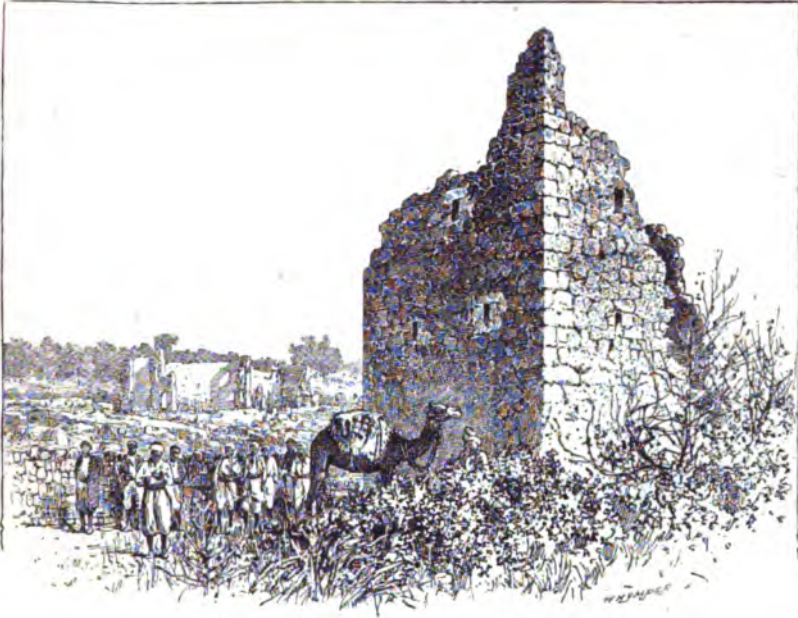
* Cf. Strabo, xiv. ch. v. Strabo's account is very exact, giving the outer depression and the inner cave. Cf. also Seneca, *Quæst. Natur.*, iii. 2, and Pomponius Mela, ch. xiii.

cave in the first century A.D. Here it was that the saffron grew alluded to by Strabo, Dioscorides, and Pliny, and each of these authors carefully distinguishes between the depression and the actual cavern. Though we found no saffron there now, we found plenty of it on the neighbouring mountains, and I have no doubt it would easily grow here too. This cave the nomads call Paradise, for here they can fasten their camels and find shelter for their goats, in contradistinction to the second cave we found, which they call Purgatory. This second cave is separated from the north end of the Corycian cave only by a distance of 100 yards, but as the sides slope inwards and are hung with stalactites, no one without proper appliances can descend into it; it is much smaller, and almost round, decidedly deeper, and far more terrible in aspect than the other, but, strange to say, I can find no allusion to it amongst either ancient or modern writers, with the exception of Pomponius Mela, who in his thirteenth chapter says that beyond the Corycian cave is another called Typhonia. The nomads say that smoke which goes in at the southern end of the Corycian cave comes out here, and I have no doubt that there is a subterranean communication between them.

Our most important discoveries concerning the Corycian cave were made outside it. On an eminence about a mile from it stood the ruins of a temple of Jupiter, doubtless the Jove who kept bound the giant Typhon in the hole below. On its walls I found scribbled a prayer invoking the assistance of the Corycian Jove, and we found the stele of a statue bearing a dedication to the same deity, ΔΙΙ ΚΟΡΥΚΙΩΙ. Outside the temple, quite accidentally, by pulling down a wall, we came across a list of 162 names, beginning with early Cilician names, running into ordinary Greek names, and the later ones showing evidences of Roman intermixture. The last on the list was the above-mentioned King Archelaus, who ruled a considerable portion of the Tracheia from his capital below at Elaëusa. He was the last king of the district prior to its becoming a Roman province, and his was the last name on our long list. This and other evidences, which I have not space to go into here, showed us that we were in possession of a list of the Teucid dynasty or priest kings of Olba, who ruled over the whole of this district from very early times.

The third cave is about five miles distant from the two Corycian caves, and is separated from them by many deep gorges and almost impassable rocks; it is considerably higher above the sea, but bears a remarkable resemblance to the larger of the two Corycian caves. It had a larger town around it in ancient times, which from an inscription I learnt was called Kanygelli, a deme of the town Elaëusa, where Archelaus lived. On the south-east side of the depression was an ancient polygonal fort, from an inscription on which we learnt that it was built by Teucer, one of the priest kings, and dedicated to the Olbian Jove; hence at once we had a sort of imaginary rivalry between the Corycian and Olbian Joves

presiding over similar caves, and, furthermore, this proved to us that the sway of Olba reached down to the coast, and that the realm of Archelaus was carved out of its possessions, if it did not include the whole. This cave is not mentioned by either ancient or modern writers; it is almost a complete circle, three-quarters of a mile round, and uniformly, except where the débris of fallen ruins have filled it up, 220 feet in depth;



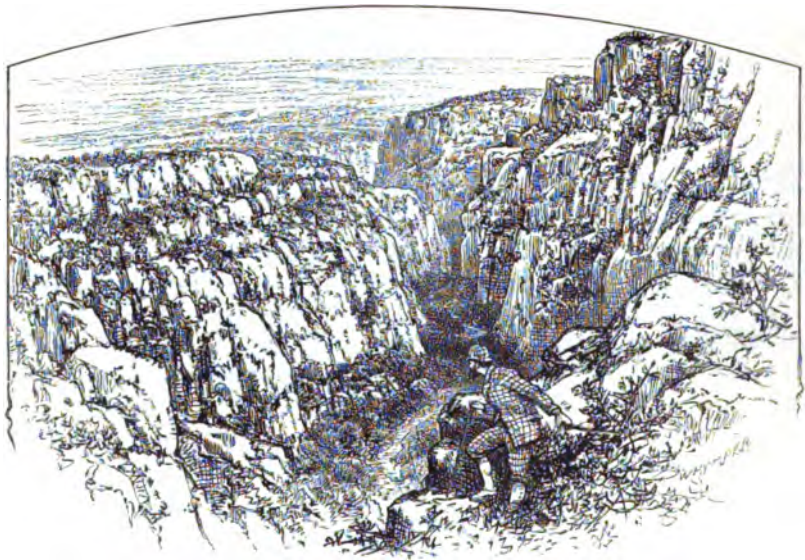
ANCIENT POLYGONAL FORTRESS AT THE LIP OF THE OLBIAN CAVE.

trees also grow at the bottom of it, but there is no apparent cavern or underground stream here now. The straight walls of the Olbian cave have in ancient days been more decorated with bas-relief and inscriptions than those of the Corycian cave, and at the bottom are fragments of columns, &c., which point to its having had a temple in its midst. There were two roads down into it; one still practicable, the other tunnelled in the rock, and now impassable, which probably had its outlet where the ruins of a Byzantine church now stand, and which may have been the site of a temple of the Olbian Jove.

At this spot we obtained our first definite intimation from epigraphy which proved to us that we were really in the country of Olba, but owing to the state of the weather we were unable at the time to penetrate far into the mountains, but visited several of the ruined towns and villages which lie thickly scattered on this first plateau, and several of which we were able to re-name from inscriptions, and amass matter of archæological interest concerning this hitherto unexplored district. The

soil of this district is all red marl, and as there is no water except rain-water, the stuff we had to drink reminded us of pea-soup. The names of this district also refer to this: *Kizil Oren*, "red ruins," near the Olbian cave; *Kizil Bagh*, or "red garden," near which place we found the ancient site of Eabbasis, and two temples of Hermes. Behind Corycos is the *Sheitan dere*, or "devil's glen," a gorge with precipitous cliffs in one part of which are a series of thirteen rock-cut bas-reliefs, specimens of which we photographed. Above these stood an ancient town.

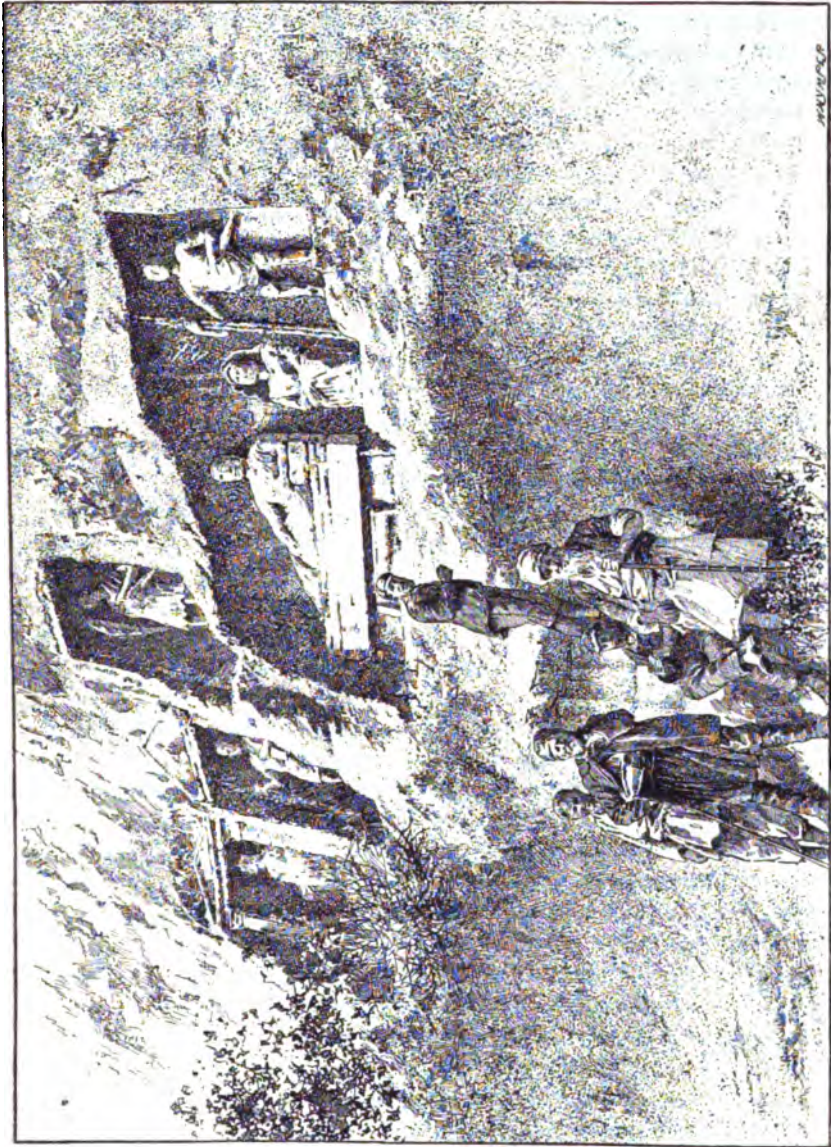
In the month of April, after an excursion through the Cilician plain, we returned to our work of thoroughly investigating the district of Olba, and penetrated into the Taurus Mountains in quest of its ancient capital.



THE DEVIL'S GORGE.

First, however, I will describe the gorge of the Lamas river, which resembles in most particulars the many gorges which cut up the southern slopes of the Taurus and make the country so difficult to traverse. The Lamas rises in the Karamanian Mountains just above Mara, and for the whole of its short course, not exceeding 50 miles with all its sinuosities, it eats its way through the rocky mountains by a gorge which is never more than half a mile across, and the stupendous walls of which for miles offer on either side sheer precipices, reaching to the elevation in some places of over 2000 feet. It is impossible to go straight up the river by its banks; for several miles it passes through a narrow gully, which does not even afford a foothold for the acrobatic nomad. The mountain paths are on the height above, and not unfre-

quently you have to go for miles along the edge of the cliff before finding a means for descent; in certain places the nomads have paths descending to the stream known only to themselves, and practicable only for a people of goat-like mode of life.



ROCK-CUT BAS-RELIEFS IN SHEWAN DEER

Along the summit of these cliffs, on either side of the Lamas gorge, in ancient days there existed a very large population; every three or four

miles we came across the ruins of towns, with their polygonal fortresses and walls of massive pre-Roman masonry, perched on sheer cliffs over the stream. Though we found several inscriptions amongst these towns in the Lamas gorge, only one revealed the ancient name of the town we found it in. This name was Bemisos, now called by the nomads Tapurelü ; it stood on the left bank of the river, about half-way from the source to the mouth, crowning two hills ; it had six polygonal towers standing, a valley of rock-cut tombs, ruins of temples, theatre, and public buildings, and next to the capital itself must have been the most important town in the Olbian kingdom, yet ancient and modern geographers are entirely silent as to its existence. These fortress towns had each their distinguishing mark or sign carved at one angle of the towers. I made a collection of eighteen of these, which are to be published in the next number of the 'Classical Review,' whilst our inscriptions will appear in full in the 'Hellenic Journal.' The sign of Olba *par excellence* was the club, which was found side by side with the local mark on many of these towns in the Lamas gorge, proving that the Cilician pirates, for undoubtedly these were their eyries, had made decided progress in the study of heraldry before Pompey broke their power at the battle of Coracesium, and planted them at Soli, thenceforward known as Pompeiopolis, near to the modern Messina. The castle of Pireneh is one of the most remarkable in the Lamas gorge ; it was built on a peak jutting out like a promontory, two sides of which are protected by the river and the third is only approachable by a narrow ledge. It is now only the haunt of the ibex and the bear, but there are evidences of its having been a very strong place in remote antiquity, and zigzag steps cut in the rock, reaching from the summit to the river, may still be seen, though now impracticable.

The Lamas gorge reminded us of a sheet of fork lightning which had eaten its way into the heart of the Taurus range, and in the evenings from our quarters on the high plateau above we watched a curious cloud effect. Towards sunset, after the heat of the day is over, mist begins to rise from the narrow gorge, and the zigzag course of the river could be traced by a line of fleecy clouds hanging over it almost down to its mouth. Though the stream is small and rapid, it is an exceedingly useful one ; it turns forty water-mills in its course, chiefly worked by Greek millers from the village of Mara in the mountains above ; it is available for irrigating the tiny fields which the nomads make on every available space on its banks. Woodcutters send down their trees by it to the shore ; and, in antiquity, besides supplying water to the many towns on the edge of the gorge, this stream supplied two big cities with water ; the aqueduct to Elæusa is still traceable throughout the whole of its course, and starts about three miles from the mouth of the gorge ; and the aqueduct to the town of Olba was fed by the upper portion of this stream. The water is good, but is strongly

impregnated with a calcareous alluvium, from the nature of the rocks it passes through; and the river abounds in excellent fish, as high as a pretty little cataract about four hours from its source, and in summer-time, when the mountain springs are dry, bears, wild goats, wild boars, leopards, &c., come down at night to drink here, and are shot by the nomads, who hide behind rocks on their known course. In most of these points the Lamas offers a marked contrast to its better known and more majestic neighbour, the river Calycadnos, which, owing to the depth of its bed, is of very little use; it works no water-mills, it cannot be used for irrigation, and woodcutters make no use of it to bring down trees. The rocks on either side of the Lamas river are honeycombed with the cells of anchorites, who lived here during that flourishing period when Isauria could boast of no less than ten bishoprics, and fine Byzantine basilicas are found at nearly all the ruined sites of this district, pointing to the extent of population prior to the Mahomedan invasion and the destructive wave of nomad hordes which devastated the country after the fall of the Armenian kingdom in the fourteenth century.

On starting for the interior from the shore at Lamas where this river empties into the sea, we immediately made a rapid ascent of 2000 feet, when an undulating plateau is reached, bounded on the right by the Lamas gorge, and north and west by two conical firclad hills; this plateau is covered with thick brushwood, consisting of stunted caroubes, wild olives, arbutus, liquorice, the holly-oak, and that most insidious of all brambles the wait-a-bit thorn; out of this wilderness peep many ruined villages, with remains ranging from ancient Greek fortresses to Christian churches, and wherever a little clearing offers space for a few blades of grass are found the tents of the Yuruks. Two hours beyond this plateau we came upon one of the many tiny mountain plains, circular depressions in the hills, where rich soil produces excellent crops, and at the edge of which is a village of twenty houses, called Guberei, belonging to the cultivators, where Yuruks of a sedentary tendency dwell for several months of the year. At Jambeslü, about four hours further on, and at an elevation of over 3000 feet, stand the very fine ruins of an ancient town; this is in the heart of the Yuruk country, and during our stay here we had ample time for studying the nomads, and those who have adopted a more sedentary life.

The many tribes of Yuruks, so-called from the Turkish *yurumek*, to wander, are almost the only inhabitants of vast districts in the highland to the west and south of Asia Minor; they are a very peaceable friendly race, quite distinct from the Afshars, Kurds, Circassians, Bosdars, and other tribes which winter on the Cilician plain, and whose summer pastures or *yailas* are further east. The Turks look upon the Yuruks, from their law-abiding tendencies, as the policemen of the mountains, and they are always ready to give information concerning suspicious characters who visit their mountains; too ready sometimes, for

they gave information concerning us, which led to our being taken prisoners to Selefkeh, but we were speedily released on establishing our identity, and on pointing out the harmless object of our wanderings. However, Kurdish robbers and Circassian smugglers often visit these wild mountains, and thanks to Yuruk information, we were twice witness of their capture. Every tent has its formidable dog, great huge creatures accustomed to tackle the wild beasts of the mountains, and they are trained so as to wander like patrols at night in a circle round the encampment and give ample warning of the approach of an enemy. They feed them on buttermilk poured into holes in the ground dug for this purpose, and it was impossible for us to stray alone far from the protection of the owners for fear of being attacked.

The natural abode of the Yuruk is his black goat's-hair tent, with his camel pack-saddles built round for a wall, and the family mattresses spread in the midst, but it is distinctly a growing tendency amongst them to live for the three winter months in hovels, erected out of the stones of ancient buildings on the southern slopes of the Taurus, such as we ourselves dwelt in at Kizil Oren and Kizil Bagh; often they inhabit the rock-cut tombs of the departed Greeks and turn them into storehouses, being curiously without superstitions on this point for so primitive a race, arising doubtless from their constant contact with ruins. Their life is occupied almost entirely in looking after their flocks, and, according to the season, moving from one pasture to another; in certain districts they are woodcutters and charcoal burners, and transact their business with the merchants on the coast with an elaborate system of tallies. Their year they divide into three seasons; *Yas*, spring, consisting of five months; *Güs*, summer, four months; and winter, three months: this season, being to them the most disagreeable, they subdivide it into three other parts—(1) *Kampsin*, a period of fifty days; (2) *Karadès*, black winter, ten days; and (3) one month, which corresponds nearly to our March, which they call *Zembrai*, or the opening. At the first sign of spring they leave their hovels, which become intolerable from the fleas and vermin they contain, and start for their nine months' nomadic life, making the same rounds, and frequenting the same pastures year by year.

They are a remarkably fine race, due doubtless to the survival of the fittest and the healthy lives they lead; diseases are uncommon amongst them, except enlargement of the spleen, and a certain affection of the throat which they call *teletmeh*, to cure which they wrap the patient in the warm skins of slaughtered animals. We found that infant mortality was excessive amongst them, owing no doubt to exposure and want of care, and there is a considerable percentage of idiots and abortions, whom they look after with special and superstitious care. They are a distinctly white race, with fair skins and long beards.

Their intercourse with the outer world is very limited; often a well-to-do citizen of some town furnishes a body of Yuruks with flocks

by contract; the Yuruk to provide so many okes of milk, cheese, butter, &c., whilst the tribe gets what dairy produce is over and above, and the hair; the contractor also agrees to keep up the flock, if by chance it diminishes, establishing what they term "an immortal contract." In this way a tribe of Yuruks often grows rich enough to pay off the contractor and become independent of external support. They are very destructive to the country they travel over, by lighting their fires beneath trees, they ruthlessly destroy acres of forest trees, and the valleys of this part of the Taurus are very rich in tall, straight fir-trees, much prized for ship masts; then they lay bare whole tracts of country that they may have fodder for their flocks; and nothing is so destructive to timber as their habit of tapping the fir-trees near the root so that the turpentine may flow to the wound. A deep notch is cut, and after a while the tree itself is cut down and the wood in the vicinity of the notch is found to be saturated with turpentine, and used for torches, the only light they ever make use of. Again, they bark the cedars to make their bee-hives and roofing for their huts; in short, they are the most inveterate enemies of the Asia Minor forests. Luckily, the vast extent of timber and the sparseness of the inhabitants make this destruction less apparent, but at the same time it proceeds steadily, and must one day ruin the forests of the country.

In his mountain fastnesses the Yuruk has regular visitors at stated times. The goat and sheep merchant comes in the spring, pitches his tent in a central place, sits with the big men of the tribe around him on cushions, smokes his narghile, and has a pot of coffee simmering on the embers; he buys from those who are willing to sell, and when he has amassed as many as he can manage to drive, he sets off to the nearest town, and realises a fine profit.

They are great camel breeders on the southern slopes of the Taurus, producing that valuable sort of mule camel common to Asia Minor, a cross between the Bactrian and the Syrian, which is excellent for mountaineering purposes. Then the tax gatherer comes to gather in the *Ashr*, or tax on their cattle. He also pitches his tent in a commanding position, and is surrounded by the leading men; but often as not he has a lot of trouble, for when they are advised of his advent, the Yuruks hide a portion of their flocks in out-of-the-way caves to avoid the government tax.

Then comes the travelling tinker to mend their pots and pans, the great importer of external gossip amongst them. He settles for a few days, where there are ten or more tents, with his bellows and his assistant, and mends with nitre the quaint-shaped copper coffee-pots and household utensils which they use, in return for which he gets butter and cheese, and these he takes back to the town when he has got together as much as his mule can carry. Visits also are periodically expected in like manner from the wool merchants, skin dealers, and the public

circumciser, who initiates the youthful Mohammedan into the first mysteries of his religion.

In matter of diet the Yuruks are most frugal; their bread in times of plenty is made with flour, in times of famine with the acorns of the oak-trees, which grow plentifully in the mountain valleys; it is of the oatcake type, thin round flat cakes, beaten out by a rolling-pin on a wooden board, and then cooked on an iron platter, and manipulated by the women with great dexterity. Sometimes they make cakes with wild vegetables in them. Meat they rarely touch, wine never, but milk and cheese form considerable items in their diet. Coffee, however, is essential to them, as essential as his glass of beer is to a German. Oftentimes I have wondered what these nomads, so unchanged in everything else, did before coffee was discovered, until one day we came across an encampment where the coffee had run short, and from the seeds of a species of thistle (*Gundelia Tournefortia*), which grows plentifully in the Taurus, coffee was made for us, a little brighter in colour, a little more bitter and aromatic in taste, but practically the same; a drink, doubtless, nearly as old as the hills themselves. They told us it was a very salutary drink, and enters largely into their pharmacy, but its effect on us was imperceptible. Tournefort gives an account of it, and calls it "the finest plant in the Levant." Gundelsheimer was the first to find it, hence its name, but both he and Tournefort seemed to be ignorant of its value. It grows also in large quantities in Afghanistan.

By boiling the cones of the juniper (*Juniperus drupacea*—many species of junipers are to be found in the Taurus) for hours in a large caldron, a sort of thick sweet juice is produced, this is mixed with flour, and when cold bears a striking resemblance, both in appearance and flavour, to a shape of chocolate cream. This delicacy they call *pelteh*. One of their great difficulties is in obtaining salt. In the winter, when their wanderings take them down to the coast, they produce salt by wetting planks with sea water, and letting them dry in the sun; but this is, of course, rather an arduous task.

In producing material from their mountain herbs they are very cunning. Before aniline dyes were invented, they drove an excellent trade in the production of colours, and always used them themselves for dyeing the wools for their carpets, but these colours are troublesome to make, and now, alas! it does not pay them to continue their production, with the result that now scarcely anything but aniline dyes are used in the making of Karamanian carpets.

The milk of a plant of the spurge tribe, called Galaxidhi by the Greeks, is boiled with onion leaves; when the wool is put in the colour does not show at first, until it has been plunged into cold water, when a brilliant and permanent red is the result. Also they use the lovely galls of the *Quercus infectoria* for a dye.

The Yuruks will do anything for tobacco, and when the genuine

article is not forthcoming, they make use of certain leaves they know of to supply its place—dried fig leaves and others.

They are essentially a polygamous race, poor though they are, and in this form a marked contrast to the settled inhabitants of the Turkish towns, who rarely now have more than one wife. It is not unfrequent to find a Yuruk with seven wives, or more properly speaking, seven slaves, each wife and her family generally occupying different tents; one minds the flocks in one direction, another tends another portion elsewhere, another wife superintends the camels, another stays at home to weave carpets, another collects wood and fetches water; and he must be a very poor man indeed who cannot boast of at least three. The natural result of this plurality of wives is that the female population, though in excess of the male, is not enough to meet the demand. So that the Yuruks do a good deal of woman snatching, and if report speaks truly, a Yuruk who wants a wife is not particular, in appropriating a lady from another tribe, as to whether she is married or single. On marriage, the husband generally pays something to the father, and this has given rise to the idea that the nomads are in the habit of selling their daughters for the harems of Constantinople, whereas from their point of view, they are only carrying out their legitimate idea of the marriage contract. Endogamy is the rule amongst the Yuruks, so that when a man peaceably procures a female from another tribe, he is figuratively said to have stolen her. Marriage with aunts or uncles, and the sisters of wives, whether deceased or otherwise, is permitted amongst them.

It is extremely difficult to obtain from the Yuruks any definite idea, from tradition or otherwise, concerning their origin; they will always tell you that they are descendants of those who inhabited the ruins among which they now dwell, and that these kind ancestors of theirs put up letters on the rock and walls to guide them to treasures which they had concealed. I have seen a Yuruk hard at work with a chisel making his way into the centre of a marble column, in which he is sure gold is concealed. I have seen them dig deep holes just below Greek inscriptions, with the same object in view. Constant disappointments do not appear to damp their ardour, for now and again a tomb is opened with some treasure in it, and the thirst for treasure hunting begins again with redoubled vigour.

As I have said, they are not superstitious: even at that dread spot, the Corycian cave, which the ancients peopled with every imaginable horror, we were told that nothing uncanny existed. An old Yuruk was quite indignant at the suggestion; neither he, nor his father, nor his grandfather had ever been troubled by apparitions and they had lived most of their lives near the cave.

Each tribe has its chief, or Agha, who is held responsible to the government for the good conduct of those under him; he generally

inhabits one of a central cluster of tents, whilst the rest of the tribe are scattered with their flocks in the brushwood for miles around. Practically, the Agha is the legislator for the Yuruks, and settles for them all their disputes, for they are wise and never think of taking their grievances into Turkish law courts.

In their dialect of Turkish one finds a much larger percentage of Persian words than in the Turkish of the towns—words which are distinctly of Persian origin, leading to the belief that at some former time they spoke Persian—"Beruk," go away, "shuma" for you, "pool" for money, "charpedar" for muleteer, and many others; the advent, however, of these nomads into Cilicia is lost in obscurity. Bertrandon de la Broquière considers that the first wave of nomads did not enter Cilicia till the fifteenth century under Rhamadan-oglu, many of whom settled in the towns, and blended with the Turks; then came another wave, who preferred to maintain the nomad life their ancestors had lived in the heart of Asia, and these are the ancestors of the present Yuruks.

I will conclude this paper with an account of the discovery of the capital of the kingdom of Olba, where the priest kings of the Teucrid dynasty held their court down to the beginning of our era, and with a description of its ruins and its site.

High up in the mountains amid a waste of rocks and brushwood, a wilderness almost as hopeless to penetrate as a primeval forest, are the ruins of two large towns; one of these is in a mountain valley, which the nomads still call Oura, a highly interesting case of the retention of a name, for Mr. Ramsay previously considered Olba to be a Hellenised form of Ourwa, with a view to introducing the idea of ὄλβος or happy. The principal ruins cover a furlong height, bounded on two sides by narrow gorges full of rock-cut tombs and carvings, and on the other by a small mountain plain; the aqueduct which brought the water from the Lamas river crosses one of the gorges, and over the principal arch we found a long inscription which told us that the aqueduct belonged to the city of Olba, ΟΑΒΕΩΝΗΠΙΟΑΙΣ, which was conclusive evidence that we had at last reached the central point of which we were in search. Here we found also several polygonal fortresses, ruins of temples and a theatre, and a fountain which supplied water in three basins. In former years the grape must have been much cultivated here, judging by the frequent occurrence of wine presses, and large cisterns connected with them for storing wine.

From this city in the valley an ancient paved road, lined with tombs and ruins, amongst which on a fallen column the name of Olba again occurred, leads to another and larger city on a hill about three miles distant, so that in ancient times they must practically have been one and the same place. This upper city is built on a round hill, the highest ground in the immediate neighbourhood, exactly 5850 feet above the level of the sea. The nomads call this hill Jebel Hissar, or the moun-

tain of the castle, and the few hovels where they live amongst the ruins, they call Uzenjaburdj or the "long castle." It is surrounded by deep gorges on all sides, and would appear never to have possessed walls, being so amply protected by nature; one of these to the north is full of tombs for the distance of three miles or more. There is no water on Jebel Hissar, hence the necessity in ancient times of an aqueduct from the Lamas river. The view is exceedingly fine, the high mountains which separate this district from Karamania, now called the Bulgar Dag, are seen to the north, and over the serrated slopes of the Taurus to the south the sea can just be descried. We found it very cold here; even in the middle of April vegetation had scarcely begun, for the snow had not been long off the ground.

The chief features of this upper town are—firstly, a large fortress 50 feet by 40 feet, four stories high and with five chambers on each story. From an inscription on it we learnt that it was built by one of the priest kings, or Tarkyaricos, as apparently the ruling family were called in Olba, of the name of Teucer, a second time confirming Strabo's statement that most of the priest kings bore this name, so that in his time the country was still known as "the country of Teucer" and "the priesthood of Teucer." Again the name of Olba supplied further proof of the identity of the site.

The second feature was the remains of a very fine temple, with thirty Corinthian columns still standing, 40 feet in height, and a proaulion wall 222 by 209 feet. This temple is wonderfully well preserved, for it had been used in later times as a Christian church, doubtless when Olba was one of the chief bishoprics of Isauria. There can be no doubt but that this was the great temple of Jove which gained for the rulers of this district the additional title of priests, and, in spite of the action of frost and snow, which have eaten away the stone, the ruins of this temple are amongst the finest left standing in Asia Minor. On a lintel amongst the ruins we found an inscription in a hitherto unknown script, and concerning which authorities are sadly at variance, but a cast of which I am placing before you.

Besides these, the hill is bristling with the ruins of public buildings, the remains of an elegant temple of Tyche, two theatres, and many others. In the study of numismatics there is much that is interesting and confirmatory concerning this identification of Olba. On coins we have both the triskeles and the club, symbols which are found cut on stone in many parts of the district.* Then the names of Teucer and Polemon both occur on coins as dynasts of Olba and toparchs of Kennatis and Lalassis; these names our inscriptions frequently revealed. Hence we had the satisfactory results of not only finding the place concerning the site of which much difference of opinion has existed amongst archaeologists, but also of confirming in nearly every detail the words of the

* Cf. Head, *Hist. Num.*, and Imhoof-Blumer, '*Monnaies Grecques.*'

old geographer Strabo, who tells us more of its ancient history than any other classical author.

Behind Olba the approach to the Karamanian mountains is rapid; very soon the thick brushwood disappears altogether, and the fir and the cedar clothe the mountain slopes. After about four hours' ride the village of Mara is reached, the last point of habitation before the new high road from Selefkeh to Karaman commences the mountain pass, and it is geographically an interesting point, being the centre towards which most of the ancient roads on the southern slopes of the Taurus make. Traces of an old road from Selefkeh to Mara are apparent, and we found the ruins of many towns along it. Then the old paved road from Corycos via Jambeslü and Uzenjaburdj through the heart of the Olba district comes here; also another old road from Lamas, joined by several side roads which crossed the gorge, passing through Orenkeui, converges here; and at Mara are traces of an old town, an acropolis, in which coins of Olba have been found, and other minor ruins. Unfortunately there are no inscriptions with which to identify its ancient name.

In modern times Mara has entered upon a new existence, owing to the camel road from Selefkeh to the interior, which was opened about five years ago. Before this it was merely a Yuruk settlement, but when it became the halting-place for caravans going over the pass it did not escape the attention of the money-loving Greeks. A Greek builder from Trebizond led the way; finding the prospect cheerful, he sent for his son and three other families; the Yuruks were bought out, and now there are some twenty Greek families settled here, who drive an excellent trade from April to October, when the pass is open. They have built a church, and there are five shops by the roadside, ready to tempt the camel-drivers with their delicacies. Mara in its revived form may be said to be a truly typical modern Greek place.

The western end of this district of the Tracheiotis, running down towards the Kalycadnos, is more densely wooded; here the valleys are a mass of foliage; fine trees, oaks, planes, and others, tower over the brushwood, and the effect is very striking; probably this is owing to the fact that there are fewer nomads in this part, and the absence of goats has given the young trees a chance of asserting themselves. To the west of the main road we saw hardly any Yuruk encampments, their favourite haunts being on the southern slopes of the Taurus, towards the sea.

After the paper,

Mr. CECIL SMITH said he must apologise for only being able to speak from one point of view of the interest of Mr. Bent's paper, namely, that of Greek archaeology, which he, Mr. Smith, had the honour partly of representing at the British Museum. Mr. and Mrs. Bent had conferred by their expedition another of the annual benefits which they had been conferring upon the British Museum in particular, and upon Greek archaeology in general. This year it was true the British

Museum had not actually reaped antiquities. In the olden days expeditions of this kind nearly always resulted in large stores of works of art and antiquities being brought to the Museum. Those days had gone by, partly because both Greeks and Turks had been vying with one another in producing laws which make the exportation of antiquities more and more difficult, and also, because there was no longer the justification for the export of antiquities which there was of old, seeing that the Greeks especially, and also even the Turks, had lately developed an intelligent interest in their own antiquities. But if they could not export antiquities, there was still, as Mr. Bent had said, much to be done in the way of archaeological research by the photographing of ancient works of art, the identification of ancient sites, and the reconstruction of maps, both ancient and modern; and, for any one who was willing and able to undertake such a task, there could be no better field than Asia Minor. Looking at it especially from the Greek point of view, they were getting more and more every year to see that it was principally to Asia Minor that the ethnographical questions with regard to Greece must be referred. It was probably in Asia Minor that they could trace the origin of Greek history, and it was probably to Asia Minor they must turn for its ultimate end. In the Greek cities, especially in the south of Asia Minor, they could trace the last end of Greek history, as it came about under the provincial administration of Imperial Rome. There seemed no doubt that Asia Minor, a field as yet little worked, was likely to afford the richest harvest for the philologist, the geographer, and the antiquarian. Mr. Bent had shown them one new language, but they had reason to believe that there might be many new languages and new arts still to be discovered in Asia Minor. They had had quite recently one special instance of this. The year before last a large hoard of cuneiform tablets was found in Egypt, which seemed to have represented the archives of King Amenophis III., about 1600 B.C. Those cuneiform tablets came to Egypt in a curious way. They appeared to be written in cuneiform script, but, at the same time, were annotated by an Egyptian scribe, and from those annotations they had been identified as forming part of a dowry that came with his wife to this king, she coming from some interior part of Asia Minor. Amongst these tablets there was evidence of at least three distinct languages hitherto unknown, and which at present remained still to be discovered. Corresponding with these cuneiform tablets, quite recently a very curious work of art had turned up in the form of a sculpture in low relief, which seemed to represent an art as yet entirely unknown, closely allied to the arts of Mesopotamia, but, at the same time, an independent art of its own. The Louvre had one fragment, and they had the other two at the British Museum; the whole subject seemed to represent an Asiatic tribe hunting the gazelle. Of course this archaeological enquiry in Asia Minor could not be brought about except with great labour, and very often, as they knew too well from the melancholy occurrence on Mount Olympus last year, with absolute personal danger. Of course everybody was not able nor ready to devote themselves to a lengthened period of exile, living in tombs, and drinking, as Mr. Bent had told them, pea-soup water, besides being in terror of their lives from the large dogs of the country. But the difficulties and dangers of work of this kind were such as Englishmen had always been found—and, in Mrs. Bent's presence, he should say Englishwomen also—ready and able to perform. This was a subject upon which they might very much congratulate themselves, that Englishmen had always been working in this direction. As early as the middle of last century they had Pocock, and, a little later on, W. R. Hamilton, the Secretary of Lord Elgin, travelling in Asia Minor. They had in the beginning of this century Colonel Leake, and a little further on Sir Charles Fellows, whose excellent labours in Lycia resulted in procuring for the British Museum the magnificent series of Lycian monuments, which

they all knew. Next to him came Sir Charles Newton, whose work on the coast of Caria resulted in the acquisition for the British Museum of the magnificent marbles of Branchidæ, of Knidos, and the Mausoleum. It was pleasant to think that even in modern days the torch of archæological research was still kept burning in competent and willing hands. They had Professor Ramsay, whose researches in Phrygia were well known. They had Mr. W. R. Paton, whose researches on the coast of Caria had resulted in some very interesting antiquities, and they had also the present and past researches of Mr. and Mrs. Bent, who he hoped would proceed to continue their explorations next year. It was a point which they looked upon with some amount of complacency, that whereas the French, the Germans, and Americans made those expeditions to a certain extent under State subvention, nearly all the names that he had mentioned represented private enterprise. That was the method in which Englishmen had always been accustomed to work, but at the same time he thought that work of that kind would be better performed, and possibly bring larger results, if the learned societies of the country could give assistance. Unfortunately in the British Museum, with all the will in the world, they were the slaves of an indigent Treasury, and, do what they would, they could not assist in the way they would like. What was really wanted in Asia Minor was, as Mr. Bent had shown, a complete and elaborate exploration of small individual sites by individual travellers. There was one point that had not been mentioned in the paper, which would illustrate what accuracy of research was required for this purpose. An American gentleman was sent out through the munificence of a private American lady two years ago, to explore this very district. He started from the coast and went along the main road for a considerable distance inland, right through the country where Mr. Bent had made his discoveries. Taking it for granted that the country so near the sea would already have been explored, he missed in that way all the results which Mr. Bent had found in such large quantities. If more volunteers like Mr. and Mrs. Bent could be found, and if the necessary organisation could be brought about by the learned societies, they might in time hope for a complete archæological and geographical survey of Asia Minor, with results of which it was impossible to estimate the full value. In this matter he thought archæology and geography might well go hand in hand.

Mr. DOUGLAS W. FRESHFIELD was afraid he had nothing to say on the immediate subject of the very interesting paper just read, but, in the absence of Sir Charles Wilson or other speakers, he might be allowed to say a few words of welcome to the class of paper to which it belonged. It must be a great satisfaction to all present to hear sometimes papers read which referred to countries that were comparatively near home, and were peculiarly interesting to everyone who had received a classical education. The more many-sided they could make geography, the more geographers there would be, and the better geographers they would make themselves. It was very pleasant, alternately with papers on the distant highlands of Central Africa, or on New Guinea, on what might possibly be the future seats of the highest civilisation, to go back to the seats of ancient civilisations, and to hear of countries from which those to whom we owe what we are, started. Mr. Bent's paper showed how essential geography was to the right reading of history, and also furnished evidence as indeed Mr. Stanley's paper had done, how truthful in the main the old geographers were. It was always satisfactory to find Herodotus, who had been recently depicted as the "father of lies," turned into the father of truth instead. To-night it had been Strabo's turn, and he had had his description of ancient localities vindicated. He should like to bring forward another vindication of the same author.

Strabo described with curious detail how a people who came to Dioscurias (Sukhum Kaleh) over the snowy passes of the Caucasus used to wear crampons tied o

their feet. He had brought from the Caucasus one of these crampons, found in an ancient grave near Vladikavkaz, and it was now on the table. It was very similar to the crampons depicted by De Saussure as worn 100 years ago by the natives of Chamonix, when they wanted to go over the glaciers of Mont Blanc. It was not only with reference to suchlike antique matters that this class of paper might prove of value, for not long ago England was interested in an island within sight of the scene of Mr. Bent's explorations, and he believed that Her Majesty's Government, wishing to put information in the hands of its officers, had been reduced to buying up Murray's Guide-Book to Syria. He hoped that whenever information was required about Asia Minor there would be plenty to be found in the Annals of their Society. At any rate, the Society was about to publish a lengthy and valuable book by Professor Ramsay, which would contain the geographical records of his late journey in Asia Minor, and would, he was sure, help to stimulate others to similar explorations.

The President said it seemed only a few days ago since Mr. Bent gave them an extremely interesting account of his exploration in the Bahrein Islands. He thought the meeting would admit that Mr. Bent had used the brief period of his absence very much to the advantage of the Society, as well as to his own. It would be remembered by many that Cicero passed some time in Cilicia, and when he returned to Europe was very much annoyed that a triumph was not given to him for his exploits there. Those there assembled could not give a triumph to Mr. and Mrs. Bent, although they travelled much further into the mountains than ever that great man did. They could not even give Mr. and Mrs. Bent an ovation, but they had given them an extremely kind reception, and he (the President) trusted that they might have many a paper from Mr. Bent, on *intensive* as distinguished from *extensive* geographical research, before he became the permanent occupant of one of those tombs which he had described as so particularly agreeable as a temporary residence.

He (the President) had only to add that this was the last meeting of the season, and that the Society would adjourn till the month of November, when he hoped he might have to lay before them some matter as interesting as that to which they had listened that evening.

GEOGRAPHICAL NOTES.

The Memorial Stars for Stanley's faithful Zanzibaris.—The silver stars, with inscription "Emin Relief Expedition, 1887-89," which our President announced at the Albert Hall Meeting as having been awarded by the Council to the faithful Zanzibaris who accompanied Mr. Stanley across Africa on his late expedition, were despatched to Zanzibar by the last mail. The stars are five-rayed, and furnished with a ring by which they may be suspended by a cord or in any way the wearer may please; they are 175 in number. The parcel has been addressed to the care of Colonel Euan Smith, our Consul-General, who has been requested to distribute them, as opportunities offer, according to the muster-roll in the hands of Messrs. Smith, Mackenzie,

and Co., of Zanzibar. One of the faithful, who is now with his master in London, has received his star direct, and attached his signature to the following letter of thanks:—" July 10th, 1890. Sali bin Othman demands that I express his best thanks to the Royal Geographical Society for sending to him the high distinction of a silver star as a decoration for his fidelity in Africa while serving with the Emin Pasha Relief Expedition.—Henry M. Stanley ; Saleh bin Osman."

Exploration in the Cameroons Region.—Lieutenant Morgen, the successor of Captain Kund in the exploration of the "Hinterland" of the Cameroons, made an excursion last December westward from Ngila, Tappenbeck's furthest point. Crossing the river Mbaw, a tributary of the Sannaga, which he considers to be of more importance than the main river, he followed for some days the northern bank of the Sannaga, and then crossing over to the other side of the river, reached the Idia Falls on the 12th January, and Malimba on the following day. The Sannaga is stated to be impracticable for navigation.

A Scientific Expedition to the Congo.—We learn that the Belgian Government have, at the instance of the Belgian Academy of Sciences, voted the sum of 1200*l.* towards the cost of a scientific expedition to the Congo State. The main object of the expedition will be to make magnetic observations for the purpose of ascertaining the declination, inclination, and intensity of terrestrial magnetism. Captain Delporte, Professor of Geodesy at the Military School, will be in command, and will have Lieutenant Gillis for a companion. Although the route of the expedition will be mostly along beaten paths, there is no doubt that the cartography of the region will benefit by the more accurate determination of fixed points.

Dr. J. Murray on the Origin and Character of the Sahara.—At the Annual Meeting of the Scottish Meteorological Society, on July 12th, Dr. John Murray read a paper on the meteorological conditions of desert regions, with special reference to the Sahara, the northern border of which he had recently visited. He pointed out that the arid regions of the world were distributed in two bands, north and south of the equator. They were all inland drainage areas, or areas where the streams had no connection with the sea. They were also regions where evaporation was in excess of precipitation, for if the latter were in excess the water would rise till it could flow into the sea, as in the case of the great lake district of North America, and the area would no longer be one of inland drainage. The largest of the deserts, the Sahara, was about three and a half million square miles in area, and the area of all the deserts of the world together was about 11,500,000 square miles. That was to say, over one-fifth of the land of the world had no outlet for drainage to the sea, and in all that area evaporation was greater than precipitation. These areas corresponded very closely with the regions of the world

where the rainfall was less than 10 inches annually. In no place in the world could there be got such enormous ranges of temperature as in the deserts. In the Sahara the temperature sometimes fell from 100 degrees during the day to the freezing point during the night. That arose from the great dryness of the atmosphere, and from the radiation that took place from the burning soil after the sun had set. These inland drainage areas corresponded very much in their barometric phenomena. In all desert regions during summer all the winds blew in to them. In winter the reverse took place—the winds flowed out of them, and that held good both for the northern and the southern hemispheres. This led to the low rainfall, for the great majority of these regions were more or less bounded by high hills. The winds came into the deserts over these hills, and the vapour was precipitated from the atmosphere by the hills, with the result that when the winds reached the interior regions there was nothing left to be deposited. If there were not hills all round any desert area, then, as in the case of Northern Asia, the winds passed from a colder to a warmer climate, and as they got to warmer regions they were able to contain more vapour, and none was precipitated. Dr. Murray then proceeded to give an account of his own views and impressions as to the Sahara. During the *Challenger* expedition he and his companions had found in the bed of the Atlantic for a long distance west of the African coast opposite the Sahara, and in the bed of the Indian Ocean to the south of Australia, small grains of red quartz sand, and they had found scarcely a trace of such in the sea-bed in any other part of the world. He suspected this quartz sand had been blown out from the Sahara in the one case, and from the Australian desert in the other. On his journey southward through Algeria, he found the country as far as Tougourt converted into a garden by means of artesian wells. At Tougourt the real sandy part of the desert began, and he made excursions into it, with that town as his headquarters. He exhibited to the meeting a specimen of the sand, of a light yellowish-brown colour, and exceedingly fine in the grains. There were, he said, a good many clay particles in it, and the quartz particles, which were also numerous, were identical with those they had got in the bottom of the Atlantic. There was no doubt that the winds from the desert carried the sand a long way out to sea. He had also examined the region geologically, and the formation of the rocks was entirely that of fresh water, and of quaternary date. The great majority of geographers and geologists had expressed the belief that the whole of the Sahara was an old sea-bed, but he was of opinion that it had never as a whole been covered by the sea since Cretaceous or Devonian times; and no part of it, he believed, had been covered by the ocean since Tertiary times. The whole question about the discovery of shells seemed to rest upon one common species being found very rarely in one region of the desert. He thought that, owing to recent researches, the opinion as to the Sahara being an old sea

bottom was very likely to disappear from our text-books. He considered that the features of the region had been produced by atmospheric conditions. The sand was the product of the disintegration of the rocks *in situ*. The existing rock was not far below the surface, and by digging down to it, the hard sandy particles were found embedded in the stone. The sun shone on the rocks, and they expanded. The sudden cooling at night broke them up, the wind carried away the smaller particles, and so continually the rocks were being disintegrated by means of changes other than water, although water perhaps had in times past played a greater rôle there than it did now. There was a range of hills in the desert, 7000 feet high, and for three months in the year their summits were covered with snow. Descending the hills were old river-courses, some of great length. Much of the region, he considered, had once been a large fresh-water lake. Speaking of the commercial aspect of the Sahara, he said it was difficult to go there without becoming enthusiastic about it. But there seemed to be no limit to the amount of water that was to be got by sinking artesian wells. The cultivation of palms was extending to an enormous extent, and the French expected to carry on their railway to Tougourt (at present nearly a week's journey from Algeria) in the next few years.

Somali Land.—The Italian traveller L. Robecchi has undertaken a journey into the unknown interior of Somali Land. He started in March last. The expedition is being supported by the African Society of Naples.

The Russian Expeditions in Central Asia.—Our correspondent M. Venukoff informs us that he had received a letter from Captain Grombchevsky, dated May 4th, in which he informs him that he left Khotan for Nia (the winter quarters of Pievtsof's expedition) on the 1st March, and that he found the members of the expedition in perfect health, and making all ready for their passage over the lofty mountain range into Tibet in May. The route between Khotan and Nia he described as being over a sandy plain, which in some parts is a perfect desert, studded with sandhills often 200 feet high, and in others is skirted on the north by forests of poplars, which prove the existence of perennial water not far below the surface of the arid soil. At Surkhan he found 3000 Chinese working for gold. He states that Lieut. Roborofsky, of the Pievtsof Expedition, had made an excursion in March to Cherchend, through a country similar to that between Khotan and Nia, i. e. a sandy desert here and there traversed by rivers which descend from the snowy range on the right and soon lose themselves in the desert. The route to the north was bordered in a similar way with forests of poplar, in which occasionally families of shepherds were seen whose herds were pastured on the foliage. Water was found without difficulty at a small depth below the surface, and sometimes it

appeared in little pools on the surface. North of the belt of poplars a vast desert stretches away to the Tarim and beyond, which no one is bold enough to penetrate. Five rivers were crossed between Nia and Cherchend, the largest being the Bostam-tograk, the borders of which were oases of verdure of greater or less width. In continuing his route towards the source of the Cherchend river, Lieut. Roborofsky reached the place where he had been before with Prejevalsky in 1886, on that occasion coming from the east.—In May, Captain Grombchevsky intends to leave Polu (whence he despatched his letter) for the plateau of Western Tibet, and has some hopes of reaching Lhasa.

M. Bonvalot.*—News has been received of the arrival of M. Bonvalot and Prince Henry of Orleans at Tachienlu, in Western China, on the borders of Tibet. The travellers, it will be remembered, reached Lob-Nor from Russian territory, viâ Kulja and Karashahr, in November last. They have now succeeded in crossing North-eastern Tibet, and so far accomplished the programme with which they set out.

The Island of Flores.—At the end of last year a Dutch expedition under the leadership of Herr van Schelle, a well-known geologist, made an attempt to explore the tin-mines near the south coast of the little-known island of Flores in the Malay Archipelago. A landing was effected near the mouth of the river Aimere, but on the second day's march up the country, the party was surprised by an attack from the natives, and compelled to beat a hasty retreat. The leader of the expedition and the two government officials were wounded. From the report of this brief excursion, we learn, however, that the maps of the island, even as regards the coast, contain many errors. A little to the west of the Rokka Mountains the Bay of Aimere cuts rather deeply into the land; at the inmost part of the bay the river Aimere empties itself. This river appears to come from the east, but in its lower course it has a north and south direction. Behind the Rokka Mountains rises another range, the Langga, which trends away to the north-west. On the west side of the Bay of Aimere there are the Sui Mountains with an extinct crater which is partially intact; further west the coast ranges are lower. At Nboro, where the river Nango Nboro debouches, the coast is flat for several miles inland. It is intended that another attempt shall be made to visit the tin-mines, and Van Schelle will this time take an escort of 150 soldiers.

Dr. Nansen's proposed North Polar Voyage.—We learn from a despatch of Mr. Michell, our Consul-General at Christiania, that the Norwegian Storting have voted, by 73 votes against 39, the sum of 200,000 kroner (11,000*l.*) towards the expense of the Polar Expedition which Dr. Nansen proposes to conduct. We gave in the March number of the 'Proceed-

* 'Proceedings,' *ante*, pp. 38, 98, 234.

ings' * Dr. Nansen's plan of the proposed expedition, and the facts and hypotheses of Polar currents on which it is founded. If the remaining funds can be obtained, Dr. Nansen intends to start early in 1892.

A New Danish Expedition to East Greenland.—The Danish Government will despatch next spring to the part of the East Greenland coast been 66° and 73° N. lat. which at present remains almost a blank on our maps, a well-equipped expedition under Lieut. Carl Ryder of the Danish Navy. It will consist of nine persons, one besides the commander being a naval officer, four others sailors, and two Greenlanders. It will be provisioned for two years.

Obituary.

Edward Colborne Baber.—Our Society and the geographical literature of our country have sustained a heavy loss by the death of this accomplished traveller, which event happened at Bhamo on the Upper Irawadi, on the 16th of June last, in the forty-seventh year of his age. His journeys in Central China in 1876–78, and the admirable series of reports and papers in which he gave the results to the world, excited great attention at the time from the precision, originality, and completeness of his observations on a wide range of subjects relating to the topography, climate, physical geography, ethnology and languages of the remote districts visited, and the clear and vivacious style in which they were set forth. The first of these journeys was that of 1876, in which he accompanied Mr. Grosvenor across Yunnan to the Burmese frontier, to investigate the murder of Mr. Margary. The second was an adventurous tour through the Sze-chuen highlands in 1877, during which he visited and studied the language, spoken and written, of the remarkable indigenous tribe of Lolos. The third was from Chung-ching to Tachienlu in 1878. He had great natural aptitude as a linguist and acquired within a comparatively short space of time a mastery of the Chinese language, as well as that intimate knowledge of Chinese customs and habits of thought which enabled him to collect the great amount of miscellaneous information with which his reports are enriched.

Mr. Baber went out to China as Student Interpreter in 1866, proceeding to Peking, where his merits were soon recognised by Mr. (now Sir Thomas) Wade, then minister at the Chinese court. He passed quickly through the various grades of the service, and reached that of first-class assistant in 1872, when he filled for a short time the post of Vice-Consul at Tamsuy, in Formosa. In 1879, he was raised to the post of Chinese Secretary of Legation at Peking, in succession to another eminent Chinese scholar, the late Mr. Mayers. In 1885 and 1886 he was Consul-General in Korea, and soon afterwards received the appointment of Political Resident at Bhamo, which he filled up to the date of his death.

His account of his "Journey of Exploration in Western Ssu-chuan" was read to the Society by the late Captain W. Gill, in the absence of the author, in June 1881, and was subsequently published *in extenso*, with maps and numerous

* *Ante*, p. 177.

illustrations, together with reprints of his official reports, in the first volume of our Supplementary Papers. These papers were hailed by the best authorities, Colonel Yule, Captain Gill, and others, as a most valuable addition to our knowledge of the geography of Central China. He had prepared himself by a previous training in astronomical observation and mapping for this part of his work, and in all his journeys made careful route surveys which he checked by observations for latitude and longitude, taken whenever practicable. On his principal journey his survey embraced 121 astronomical observations to fix positions. For these achievements he was awarded the Royal Medal of the Society in 1883, which he received in person at the Anniversary Meeting of that year. In the same year he read at our evening meeting of April 23rd, a descriptive paper on "China in some of its Physical and Social Aspects."

We are indebted to his father, Mr. E. Baber, for the following additional biographical notes:—

"Mr. Edward Colborne Baber was born 30th April, 1843, at Dulwich. 'The School of the College of God's Gift,' of which the present Dulwich School is the mature growth, had been opened in the previous summer, and I had been appointed head-master. I subsequently became head-master of the junior school at Rossall College, and under my care the boy received his education up to the age of ten years. As a proof of the possession and early development of unusual intellectual power it may be mentioned that on his seventh birthday he repeated correctly and intelligently the whole of the first book of Milton's 'Paradise Lost.' At the age of ten years he was admitted to Christ's Hospital, where he continued upwards of nine years, passing through in the usual way until he finally became a Grecian, and ultimately left, having obtained his exhibition.

"During this period he began to display remarkable decision of character, which was sometimes manifested in a way not quite agreeable to the authorities. I could not, however, ascertain that there was anything alleged against him, except that he was habitually inattentive and idle. Whether such an estimate was just or not was soon decided. An announcement appeared a few weeks afterwards in the public papers, of four open scholarships for competition at Magdalen College, Cambridge, of the value respectively of 60*l.*, 40*l.*, 40*l.*, and 30*l.*, per annum, tenable for three years, and with my concurrence he determined on submitting to the test of this competition. He obtained the 60*l.* scholarship, and the school committee, although they had threatened to withhold this privilege, recommended him for the exhibition of 80*l.* per annum.

"To Cambridge he accordingly went, where he took his B.A. degree in the usual course. His next step was to enter for the Civil Service examination of candidates to compete for three Student Interpreterships for China or Siam, held 10th July, 1866, at which he obtained the first place, scoring 1042 marks out of a maximum of 1350, the other successful candidates making 946 and 923 respectively.

"The following from a letter to me under date Peking, 29th June, 1867, is interesting, not only as showing his zeal and energy in the prosecution of his duty, i. e. the study of the Chinese language, but also as giving some idea of the peculiar difficulty of the task. He writes:—

"As to mastering the language, which you give me credit for intending to do, are you aware that that has never been done yet, and will as certainly never be done? Are you aware that thousands of Chinese read their own language thirty years or more, and in very rare instances indeed master more than a tenth of the characters it contains? Nevertheless, I am very well satisfied with the progress I have made. I have been working with small intermission between nine and twelve hours a day for six months, and yesterday evening I finished the colloquial course of Mr. Wade.

Exactly six months, the shortest time it has ever been done in. . . . To give you some idea of the amount of work involved in learning Chinese, by the time you get this letter I shall have thoroughly learned, so as to be able to write them, which very few can do, about three thousand characters, very few of which have any connection with others, and even that often imaginary or conventional.'

"Having succeeded in his examination, his time was now devoted to the acquiring of the language as perfectly as possible, and in the following February he mentions two years as the period in which he expects to master it, yet on 16th of April he had entered the Chinese Secretariat, which he says 'A man is not usually thought fit for until he has been reading for at least five years, and as I have been grinding at Chinese for little more than a year you may imagine the result is a great strain on the powers of memory and attention. I am getting on very well with Chinese, though I don't see the end of it yet.'

"That he may not be exposed to the charge of vain boasting, it is only necessary to observe that this was written in the usual frankness of family correspondence. Thus he went on until on the 9th October, 1870, he speaks of having changed into the Consulate of Canton, and so he passes through the usual grades of the service without anything of great importance occurring until he reaches the turning point in his career, when, in 1875, he was appointed to Mr. Grosvenor's Mission, which experienced very protracted delay in starting through the dilatoriness of the Chinese Government. Meantime he writes (14th August), 'I am brushing up my mathematics and working hard at astronomical observations for determining latitude and longitude; another fortnight will find me tolerably proficient. Seeing that it is very possible we may pass through districts never previously visited by Europeans, it will be of great advantage to me to become a practical observer.' Thus careful was he in qualifying for duty, and hence the thoroughness with which he discharged it.

"But they yet waited on. 18th September he writes:—'The cue of the native Government is procrastination to the uttermost. Until the knife is at their throats they will hold out.' Nor did they set out until November, when the *expedition* travelled at a *speed* of ten miles a day in a large junk.

"It is needless to pause over further details, the narratives of this journey, as well as of his subsequent travels, having been published.

"On 4th February, 1877, he announces his mission to Ch'ung-K'ing, on which he was accompanied by the lamented Captain Gill. Respecting this he writes:—'I have nothing whatever to do but to take a house at Ch'ung-K'ing and look about me. We shall have no Europeans within several hundred miles of us, and if Gill leaves me I shall be quite alone.'

"On 8th December, writing from Ch'ung-K'ing, he says, 'My late journey was made under circumstances of considerable privation and extreme changes of climate. For instance, two days after starting the heat was so intense that I slept naked by the wayside with a coolie fanning me; two months afterwards I was shivering in huts of wattle and cow-dung among snowy mountains. This is severe work, especially on native food, but my health did not suffer in the slightest, and I now feel prepared for anything in the way of Asiatic travelling.'

"How different the glee with which he regarded his prospects, and the regret we now feel on looking back on the exposure to which he refers! Then, no doubt, were laid the seeds of the disease to which he has at length succumbed. Whilst we admire the heroism with which he sacrificed himself, we cannot but mourn that such a life should have run so short a career. He has since this time been much at home invalided. Of his subsequent appointment at Korea there is nothing to record, whilst his work at Burmah, hardly begun, has been cut short by his melancholy death.

"He was never married, but there is reason to believe that an early attachment, which was followed by the premature death of the lady, left a premature gloom on his mind."*

THE ANNIVERSARY MEETING, JUNE 16TH, 1890.

The Right Hon. Sir MOUNTSTUART E. GRANT DUFF, G.C.S.I., President,
in the Chair.

ELECTIONS.—*Rev. Charles Wright Barclay, M.A.; Rev. T. C. V. Bastow; J. Theodore Bent, Esq.; Isidore E. Clifford, Esq.; Emmanuel Clough, Esq.; Capt. E. O. V. Haldane; Henry Godfrey Holdsworth, Esq.; George Pierre Hunot, Esq.; Captain Mainwaring G. Jacson; A. J. Jordon, Esq.; Sir Archibald Lamb, Bart.; William Edward Nicol, Esq., J.P., D.L.; Rev. W. H. P. Richards; Joseph Rock, Esq.; Herman Seidel, Esq.; George Edward Skerry, Esq.; Francis Gray Smart, Esq., M.A., M.B., F.L.S.; R. Lynn Smart, Esq.; Henry Taylor, Esq.*

The proceedings commenced by the reading of the rules relating to Anniversary Meetings, after which the Secretary (Mr. DOUGLAS FRESHFIELD) read the minutes of the last Annual Meeting.

The PRESIDENT then appointed Admiral Sir ERASMUS OMMANNEY and Colonel G. T. PLUNKETT, R.A., as Scrutineers of the Ballot.

PRESENTATION OF THE ROYAL MEDALS.

The Royal Medals for the Encouragement of Geographical Science and Discovery had been awarded by the Council this year as follows:—

The Patron's or Victoria Medal to EMIN PASHA; in recognition of the great services rendered by him to Geography and the allied sciences by his explorations and researches in the countries east, west, and south of the Upper Nile, during his twelve years' administration of the Equatorial Province of Egypt.

* "My son never mentioned this subject, but the following lines written by him on the occasion show how deep an impression it made:—

Why are the fond forsaken?
Why do the dear ones die?
Shall we from death awaken,
To find the loved ones nigh?
Is it but empty seeming,
An idle tale and vain,
That I am always dreaming
Of meeting thee again!

O fondest, truest, dearest!
In that sweet heaven above,
I wonder if thou hearest
The voice of thy true love?
The voice that often moved thee,
As none could move before;
The voice of him who loved thee,
And lost thee—dead Lenore.

Hast thou the same sweet presence
As in the happy past,
Or art thou but an essence,
That wanders in the vast?
Or does that same sweet spirit,
That filled a form so fair,
In some high heaven inhabit
The shape that angels wear?

Oh! my heart, my heart is aching,
With longing to be free.
If death has any waking,
I shall awake with thee.
Such burning thoughts come thronging,
And thrill me more and more,
With an eternal longing
To be with thee, Lenore."

The Founder's Medal to Lieutenant F. E. YOUNGHUSBAND; for his journey across Central Asia in 1886-87, from Manchuria and Peking via Hami and Kashgar and over the Mustagh to Kashmir and India; and especially for the route-surveys and topographical notes made by him over a distance of 7000 miles, the results of which have been of much value to the cartography of the regions traversed, as supplementing or correcting the previous route-maps of Prejevalsky and Carey.

Dr. R. W. FELKIN attended by desire of Emin Pasha to receive the medal on his behalf, and the PRESIDENT, addressing him, said:—

You would, I am sure, Dr. Felkin, be even more glad than any of us who are present if Emin Pasha could have been here to-day, and could himself have received his medal. As that, however, is impossible, it is most agreeable to me to comply with his wishes, and to hand it to you, who have done so much to make his work known to the English public. You are aware that this Society has no politics and no political proclivities at all. We do not see in Emin Pasha a German subject nor an officer of the Khedive; we do not see in him one of Gordon's lieutenants, or a companion of Major Wissmann; we simply see in him a man who has in early life given a great deal of attention to botany, to natural history, and other studies which go to make an intelligent traveller, and who, having had very great opportunities whilst he was in charge of the Equatorial Province, made in and around that Province more than, I think, twenty journeys, by which he very much added to our knowledge of those countries, and our general knowledge of geography. I sincerely trust that Emin Pasha's health may be such as may enable him to fulfil the aspiration which he expressed in his courteous telegram sent to me as President, some time ago, in which he said he hoped he would be able to do much more for geography in the future than he had done up to the present.

Dr. R. W. FELKIN replied in the following words:—

Mr. President, Ladies, and Gentlemen,—In receiving this medal on behalf of Emin Pasha I am expected to address a few remarks to you. I can assure you that no one in this room regrets more than I his absence. It is to me personally a great disappointment, as I confess I had hoped to witness his reception by the Royal Geographical Society, being convinced that it would have been a very cordial one. I regret his absence the more, because I am unable to explain to this meeting his reasons for not having returned to Europe. Since Mr. Stanley's expedition arrived at the Albert Lake I have had no communication with him, except two brief letters and the telegram requesting me to represent him here to-day. In both letters he has referred to other communications which he has sent me, in which his position and intentions were explained, but, unfortunately, these have never reached me. When I received his telegram requesting me to act as his substitute to-day, I felt that I could not do otherwise than accede to his request, feeling as I do that I am responsible for having brought his name prominently before the public, although I do not hold myself responsible for any idealised conception of him which apparently has been formed in some minds, nor is it my attention on this occasion to express any opinion as to the course he has seen fit to adopt since our correspondence has miscarried. In all I have written and spoken concerning Emin Pasha I have tried to be accurate and just. I formed, and I still hold, a very high opinion of him as a scientist, a humanitarian, and an administrator. As a scientist he may well rank with Schweinfurth, as a humanitarian with Livingstone, and when speaking of unselfishness, of devotion to duty, and of anxiety for the welfare of the people committed to his charge, he may be mentioned in the same breath with Gordon. But I have never claimed for him military genius, though at the same time I can only express my surprise that he conducted his military affairs as well as he did,

especially when the material he had to work with is taken into account; and this I feel sure those who have taken the trouble to read his published letters will readily understand. In any case, the indubitable fact remains that for years, cut off from all communication from the outside world, he, single-handed, maintained his position at the furthest outpost of civilisation. To-day I appear as a scientific man, before a scientific society, and I have, therefore, only to refer to Emin Pasha's scientific attainments, begging you to remember that his work has been accomplished entirely deprived of the stimulus of intercourse with men like-minded with himself, and under circumstances of unparalleled difficulty. The contributions which he has made to science during the last fifteen years are many and varied, and of no mean order. It would be impossible for me to detail at length the rich stores of knowledge he has added, not only to geography, in which you are specially interested, but to the sister sciences of anthropology, philology, meteorology, and natural history.

Referring, in the first place, to Emin's geographical work, I find that from 1878 to 1883 no fewer than eleven geographical papers, besides many smaller communications, have been published in 'Petermann's Mitteilungen.' These papers have been accompanied by six large and valuable maps; in addition to this his routes in Monbuttu were published together with Junker's surveys. Several papers of merit have also appeared in the 'Proceedings' of the Geographical Society of Vienna, and his last great work, the survey of Lake Albert, is now being compiled by Dr. Hassenstein, and will be published this year. A paper on the Albert Nyanza, containing an account of his discovery and exploration of the Semeliki river, was published by the Royal Scottish Geographical Society two years ago. The route surveys made by Emin, and already published, extend to more than 4000 English miles, and he has not contented himself with a simple detailed survey of his various routes, but he has also made a triangulation survey of the country extending from the Victoria and Albert lakes in the south to Lado in the north, to the river Djur in the north-west, to Monbuttu and the river Welle in the south-west. The base-line for this triangulation—Lado, Redjaf, and Gebel Kunuf, has been measured repeatedly, and with great care. The surveys which Emin has made are characterised by the utmost accuracy and minutest detail, and rival those of the best explorers. In fact, as Herr Wichmann, of 'Petermann's Mitteilungen,' writes me:—"One may say that Emin Pasha's provinces are more reliably mapped than Darfur and Kordofan, where a large staff of surveyors were engaged in the work. It is true that Emin has not been able to compute latitudes and longitudes, but this deficiency has been reduced in importance by his care and the frequent repetition of his surveys, this forming an excellent confirmation of his work."

Turning next to meteorology and climatology, Professor Hann of Vienna writes to the following effect:—"In my opinion no one can compare with Emin Pasha in the amount he has done, entirely unaided, for the climatic investigation of a country which was quite unknown before his residence in it. His perseverance for so many years in making meteorological observations three times a day, and this with scientific accuracy, is simply wonderful. Nothing was known of the meteorology of this part of Central Africa before Emin Pasha worked there, and now this district belongs to the best investigated of the whole of Central Africa; and as the result of his work Lado has become the point to which all barometrical observations of heights are referred in East Equatorial Africa. It would be fortunate if there were in South America a point, the meteorology of which were so perfectly ascertained as that of Lado. In South America there is a great empire with European civilisation, having had for many years a monarch at its head who was interested in science, and yet we are completely destitute of all accurate knowledge of its climatological conditions.

From such a summary as this may be seen most clearly what one man—Emin Pasha—has done in Central Africa. The science of meteorology will for ever owe him the greatest thanks for his work.”

I may mention that Emin Pasha's meteorological journals contain observations for seven years and ten months. They continued up to the 4th December, the very day on which he met with his accident; and it is a noteworthy fact that on the 5th of January, 1890, he recommenced his meteorological observations in the German hospital at Bagamoyo.

Regarding Emin Pasha's services to natural history, I have to thank Professor Flower and Mr. Oldfield Thomas, of the British Museum (Natural History), for the following information. Mr. Oldfield Thomas writes:—“Ever since Emin went out he has industriously collected the animals in the regions in which he has found himself. Commencing, like so many other naturalists, with the birds, he sent several different collections to Dr. G. Hartlaub, of Bremen, and Dr. Von Pelzeln, of Vienna, each of whom published several papers on his collections, and described many species discovered by him for the first time in these districts around Lado. Many mammals also were collected at the same time and formed the basis of a valuable paper by Dr. W. Leche. His first connection with the zoologists of this country was in 1887, when he sent to our national museum the magnificent collections worked out by the staff of that institution, in a series of papers published in the first part of the Zoological Society's 'Proceedings' for 1888. This collection (consisted of over 100 mammals, the most difficult and troublesome of all things to collect, some 350 birds belonging to 179 species, many reptiles, batrachians, 380 butterflies, belonging to 356 species, of which no less than 15 were new to science, besides many beetles, scorpions, and a large number of land and freshwater shells.”

The care and trouble necessary to form such a collection as this can only be understood by those who have tried to do it themselves, and it must have occupied an enormous amount of time, time which has resulted in removing the thick veil behind which all the animal productions of Central Africa were hidden. What the fauna of the great Equatorial forest is was absolutely unknown until Emin made expeditions to Tingasi in Monbuttu in 1883 and 1884, and sent the specimens obtained to the British Museum. Those specimens prove that in crossing the watershed of the Congo basin into the great forest Emin found a fauna which was practically identical with that of the Gaboon, an enormous extension of the West African fauna that was as striking as unexpected.

After sending these collections, we know from Emin's letters that he was actively engaged in collecting specimens from the districts round the great lakes; but most unfortunately all were left behind when he started to return with Mr. Stanley. Still, however, after losing the fruits of several years' hard work, Emin was not disheartened, but collected energetically throughout the retreat, and obtained many most valuable and important specimens, ending with sending a number of forms found at Bagamoyo. Of these collections the birds have been sent to Dr. Hartlaub and the mammals partly to the British Museum and partly to the Zoological Society, under whose auspices they have been worked out and described.

All the many specimens obtained in these years of collecting have been most carefully and conscientiously labelled in Emin's own handwriting, and no tribute can be too high for the man who with the cares and troubles incidental to such a position could find time systematically and steadily to prepare for scientific examination the enormous mass of material which science generally, and British scientists especially, owe to the enthusiastic naturalist, Emin Pasha.

I have only time to refer in a word to Emin's anthropological studies. No one has, I think, described with more detail or insight the habits, customs, and folklore of the

native tribes with whom he has come in contact, and although much has already appeared in 'Emin Pasha in Central Africa,' a vast store of knowledge is awaiting publication in this connection. Emin has also made many detailed anthropological measurements of the natives amongst whom he has lived, and in 1887 he sent two Akka skeletons to the British Museum, which constituted the material for Professor Flower's paper in the journal of the Anthropological Institute for May 1888. As Professor Flower writes to me: "These were the first skeletons of any of this pygmy race, now exciting so much attention, made available for scientific examination."

Such, Mr. President, Ladies and Gentlemen, is a brief outline of the scientific work accomplished by the man whom you have decided to honour with the blue ribbon of your Society. I had the privilege of seeing him engaged in this work, and can bear personal testimony to the ardour with which he threw himself into its prosecution; though, notwithstanding his keen desire to enrich science, he never permitted his favourite studies to interfere with his official work, and the improvement of his people and the peaceful extension of his sphere of influence were always his first consideration. It was only during the necessarily long and tedious journeys, accompanied as they were by numerous detentions, partly caused by the difficulty of the terrain traversed, partly by delays owing to patient negotiations with chiefs and tribes, or, on the other hand, during hours snatched from sleep, that he pursued his scientific investigations. Though some may speak with contempt of a man who can interest himself in beetles, birds, and butterflies, scientists may well disregard such criticism, and will know how to value at its proper worth such patient and persevering devotion to nature and science. I beg, on my own behalf, to thank you for the indulgence with which you have listened to me, though I fear I have taxed your patience, and on behalf of Emin Pasha to thank you most heartily for the honour you are conferring upon him, which I am sure he will regard not merely as a reward for work in the past, but as an incentive to the pursuit of, if possible, still greater achievements.

The PRESIDENT, in presenting the Founder's Medal to General YOUNGHUSBAND on behalf of his son, Lieutenant F. E. YOUNGHUSBAND, said:—

I have very great pleasure in handing this medal to you for your son. Emulous of your own distinguished career in India, he determined to add something to our knowledge of the countries lying to the north of India, which some twenty years ago were all lumped together under the name of Exterior Central Asia. Starting from Peking he passed the Great Wall of China, entering the country known to Marco Polo, and described by him as the country of Gog and Magog, passed through one of the very worst portions of the Gobi Desert; then across the Zingari wilderness till he arrived at the Tian Shan, and to the countries little known, but now better known, of Kashgar and Yarkand. From that point most travellers, satisfied with what they had done, would have desired to reach India by the most easy route. Happily, your son was more ambitious. He saw rising before him the Mustagh Range, which appeared to him like a number of needle peaks, such as the Matterhorn, standing up before him, only with this difference: where he was the Matterhorn would have been some distance below him, whereas these peaks were some thousands of feet above him. He determined to find his way through an exceptionally difficult pass, and he did so with an amount of exertion which would be spoken of with respect, even by experienced members of the Alpine Club. Since that journey he has made other journeys in the neighbourhood, of which we shall doubtless hear in good time. You will, I trust, convey this medal to him with our congratulations for the past, and our best wishes for the future.

General YOUNGHUSBAND, in reply, said :—

I cannot express the pride and gratification I have in receiving this high honour for my son. In writing to ask me to receive it, he begged I would acknowledge in suitable terms to the President and Members of the Geographical Society, a sense of the honour done him, and I cannot do better than give it in his own words :—" Please convey to the President, Council, and Fellows of the Royal Geographical Society my most grateful thanks for the high honour they have conferred upon me in presenting to me their Gold Medal, which to an explorer is the most coveted of all prizes. To me it has been especially gratifying to receive so great a distinction, for many and many a time, in the depth of gloomy forest, on the scorching desert, or among those terrible Himalayan glaciers, when I have had no European near to encourage me, I felt inclined to give in and leave the secret of the desert and the mountains to be discovered by others. But now I can feel that my humble efforts have not been in vain, and while the hardships and difficulties of the journey have long since been forgotten by me, I shall now, through all my life, bear a grateful remembrance of the way in which the Royal Geographical Society of London have so graciously shown their appreciation of my slight endeavour to aid the cause of Geographical Science, and solve a few of the mysteries of Central Asia."

OTHER AWARDS.

The PRESIDENT announced that the Council had awarded the Murchison and other *præmia* of the year as follows :—

The MURCHISON GRANT for 1890, to Signor VITTORIO SELLA, in consideration of his recent journey in the Caucasus, and the advance made in our knowledge of the physical characteristics and the topography of the chain by means of his series of panoramic photographs taken above the snow-level from points to which his camera had to be conveyed by trained Alpine mountaineers, whom he took out with him for the purpose from North Italy.

The CUTHBERT PEEK GRANT, to Mr. E. C. HOBBS, for his valuable observations on the physical geography of Tanganyika, made during his many years' residence on that lake, a summary of which, communicated by him to the Society, was published by him in the 'Proceedings' for October 1889.

The GILL MEMORIAL, to Mr. C. M. WOODFORD, for his three expeditions to the Solomon Islands and the important additions made by him to our topographical knowledge and natural history of the islands.

The three Honorary Corresponding Memberships for 1890 had been voted to Professor G. DAVIDSON, of San Francisco, California; Dr. JUNKER (Leipzig); and Senhor J. B. SANTA ANNA NEBY (Brazil).

PRESENTATION OF THE TRAINING COLLEGE PRIZES.

The Scholarships and Prizes offered by the Society to the students of Training Colleges for proficiency in Geography at the Examinations in December last had been awarded by the Examiners of the Education Department to the following :—

MALE STUDENTS. *Scholarship*: G. J. S. HOLLISTER, Cheltenham College; *Prizes*: J. W. KENTON, Cheltenham College; J. G. ANDERSON, Culham College; F. WILLIAMS, Chelsea College; R. H. WHITEHEAD, Westminster College.—FEMALE STUDENTS. *Scholarship*: K. B. CLAGUE, Southlands College; *Prizes*: JANE

BENSTEAD, Lincoln College; E. HARRIS, Derby College; K. MORRISON, Whitelands College; A. LAY, Salisbury College (the last two equal).*

Mr. H. J. MACKINDER (Oxford), in introducing the successful candidates, said:—

The students who will now come to receive prizes belong to the Training Colleges in different portions of England, and I have been asked, for the benefit of those present, who may not be acquainted with the details of the system of training teachers for the Elementary Schools, to state how these prizes and scholarships are awarded. The Training Colleges are naturally of two kinds, male and female. The students remain two years in those colleges. At the end of each year there is a Government examination. In the case of the male colleges, geography is an obligatory subject at the end of the first year; in the case of the female colleges it is an obligatory subject in the second, and therefore the Society's prizes are awarded on the results of the obligatory examination, that is to say, the first year's examination in the case of the men, and the second year's in the case of the ladies. Of course in dealing with these prizes we have to bear in mind two sets of people, those who receive them, and their teachers. Those who come before you bear witness to their own success; those who do not come before you should, I think, have special attention called to them. The teachers cannot be judged of by the result of a single prize. The personal proclivities of one prize-winner may win him the prize; therefore, we have to look for a succession of winners from a college, and we think when that is the case, we may fairly call attention to the college. These prizes have been awarded for three years, and I find, on investigating the results, they already give certain hints. Sixteen prizes have been awarded to men from the colleges, and sixteen to the ladies, the extra one (five each year) being due to the circumstance that two or more were, on one of the examinations, bracketed equal. Of the sixteen, six have belonged to the Borough Road College, three to Cheltenham, two to Battersea, and five have furnished one each to York, Chester, Culham, Chelsea, and Westminster. Of the sixteen to the ladies, three have been furnished by Lincoln College, two by Salisbury, two by Chichester, two by Whitelands, and seven to one each of seven different colleges. I think this is a most excellent result, because in the case of the medals given to public schools, the failure of that system was largely due to the fact that, owing to excellent teaching, two schools monopolised nearly the whole of the prizes. We want to see the prizes distributed everywhere, in order to show that there is competition among a large number of colleges, but we also want to see a certain amount of that which we saw too much of in the public school prizes, that is, consistent success on the part of certain colleges. I think, therefore, it is only due to the teachers in these colleges, that we should each year mention the statistics for the encouragement of the teachers winning successes.

* The Medals for the Promotion of Geographical Education, placed by the Society at the disposal of the Syndicates respectively of the Oxford and Cambridge Local Examinations, were awarded as follows:—

1889. Oxford (June).—*Silver Medal*—John Borthwick Dale, Liverpool. *Bronze Medal*—Rachel Steel, Cheltenham.

Cambridge (December).—*Silver Medal*—(Physical Geography)—Florence Griffiths. *Silver Medal*—(Political Geography)—George Ernest Davis.

THE PRIZE ATLASES offered by the Society for Geographical Proficiency to the cadets of the Nautical Training Colleges on board H.M. ships *Worcester* and *Conway*, were awarded, at the examinations held in July 1889, to the following:—Alfred William Gush (*Worcester* training ship); Christian Reginald Corfield (*Conway* training ship).

The Scholarships and Prizes were then handed by the President to the successful Students.

Rev. J. P. FAUNTHORPE (Principal of Whitelands College) said, as Principal of a Training College for schoolmistresses, and in by-gone years teacher of Geography at a Training College for men, he knew something about the whole scheme of teaching Geography in Training Colleges; he would, therefore, with the President's permission, like to say a few words. Mr. Mackinder had hardly represented correctly to them how the thing was arranged. Geography is obligatory in both years in both classes of college, unless the candidate obtains the mark "Good" at the end of the first year.* If that be done, then it is at his or her option whether to continue the study of Geography or not. That, of course, does not quite depend on the student, but upon the authorities of the college, as to whether any other subject can be substituted. A student who has passed extremely well may take up French. Whitelands had gained two of the Society's prizes, one to-day, and one two years ago, when the student from his college obtained the scholarship. It was a subject of great personal gratification to him, as a student and teacher of Geography for thirty years, and as a Fellow of this Society, to see the Royal Geographical Society reward the thorough teaching of geography which obtains in the Training Colleges of this country. In no other teaching bodies is the subject of Geography pursued earnestly, thoroughly, scientifically, among all who come within the sphere of their influence, and that is a very great thing to say. Of course, in an empire like ours, extending all over the world, a knowledge of the Colonies is of extreme importance. Schoolmasters and mistresses come in contact with precisely that class of persons who are fitted to be successful emigrants, those who can work mainly with their fingers, and from time to time, through the knowledge they have acquired in the Training Colleges, they have had means of being useful to those who intend to emigrate. The Colonies, through their representatives, take every means they can of spreading a knowledge of their capabilities. Quite recently Mr. Colmer, the Secretary of the Dominion, sent to him a batch of fifty pamphlets which the Dominion has published containing information about the colony. Those were given to teachers who would give the information to hundreds of persons every year. He knew for a fact that the officers of the Royal Geographical Society who visited the Education Department, for the purpose of looking over the papers, were particularly struck with the excellence of them—not merely of the five or six papers that by certain chance or extra excellence happened to obtain prizes (which is a small matter), but upon looking over some 1500 or 1600 papers written by female students, and 1300 or 1400 by male students, they expressed themselves as particularly struck with the excellence of the work right through, from beginning to end. For a period of two years these students are lectured to, examined, and thoroughly well taught in the subject of geography for three or four hours a week, and the Geographical Society has acted with wisdom in endeavouring to reward them in some way. Therefore, as a principal of a Training College, and as a teacher of geography, and as interested in the welfare of the Empire, he begged to thank the Council on the part of the students who have received prizes, and also on behalf of those who have not, but who have received a filip, because they find that Geography, which is sometimes referred to as a dry subject, which it by no means is, is taken up by such a Society as this, and that prizes are given for it.

* In the original arrangement with the Education Department, the prizes were offered to male students in their first or second year, and to female students in their second year.—[ED.]

REPORT OF THE COUNCIL.

The Secretary (Mr. Douglas Freshfield) then read the Report of the Council for the past year.

The Council have the pleasure of submitting to the Fellows the following Report on the financial and general condition of the Society :—

Members.—The number of Fellows elected during the year (ending April 30th, 1890) was 293, besides three Honorary Corresponding Members. In the previous year, 1888-89, the total elections amounted to 181, and in 1887-88 the number was 171. Our losses have been, by death 77 (besides 1 Honorary and 3 Honorary Corresponding Members), by resignation 37, and by removal on account of arrears of subscription 48; making a net increase for the year of 131. In the year 1888-89 there was a decrease of 21; in 1887-88 an increase of 29. The total number of Fellows on the list (exclusive of Honorary Members) on the 1st of May was 3513.

Finance.—As will be seen by the annexed Balance Sheet, the total net income for the Financial year ending 31st December, 1889 (i. e. exclusive of balance in hand) was 8224*l.* 7*s.* 7*d.*, of which 5960*l.* consisted of entrance fees and subscriptions of Fellows. In the previous year, 1888, the total net income was 8053*l.* 5*s.*, and the amount of subscriptions, &c., 5976*l.*; in 1887 the two totals were 8007*l.* 16*s.* 3*d.*, and 5861*l.* respectively.

The net expenditure for the past year (i. e. exclusive of balance in hand) was 7025*l.* 15*s.* 10*d.* The net expenditure in 1888 was 7908*l.* 18*s.* 6*d.*; in 1887, 8493*l.* 10*s.* 3*d.*

The Finance Committee of the Council have held, as usual, Monthly Meetings during the year, supervising the accounts of the Society. The Annual Audit was held on the 27th of March last, the Auditors being, on behalf of the Council, Sir Rawson W. Rawson and Sir Henry Barkly, and on behalf of the Fellows at large, K. O. Tudor, Esq., and J. Duncan Thomson, Esq. The cordial thanks of the Council and Fellows are due to these gentlemen for having freely devoted their valuable time to this important task. At the end of their labours the Auditors drew up the following Report to the Council :—

Auditors' Report.—“The Auditors appointed to the examination of the Accounts of the Royal Geographical Society for the year ended 31st December, 1889, have examined the Balance Sheet submitted, and having compared it with the several Account Books and vouchers, all of which have been presented to them in the usual satisfactory form and manner, have found it to be correctly stated and sufficiently vouched.

“The Investments remain the same; but this branch of the Assets has been increased by a deposit of 1000*l.* at the Society's Bankers. The total amount is 20,568*l.* 12*s.* 4*d.*

“The following are the details of the investments, showing their source and their nature. Both are inserted for convenience of reference :—

<i>Source.</i>	£	s.	d.
Davis bequest	1800	0	0
Murchison bequest	1000	0	0
Gill memorial	1028	5	6
Peek grant	1000	0	0
Back bequest	561	0	8
Trevelyan bequest	510	4	0
Miscellaneous	14,669	2	2
	£20,568	12	4
		2	12

<i>Nature.</i>	<i>£</i>	<i>s.</i>	<i>d.</i>
North-Eastern Railway 4 per Cent. Debenture Stock	1000	0	0
Great Indian Peninsula Railway 5 per Cent. Stock ..	4000	0	0
Great Western Railway 4½ per Cent. Stock (Davis bequest)	1800	0	0
London and North-Western Railway 4 per Cent. Stock (Murchison bequest)	1000	0	0
Caledonian Railway 4 per Cent. Preference Stock	2000	0	0
Norwegian 4 per Cent. Bonds	1000	0	0
New South Wales 3½ per Cent. Stock (Gill memorial)	1028	5	6
India Stock	1000	0	0
India 3½ per Cent. Debentures	1000	0	0
Consols	3669	2	2
" (Peek fund)	1000	0	0
" (Back bequest)	561	0	8
" (Trevelyan bequest)	510	4	0
On deposit	1000	0	0
	<hr/>		
	£20,568	12	4
		<hr/>	<hr/>

"The Balance Sheet is eminently satisfactory. It shows an excess of Receipts over Expenditure amounting to 1198*l.*, and this is by no means owing to the small cost of expeditions incurred during the year, on which the saving has been only 538*l.* There has been an increased receipt of nearly 100*l.* from the sale of Publications, and the receipts from Payments for Scientific Instruction have more than doubled. There has been an economy in the Library and Map Room; and a saving of 485*l.* in the printing and publication of the Monthly 'Proceedings' has more than covered the cost of printing the new edition of 'Hints to Travellers' (363*l.*), which, if treated as the Society's contribution for the past year to 'Expeditions of Travellers,' will entitle it to take full credit for the substantial surplus above shown upon the operations of the year.

"A comparison of the last three years shows the following results:—

Years	Ordinary Receipts. <i>£</i>	Total Expenditure. <i>£</i>		<i>£</i>
1887	8008	8493	Excess of Expenditure	485
1888	8053	7909	Surplus	144
1889	8224	7026	Surplus	1198

"The arrears of subscriptions, valued last year at 412*l.*, have increased this year to 440*l.*

"The total assets of the Society, valued last year at 40,164*l.* 13*s.* 6½*d.*, have increased to 41,391*l.* 5*s.* 3½*d.*"

The following Balance Sheet and Statement, showing the Receipts and Expenditure of the Society from the year 1848 up to the present date, are annexed to the Report of the Auditors:—

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year
1848 to the 31st Dec., 1889.

	Year.	Cash Receipts	Cash Amounts	Deducting
		within the Year.	invested in Funds.	Amounts invested in Funds; actual Expenditure.
		£ s. d.	£ s. d.	£ s. d.
¹ Includes Treasury Grant of 1000 <i>l.</i> for the East African Expedition.	1848	896 10 5	755 6 1
	1849	778 3 0	1,098 7 6
² Includes Treasury Grant of 2500 <i>l.</i> for the East African Expedition.	1850	1,036 10 5	877 2 10
	1851	1,056 11 8	906 14 7
	1852	1,220 3 4	995 13 1
³ Includes Legacy of Mr. Benjamin Oliveira, 1806 <i>l.</i> 17 <i>s.</i> 1 <i>d.</i>	1853	1,917 2 6	1,678 6 0
	1854	2,565 7 8	2,197 19 3
	1855	2,584 7 0	2,436 3 1
⁴ Includes Legacy of Mr. Alfred Davis, 1800 <i>l.</i>	1856	3,372 5 1	833 10 0	2,514 8 1
	1857	3,142 13 4	378 0 0	3,489 19 9
⁵ Includes Legacy of Sir Rodrick Marchison, 1000 <i>l.</i>	1858	3,089 15 1	2,944 13 6
	1859	3,471 11 8	950 0 0	3,423 3 9
⁶ Includes Mr. James Young's Grant for Congo Expedition, 2000 <i>l.</i>	1860	6,449 12 1	468 17 6	5,406 3 7
	1861	4,792 12 9	1,358 2 6	3,074 7 4
	1862	4,659 7 9	1,389 7 6	3,095 19 4
⁷ Includes 100 <i>l.</i> 14 <i>s.</i> 6 <i>d.</i> sale of Ex- chequer Bills.	1863	5,256 9 3	1,837 10 0	3,655 4 0
	1864	4,977 8 6	1,796 5 0	3,647 7 10
⁸ Includes Mr. James Young's Grant for the Congo Expedition, 1041 <i>l.</i> 14 <i>s.</i>	1865	4,905 8 3	1,041 5 0	4,307 4 5
	1866	5,085 8 3	1,028 15 0	4,052 15 0
	1867	5,462 7 11	1,029 0 6	3,943 17 4
	1868	5,991 4 0	1,857 3 9	4,156 17 10
⁹ Includes Parliamentary Grant of 3000 <i>l.</i> to Cameron Expedition.	1869	8,859 16 0	2,131 5 0	4,646 0 8
	1870	8,042 6 1	3,802 6 0	3,845 10 6
¹⁰ Includes Donation of 500 <i>l.</i> by Mr. C. J. Lambert.	1871	8,637 3 7	1,000 0 0	3,726 4 4
	1872	28,119 7 9	1,999 4 6	5,871 13 2
	1873	7,761 18 10	2,015 1 8	6,697 12 6
¹¹ Includes Legacy of Admiral Sir George Back, 540 <i>l.</i>	1874	8,753 5 10	499 0 0	7,676 2 3
	1875	7,934 15 10	2,002 7 6	5,683 4 10
	1876	11,611 11 8	6,870 13 1
¹² Includes Legacy of Sir W. C. Tre- velyan, 500 <i>l.</i>	1877	107,950 1 11	2,538 2 0	8,940 17 11*
	1878	118,124 10 0	3,000 0 0	6,361 9 6
¹³ Includes 100 <i>l.</i> 8 <i>s.</i> 2 <i>d.</i> , sale of Ex- chequer Bills.	1879	138,979 14 10	1,551 10 10	6,999 14 2
	1880	8,599 18 4	1,567 5 1	8,454 1 10†
¹⁴ Includes 1000 <i>l.</i> received from Mr. B. Leigh Smith.	1881	8,809 19 5	8,362 5 6‡
	1882	108,942 15 0	8,779 10 7
	1883	109,599 9 0	1,001 5 0	3,624 2 11
¹⁵ Includes 500 <i>l.</i> on loan from Bankers.	1884	108,964 11 7‡	9,266 0 5
	1885	108,738 12 3	8,555 3 10‡
¹⁶ Includes 998 <i>l.</i> 0 <i>s.</i> 10 <i>d.</i> , sale of India Debentures.	1886	17,968 9 0	1,000 0 0	7,767 18 0‡
	1887	8,007 16 3	8,493 10 3
¹⁷ Includes Donation of 1000 <i>l.</i> from Miss Gill.	1888	8,053 5 0	7,998 18 6
	1889	8,221 7 7	1,000 0 0 on deposit.	7,025 15 10

* This sum includes the Special Parliamentary Grant transferred to the Cameron Expedition Fund in February, 1877.

† This amount includes the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in this and the previous year.

‡ This sum includes the payment of 102*l.* 8*s.* to the African Exploration Fund; also 714*l.* 9*s.* 1*d.*, the final payment for Cameron Expedition Fund.

STATEMENT OF ASSETS—31st December, 1889.

	£	s.	d.
Freehold House, Fittings, and Furniture, estimated (ex- clusive of Map Collections and Library insured for 10,000 <i>l.</i>)	20,000	0	0
Investments (amounts of Stock), as detailed in the above Report of the Auditors valued March last at	23,891	2	9
Arrears due on December 31, 1889, £1100. Estimated at	440	0	0
Balance at Bank (less Cheques not cashed)	£371	11	9
" in Accountant's hands	11	1	2½
	382	12	11½
Total	£44,713	15	8½

Publications.—The monthly 'Proceedings' have been issued with regularity throughout the year; the twelve numbers for 1889 forming a volume of 792 pages, illustrated by 23 maps and 2 pictorial diagrams. The total cost of the edition of 5000 copies (including 316*l.* 6*s.* 8*d.* for free delivery to Fellows and Institutions) was 2165*l.* 2*s.* 7*d.* From this is to be deducted the amount of 477*l.* 2*s.* 2*d.* received from sale of copies to the public and from advertisements. Two parts of the 'Supplementary Papers' (Vol. II., Parts 3 and 4) were also issued during the year; the total cost of which was 164*l.* 6*s.* 5*d.*

A new edition, the sixth, of the 'Hints to Travellers' has been published during the year, the previous edition, issued in 1883, having been for some months out of print. The work has been edited, under the authority of the Council, by Mr. Douglas W. Freshfield (Secretary R.G.S.) and Captain W. J. L. Wharton (Hydrographer to the Admiralty), who, without altering the general character of the work, have increased, as it is hoped, its usefulness, by adding new sections and revising it throughout, with the aid, in most cases, of the authors of the separate sections of the preceding edition, who have brought their subjects up to date. The Hints on Meteorology have been re-written by Mr. H. F. Blanford; and the Hints on Outfit remodelled. The total cost of the volume and the numerous maps and illustrations it contains has been 363*l.* 0*s.* 7*d.* The number of copies sold up to the end of May last was 1025, including 250 for the United States.

Library.—During the past year 968 books and pamphlets have been added to the Library; 763 by donation, and 205 by purchase; 330 pamphlets have been put in covers by the Society's map-mounter, and 340 volumes have been bound.

The sum of 86*l.* 12*s.* 1*d.* has been spent in purchasing books, and the further sum of 95*l.* 8*s.* 3*d.* in binding for the Library.

Among the more important accessions are the following:—'Report of the United States Expedition to Lady Franklin Bay,' 2 vols. (Brig.-Gen. A. W. Greely); 'Norwegian Polar Observations,' Vol. II. (the Norwegian Government); Index to the Ninth Edition of the 'Encyclopædia Britannica' (the Publishers); 'Miscellaneous Papers relating to Indo-China,' First and Second Series; Paulitschke's 'Harar' (the Author); Thomson's 'Travels in the Atlas' (the Author); Cecil's 'Journey Round the World' (the Publishers); continuation of the Reports on the Scientific Results of the Voyage of the *Challenger* (the Lords of the Treasury); the Publications of the Meteorological Office, the Intelligence Department of the War Office, and of the Admiralty; continuation of the General Report of the Survey of India (the Director-General of the Survey), and of the publications of the Geological Survey of India (the Indian Government); 'Report of Explorations in Sikkim, Bhutan, and Tibet'; New Edition, by Rosser, of Norie's 'Practical Navigation and Nautical Astronomy' (the Editor); a collection of 32 Handbooks to the Provinces of Italy; Ashe's 'Two Kings of Uganda' (the Publishers); Theal's 'History of South Africa from 1854 to 1872' (the Publishers); Werner's 'Visit to Stanley's Rearguard' (the Author); Dawson's 'Report of an Exploration of the Yukon District and adjacent portion of British Columbia, 1887' (Dr. Dawson); Annual Report of the Geological and Natural History Survey of Canada (the Director of the Survey); the Publications of the U.S. Geological Survey; Justin Winsor's 'History of America,' Vols. I. and VIII.; various publications of the Dépôt des Cartes et Plans de la Marine, the Chinese Imperial Maritime Customs, and of the Victorian, Queensland, and S. Australian Governments; Storm's 'Studies on the Vineland Voyages'; Schweiger-Lerchenfeld's 'Das Mittelmeer'; Woeikof's 'Der Einfluss einer Schneedecke auf Boden, Klima und Wetter' (the Publisher); Coolidge's 'Swiss Travel and Swiss Guide Books' (the Publishers); Giglioli, 'Primo Resoconto dei risultati della Inchiesta Ornitologica in Italia, Parte prima Avifauna Italica' (the Author); Gopčević, 'Makedonien und

Alt-Serbien'; Blanford's 'Practical Guide to the Climates and Weather of India, Ceylon, and Burmah' (the Publishers); Bretschneider's 'Mediæval Researches from Eastern Asiatic Sources'; Lanessan's 'L'Indo-Chine Française'; Percival's 'Land of the Dragon' (the Publishers); Posewitz, 'Borneo'; Martinière's 'Morocco' (the Publishers); Philibert, 'La Conquête Pacifique de l'Intérieur Africain'; Danish Polar Observations, II.-II^e. liv.; Romilly, 'From my Verandah in New Guinea' (the Publisher); Deschanel, 'Les Intérêts Français dans l'Océan Pacifique'; 'Dictionary of National Biography,' Vols. XVIII.-XXII.; Fisher's 'Physics of the Earth's Crust,' 2nd Edn. (the Publishers); 'Die Erde in Karten und Bildern'; the Congo Railway, Matadé to Stanley Pool; Nachtigal's 'Sahara und Sudan,' Vol. III.; Peragallo, 'Cristoforo Colombo' (the Author); continuation of the publications of the Hakluyt Society; Bristowe and Wright's 'Handbook of British Honduras for 1888-90; (the Publishers); Cook's 'Jenolan Caves' (the Publishers); Chisholm's 'Handbook of Commercial Geography' (the Publishers); the publications of the International Geodetic Association; Kaulbars' 'Aperçu des travaux géographiques en Russie' (E. D. Morgan, Esq.); 'Mémoire sur les travaux d'amélioration du cours du Bas-Danube, 1873-1886' (the European Commission); Curzon's 'Russia in Central Asia in 1889' (the Publishers); Findlay's 'Directory for the Indian Archipelago,' 3rd Edn. (the Publisher); Markham's 'Life of Davis' (the Publishers); Zsigmondy 'Im Hochgebirge'; Lobley's 'Mount Vesuvius' (the Publishers); Macintyre's 'Hindu-Koh' (the Author); Dupont, 'Lettres sur le Congo'; 'Canada, a Memorial Volume' (the Publisher); Moss, 'Through Atolls and Islands in the Great South Sea' (the Publishers); completion of the 'Encyclopædia Americana'; Asboth's 'Bosnia and Herzegovina' (the Publishers); Ainsworth's 'River Karun'; Ball's edition of Tavernier's Travels in India, 2 vols.; Le Messurier, 'From London to Bokhara'; Proskowetz, 'Vom Neustraand nach Samarkand' (the Author); Abercromby's 'Trip through the Eastern Caucasus'; continuation of 'Beiträge zur Kenntnis des Russischen Reiches'; Hallett's 'Thousand Miles on an Elephant' (the Author); Willoughby's 'East Africa and its Big Game' (the Publishers); Dutreuil du Rhins, 'L'Asie Centrale,' Text, and Atlas (the Author); Hickson, 'A Naturalist in North Celebes'; Rawlinson's 'History of Phœnicia' (the Publishers); Collinson's 'Journal of H.M.S. *Enterprise*' (Major-Gen. Collinson); Mallock's Cyprus'; Rusden's 'History of Australia,' 3 vols., and 'New Zealand,' 3 vols. (the Author); Samuelson's 'India'; Betham-Edward's 'Roof of France'; Tozer's 'Islands of the Ægean' (the Publishers); Modigliani, 'Un Viaggio a Nias' (the Author); Heilprin's 'Bermuda Islands'; Giles, 'Australia Twice Traversed,' 2 vols. (the Author); Lumpholtz, 'Among Cannibals'; Woodford, 'Naturalist among the Head-hunters' (the Author); Anderson, 'English Intercourse with Siam in the 17th Century'; Green, 'Among the Selkirk Glaciers' (the Publishers); Wright's 'Ice Age in North America'; continuation of the 'Archives des Missions Scientifiques et Littéraires'; a facsimile reproduction of Columbus' Spanish Letter; Dana's 'Corals and Coral Islands,' 3rd Edn. (the Author); illustrated edition of Darwin's 'Voyage of the *Beagle*'; 'Forschungareise der S.M.S. *Gazelle*,' 1874-76, 4 vols.; Chisholm's 'Smaller Commercial Geography' (the Publishers); Smith, 'Through Abyssinia' (the Publisher); Lindsay's 'History of Merchant Shipping and Ancient Commerce,' 4 vols.; Selous 'A Hunter's Wanderings in Africa,' 2nd Edn.; Humann and Puchstein 'Reisen in Kleinasien und Nordsyrien,' Text, and Atlas; Bettencourt's 'Portuguese Discoveries and Conquests of the 15th and 16th Centuries'; De Morgan, 'Mission Scientifique au Caucase,' 2 vols.; Holub's 'Four Years' Travels in South Africa,' 2 vols.; Giraud, 'Les Lacs de l'Afrique Equatoriale'; Büttikofer's 'Reisebilder aus Liberia,' Vol. I. (the Publisher); and, 14 volumes of Bancroft's works.

The Educational Collection.—This collection, in one of the upper rooms of the

Society's house, continues to be utilised by teachers and others interested in education.

Scientific Purposes Grant.—During the past year 16 intending travellers have received instruction from Mr. Coles, in Practical Astronomy, in the Society's Observatory, and in route surveying with the theodolite, prismatic compass, and plane table, in the country. There has been a very marked increase in the amount of instruction given, the number of hours devoted to teaching being 343, as against 174 for the previous year.

Instruments to the value of 201*l.* 10*s.* have been lent during the past year to the following travellers:—Mons. H. M. P. de la Martinière (Morocco), 35*l.*; Mr. D. W. Freshfield (Caucasus), 23*l.* 12*s.*; Col. Sir Francis de Winton (Swaziland), 61*l.* 13*s.* 6*d.*; Rev. H. Ridley (Malay Peninsula), 65*l.* 13*s.* 6*d.*; Mr. H. W. Seton-Karr (Alaska), 15*l.* 11*s.*

The instruments lent to the following gentlemen have been returned, with the exception of those which have been lost:—Lieut. H. G. C. Swayne (East Africa) 1888; Mr. A. P. Mandalay (Guatemala), 1888; Mr. D. W. Freshfield (Caucasus), 1889; Col. Sir Francis de Winton (Swaziland), 1889.

The following is a list of travellers who still have the instruments lent to them in their possession:—Rev. W. P. Johnson (East Africa), 1876; Rev. W. G. Lawes (New Guinea), 1880; Rev. T. Wakefield (East Africa), 1882–83; Mr. W. Deans Cowan (Madagascar), 1883; Mr. E. Douglas Archibald (for cloud observations in England), 1885; Dr. E. J. Baxter (East Africa), 1884–85; Lieut.-Col. Kitchener (East Africa), 1885; Mr. F. C. Selous (South Central Africa), 1888; Mr. H. H. Johnston (Mozambique), 1889; Mr. F. S. Arnot (Central Africa), 1889; Rev. A. Hetherwick (South-East Africa), 1889; Mons. H. M. P. de la Martinière (Morocco), 1889; Rev. H. Ridley (Malay Peninsula), 1890; Mr. H. W. Seton-Karr (Alaska), 1890.

Map Room.—The accessions to the Map Room Collection during the past year comprise 1163 Maps and Charts on 1616 sheets; 27 Atlases, containing 1172 sheets of Maps, 615 Photographs, and 284 Magic Lantern Slides. Of these, 92 Maps on 351 sheets, 7 Atlases, 68 Photographs, and 244 Magic Lantern Slides have been purchased.

Among the more important donations to the Map Room Collection are:—

Maps.—638 sheets of the Ordnance Survey of the British Isles (presented by the First Commissioner of Public Works, through the Director-General of the Ordnance Survey); 60 British Admiralty Charts (The Lords Commissioners of the Admiralty, through the Hydrographer); 119 sheets of the various Indian Government Surveys (H.M. Secretary of State for India); 18 United States Charts (Captain H. F. Picking, U.S.N., Hydrographer to the Bureau of Navigation, Washington, D.C.); 34 French Charts (Service Hydrographique de la Marine, Paris); 12 Danish Charts (The Hydrographer, Danish Admiralty); 17 sheets of Maps of various parts of Sweden (Generalstabens topografiska afdelning, Stockholm); 21 sheets of Norwegian Maps and Charts (l'Institut Géographique de Norvège); 4 sheets of the Generalstabens Topografiske Kaart over Danmark (Danish Minister of War, through the Danish Legation); 18 Maps published in Petermann's 'Geographische Mitteilungen' (Herr Justus Perthes); 3 Maps and 3 Atlases, published by Messrs. W. & A. K. Johnston (Publishers); Map of the Transvaal, or South African Republic, and surrounding Territories, by Frederick Jeppe (Author); 2 Maps of Western Australia (Surveyor-General of Western Australia); Map of New South Wales (Surveyor-General of New South Wales); 37 Maps of Victoria (Surveyor-General of Victoria); 6 Maps of New South Wales (H. F. W. Crummer, Esq.); Ethnografisk Kart over Finmarkens Amt, by Professor J. A. Friis (Librarian of the Royal University, Cristiania); Karten von Attika, by Curtius and Kaupert, Parts V. and VI., with text (Herr Dietrich Reimer); Library Reference Atlas of the World, by J. Bartholomew

(Messrs. Macmillan & Co.); Parts XXXIV. and XXXV. of the Topographischer Atlas der Schweiz (Swiss Government, through the Foreign Office); Carte de Madagascar, par Laillet et Suberbie (Authors); Atlas of the Rios Itapetininga and Paranapanema, illustrating the surveys of Theodora F. Sampaio (Professor O. Derby, through Franz Gotto, Esq.); MS. Map of New Guinea, by W. J. Steains (Author).

Photographs.—Photograph Album containing Views of Kabul and its Environs (Col. E. T. Thackeray, c.b., v.c.); 18 Photographs taken by Professor Mushketoff, to illustrate the Seismographic Phenomena in the Issik-Kul district (Professor Mushketoff, through Miss M. B. Hay); 6 Photographs of the Himalaya Mountains as seen from Darjiling (Messrs. Johnston and Hoffman, Calcutta, through Chas. E. Pitman, Esq.); 104 Photographs of France, Spain, and 62 vols. of the 'Annuaire du Bureau des Longitudes' (James Jackson, Esq., Paris); 68 Photographs of Upper Burma, taken by Captain G. H. H. Couchman, 1887-9 (Captain G. H. H. Couchman); 8 Photographs of the Alps, and 130 Photographs of the Central Caucasus (Signor Vittorio Sella); 55 Photographs, and 41 Lantern Slides, of the Caucasus (Hermann Woolley, Esq.); 71 Photographs of the Niger Region (Captain A. F. Mockler-Ferryman).

11 new Diagrams have been constructed by the Society's draughtsmen, and alterations and corrections have been made to five others.

On the motion of Mr. W. T. BLANFORD, F.R.S., seconded by Mr. J. K. LAUGHTON, the above Report was adopted by the Meeting.

THE PRESIDENT'S ADDRESS.

The PRESIDENT read his Annual Address on the Progress of Geography.* On its conclusion General Sir BEAUCHAMP WALKER rose and said :—

Mr. President, Ladies, and Gentlemen,— I have been requested by General Strachey, who would have been manifestly the best person to have undertaken what I have now promised to do, to take his place, as he was obliged to leave to fulfil an engagement in the City. At this very late hour I will make what I have to say as short as possible. What I have to propose is a cordial vote of thanks to our President, not only as President of the Society generally and of the Council particularly, but also for the very admirable paper he has read to us to-day. Our President is a man of very varied attainments and great experience of life, and we are all deeply indebted to him for his judicious management during his year of office, and we feel sure that he will continue to carry out all his duties with the greatest courtesy and consideration to everybody concerned. I need only refer to the admirable manner in which he performed the onerous task of presiding over so large an assembly as we had at the reception of Mr. Stanley at the Albert Hall, to show how well he deserves the thanks of the Society at large, as well as of those immediately connected with it, and I may add, from what was said to me by others, that his voice on that occasion was admirably heard in the remoter parts of the hall. Those who told me, added also that the voice of the Prince of Wales was distinctly heard. I consider it as adding something to his claims upon us that he not only should have presided on that occasion with great tact and great ability, but also that he made himself heard in every part of the building. I beg to propose a vote of thanks to Sir Mountstuart Grant Duff for his conduct as President of the Society.

Sir RAWSON W. RAWSON had great satisfaction in seconding the motion.

The PRESIDENT, in reply, returned his most sincere thanks for the kind terms in which both the proposer and seconder had spoken, and also for the manner in which their words had been received by the meeting. The Society might be well assured that while he occupied the position of President he would do the very best he could for

* Published in the July Number of the 'Proceedings,' ante, p. 373.

its interest. Of another thing they might be also perfectly assured, and that was that he could not have done anything for the good of the Society unless he had been assisted by a most admirable body of colleagues in Council, and unless he had the constant assistance of Mr. Freshfield, their Honorary Secretary, and their unique Assistant Secretary, Mr. Bates. Their efforts and his had been well seconded by the general staff, who had worked together in the most harmonious and satisfactory manner.

THE BALLOT FOR THE COUNCIL, 1890-91.

The Scrutineers having completed their examination of the balloting papers, the following list was announced as adopted. The names of new Members or those who change office are printed in *italics*:—

President: Right Hon. Sir Mountstuart Grant Duff, G.S.C.I., C.I.E., &c. *Vice-Presidents*: Francis Galton, Esq., F.R.S.; Major-General Sir F. J. Goldsmid, K.C.S.I., C.B.; Sir Joseph Hooker, K.C.S.I., C.B., F.R.S.; *Major-General Sir Henry C. Rawlinson*, G.C.B., F.R.S.; General R. Strachey, B.E., C.S.I., F.R.S.; General Sir C. P. Beauchamp Walker, K.C.B. *Treasurer*: Reginald T. Cocks, Esq. *Trustees*: Right Hon. Lord Aberdare, G.C.B., F.R.S.; Right Hon. Sir John Lubbock, Bart., F.R.S. *Secretaries*: Douglas W. Freshfield, Esq.; *H. Seebohm*, Esq., F.L.S. *Foreign Secretary*: Lord Arthur Russell. *Members of Council*: *Sir Rutherford Alcock*, K.C.B.; *J. Theodore Bent*, Esq.; *W. T. Blanford*, Esq., F.R.S.; Right Hon. Sir George F. Bowen, G.C.M.G.; *Hon. G. Curzon*, M.P.; R. N. Cust, Esq., LL.D.; *Major Leonard Darwin*, B.E.; Sir Alfred Dent, K.C.M.G.; *The Duke of Fife*, K.T.; Sir John Kirk, G.C.M.G., F.R.S.; Lieut.-General Sir Peter S. Lumsden, G.C.B.; *Sir W. Mackinnon*, Bart.; General R. Maclagan, B.E.; Clements R. Markham, Esq., C.B., F.R.S.; Alfred P. Maudslay, Esq.; Admiral Sir F. L. M'Clintock, F.R.S.; *Cuthbert E. Peck*, Esq.; Sir Rawson W. Rawson, K.C.M.G., C.B.; P. L. Sclater, Esq.; S. W. Silver, Esq.; B. Leigh Smith, Esq., M.A.

The meeting then adjourned.

REPORT OF THE EVENING MEETINGS, SESSION 1889-90.

Thirteenth Meeting, 30th June, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.C.S.I., President, in the Chair.

ELECTIONS.—*Louis Abelson*, Esq.; *Captain D. Baker* (3rd Batt. Welsh Regt.); *Henry Hales Pleydell Bouverie*, Esq.; *St. John Brenan*, Esq.; *Captain William Greene Brighton*; *Rev. Felix Edward Pepys Bull*, M.A.; *Victor William Chemery*, Esq.; *Beaumont Rowley Conolly*, Esq.; *Thomas Cotton*, Esq., M.D.; *Major George de Winton*; *Basil Robertson Fleming*, Esq.; *John Gibson Fleming*, Esq.; *Ralph Broune Forster*, Esq.; *William Jacobs*, Esq.; *Henry Martyn Kennard*, Esq.; *George Lawford*, Esq.; *Henry James Lewis*, Esq.; *Henry A. Mangles*, Esq.; *Mortimer Menpes*, Esq.; *Michael A. Morison*, Esq.; *Percy Mortimer*, Esq.; *Campbell Praed*, Esq.; *Lewis H. Ransome*, Esq.; *George de Reuter*, Esq.; *Captain T. H. Hatton Richards*; *Charles Robert Rivington*, Esq.; *Oliver Claude Robson*, Esq.; *Alexander Ross*, Esq.; *H. Cameron Ross*, Esq.; *Irving C. Rosse*, Esq.; *Howard Rumney*, Esq.; *Henry Smiles*, Esq.; *Armstrong Smith*, Esq.; *Frederick Stafford*, Esq.; *Thomas Muirison Stewart*, Esq.; *Hugh M. Stutfield*, Esq.; *Henry William Taylor*, Esq.; *John Hewitt Watterson*, Esq.; *Thomas H. Wheeler*, Esq.

The paper read was:—

Explorations in Cilicia Tracheia, Asia Minor. By J. THEODORE BENT, Esq. *Vide ante*, p. 445.

Mr. STANLEY, who was received on rising with loud cheers, replied as follows :—
Mr. President and Gentlemen,—In looking over some old papers this afternoon I came across a reported speech of my own in the *Scotsman* of January 20, 1887, in which I said :—

“Your toast was health, happiness, and prosperity to me. It is not likely that I shall find health in Africa, and I do not think that anybody—even the most demented—would go to Africa for happiness, and I do not believe that the most inexperienced would go to the unknown parts of Africa to seek prosperity. Nevertheless, I take your wish to be a hearty one, and I hope that I may find something in that unknown territory between the Congo mouth and the beleaguered Pasha which will compensate the Geographical Society for the 1000*l.* ventured on me. Seeing that some invisible influence has been pushing us on during past expeditions, let us hope that that same influence will impel us on this until we obtain a successful issue. There is not a face in this room which does not bring to my recollection something connected with Africa, and I can quite imagine what sympathies will be aroused and possibilities excited by the successful rescue and relief of Emin Pasha. Meantime we hope that Emin, true as he has been, will be true still, and we hope that he will endure until we bring him words of English hope and English faith. If we are successful the expedition will result in permanent good, and Central Africa will be redeemed. Let us hope that the next year, and if not the next some other year, we shall all meet again to tell of our adventures and to recite the story of the rescue of Emin Pasha.”

That was the speech I delivered as a farewell to the gentlemen assembled to wish me God speed on my journey to the rescue of Emin Pasha. I have told you the story. The results have been foreseen ; the results you know. What I have seen since my return causes me to think that this country is undergoing a change. After the periods which I pass in Africa I always find something new on my return, and this time I find that every property, or claim to property, which the English had, rapidly came under the paw of the Germans, and I find that, no matter what sacrifices we made, the Germans had a prior right and claim to it. And my regret is keen and intense when I find that some of the Geographical Society also think that it is their duty also to surrender to the Germans. But I have that calm satisfaction within me that the time will come, in a few years, when you will see the effect of what I have been fearing far more clearly than you do now. I should have been delighted to have said the best that could be said with respect to Emin had he only permitted me. Possibly you may know him better than I do, but a voice will rise before the year is out and will tell you in better terms than I can what a strange and complex character Emin was.

I will read a portion of a note which your eminent secretary, Mr. Bates, has written to me :—“You will be expected to give a little speech in response to a toast by the President, as a matter of course. What do you think, as a topic, of saying something to encourage scientific men to go in and investigate the meteorology, geology, ethnology, botany, &c., of the central forest and the Ruwenzori to which you have shown them the way ?” As for saying something to encourage scientific men to investigate the meteorology, ethnology, botany, and all the other “ologies,” I am too tender hearted altogether to impose upon you such a vast number of scientific essays upon the various “ologies” in Africa. I have suffered so much from ants, butterflies, and moths and bugs in Africa that I should not recommend any of you to go there. But, Mr. President and gentlemen, though I cannot recommend the study of entomology in the great forests of Africa, I can recommend some things which it would be well for a Geographical Society to keep in view. One thing is that you should investigate the great watershed of the Congo, where I am sure something of interest

would be found. If this is too far, see what can be made of the British possessions in that part of Africa, and particularly of the great region discovered by myself and Livingstone. They may be able to produce results similar to those which have immortalized the name of Bates in connection with the Amazon. Mr. President, this is my last speech. I have no more public meetings to attend. This time my mind is perfectly easy, and I feel assured that the Geographical Society are as good friends as human nature will permit us to have. They have given me a special gold medal, and they have immortalized my features in gold, and, so far as I know, there is absolutely nothing I could wish. I shall write down the events of this evening in my diary for the benefit of the posterity which I hope to found. I have not the slightest doubt, if I live long enough, that we shall meet again. I shall then hope to repeat the most amiable words which I have delivered this evening. They are full of love towards every member of the Geographical Society, which I hope may live in itself and a thousand branches growing out of it. Mr. President and gentlemen of the Geographical Society, let me thank you once more for seeing you all in the flesh, and seeing you all so happy and comfortable, and enjoying equally with myself this splendid banquet.

"TRAVEL AND EXPLORATION" was next proposed by Mr. DOUGLAS W. FRESH-FIELD, who said:—We have first, as was meet, done honour to the guest of the evening. It is now my agreeable duty to call on the Fellows of the Society present, and our guests, to turn from the particular to the general, and to drink the toast of "Travel and Exploration"—to drink, that is, to the success of all the travellers and explorers who are now engaged in extending and adding to our knowledge of the surface of the globe to which we are confined. And—may I not add?—to drink also to the memory of those travellers who have gone before us, yet still live by their works in the minds of men, from Herodotus to our lamented colleague, Sir Henry Yule.

In our crowded and busy metropolis the ordinary traveller will, as a rule, hardly be tempted to think too much of himself. Society is so fully occupied in its own pursuits, in drawing portraits—not to say caricatures—of persons, that it can seldom find leisure or interest for portraits of places. The only welcome traveller is he who can recommend his subject by the vigour of his own personality. When the witty players from the Parisian Boulevard came over to Her Majesty's Theatre the other day, the appearance on the stage of a traveller fresh from the Tour du Monde was the accepted signal for all the other characters to fly. But we surely may be content to put in the balance against the authors of 'Paris Fin de Siècle,' a greater dramatist. Does not one of the characters in "All's well that ends well" affirm that "a good traveller is worth something at the latter end of a dinner?" I trust no one here to-night will contest the authority of Shakespeare, who, when he joined "the Right Worshipful Fraternity of Sirenaical Gentlemen, that met the first Friday of every month" at the famous sign of the "Mermaid," sat down with at least one "good traveller," in the person of Tom Coriate, "the Odcombian Legstretcher, and Traveller for the English Wits."

When I look round these tables for "good travellers" to respond in the names of Travel and of Exploration, the only embarrassment I can feel is that of choice. I might for once affirm the claims of our neglected Europe to a place in geography by pointing out among our guests Dr. Tyndall, who has done so much to carry to completion the task initiated by De Saussure and Forbes, who has helped to give us a complete physical as well as topographical knowledge of the "icy privacies" of the Alps, and has fixed his name for ever on the highest shoulder of the Matterhorn: or I might recognise Asia by mentioning the name of Mr. George Curzon, who has lately shown to what good purpose a young statesman may spend his holidays, and has taught

us to regard the legendary cities and fabled rivers of the Old World, the farthest goals of Vambéry and O'Donovan, as within the range of a Continental Bradshaw.

But I am sure I shall have your universal sympathy if I select as a representative of Travel our distinguished guest, Comte de Hübner. Of the Count's remarkable diplomatic career, of the services he has rendered to his sovereign, this is not the place, nor am I the proper person, to speak. They already form part of history, and we must rejoice to learn that in this instance history will have no excuse for error, since Comte de Hübner intends himself to supply her with material by becoming a contributor to that most delightful form of literature—autobiographies. To-night, however, we welcome the Count as a traveller, as one who has twice visited the remotest parts of the globe, and added to our knowledge of them in his two excellent works translated under the titles of 'Ramble Round the World,' and 'Through the British Empire,' in which he has given Europe a favourable and—as we at any rate must believe—an accurate account of our great possessions overseas, and particularly of our Indian Empire. *Laudari a laudato* is to a nation, as well as to an individual, the highest form of praise, and this England owes to the Comte de Hübner. If the acknowledgment here made him through my mouth seem inadequate, he will, I trust, believe that it is sincere and heartfelt.

But I must not forget that I have still to find a representative Explorer. No form of travel, that adds to knowledge, is alien to our Society; but the Explorer, the man who, often at the risk of life or health, turns over for his fellows some fresh page in the great book of the world, who opens new fields to research, and new regions to commerce and civilisation—the pioneer who tramps in front of the army of human progress—he has ever been the object of our special concern and sympathy; and of such men to-night we have no lack. I may indeed regret for a moment, that in the absence of our recent gold medallists, Lieutenant Younghusband and Mr. Carey, I cannot emphasise the fact (sometimes questioned by the profane) that the eyes of our Council reach beyond the limits of Africa. I may wish that Mr. Edward Whympere, by the production of his work on the Andes of Ecuador, his more than nine years' labour with which has been, and is still, watched anxiously both by men of science and mountaineers, had given me a reason for bringing to the front South America. But there is still ample choice in this room. My eye lingers on Mr. Paul du Chaillu, the *vates sacer* of the Viking and the gorilla. But it must pass on to rest on my friend Mr. Johnston, Her Britannic Majesty's Consul at Mozambique, who has but just returned from maintaining the claims of British subjects to free access to, and free enjoyment of, their settlements on and near Lake Nyassa.

Mr. Johnston became conspicuous as a traveller when he was young in years, and even younger in aspect. He will, I am sure, excuse me for recalling the genuine outburst of M. de Lesseps when introduced to him some years ago at one of our meetings,—“Monsieur Johnston! Mais quel pays, où même les petits garçons sont de grands voyageurs!” Mr. Johnston has since that time made his name well known on both coasts of Africa. He has mapped the intricate mouths of the Niger, he has persuaded cannibal tribes to accept the rule of—and probably to idolise—our gracious Sovereign. Many generals have put to flight one army; but on the slopes of Kilimanjaro Mr. Johnston put to flight two contending hosts by the simple expedient of letting off a cheap assortment of fireworks! He is an artist also with the pencil as well as with the pen; and his accurate sketches first taught us that there was glacier ice on the great African mountain. And he has lately added to his other claims to our admiration by proving himself a judicious diplomatist, who knows how to further the reasonable claims of his countrymen.

I ask you, gentlemen, therefore, to drink the toast of “Travel and Exploration,” coupled with the names of Comte de Hübner and Mr. H. H. Johnston.

Comte DE HÜBNER spoke as follows :—I thank you, sir, for the manner in which you mentioned my name in your toast to Travel and Exploration, and I thank you, my lords and gentlemen, for the way in which you received those kind words, but I must confess that I feel rather uneasy to see myself at this banquet, offered to the illustrious explorer of darkest Africa, amongst men of the highest scientific authority, and with several of the greatest explorers of our days, who have extended and enriched our knowledge of the globe at the cost of immense exertions, and very often with risk of their lives. What am I compared to them? Why, a fly compared to an elephant. In my travels I seldom ventured on untrodden ground, and everything has been made smooth and easy to me; thanks to the great kindness with which I have been received everywhere. It is a great comfort for the weary wayfarer in far-off countries to be received every night—and in India, where I covered nearly 6000 miles, this was literally the case—by kind faces, to sit down to a good dinner in good company, and to sleep in a good bed. But what I appreciated still more was, if I may say so, the intellectual hospitality tendered to me, the eagerness in answering my questions, and in giving me the most valuable information, and nowhere did I enjoy more of this double benefit than in Grundy Park, under the hospitable roof of my honoured friend next to me, then Governor of Madras.

Well, my lords and gentlemen, I wish to tell you why I travelled at my time of life, when people generally prefer staying at home. The reason is this—I came for the first time to England in 1839, and ever since, as often as I could, I returned to this country always delighted with the beautiful things I saw here, but when I asked whence these beautiful things came, I was at a loss to find the answer. Then a thought occurred to me—Would it not be desirable to look at England from afar? Every one who has travelled in Alpine countries knows, and no one, I suppose, knows it better than Mr. Freshfield, how difficult it is to see well this or that particular mountain. For example, you wish to see Monte Rosa, so you go to Zermatt, and climb the hills above that village. There it is, you see it perfectly, but not completely, because you see it surrounded by other seemingly higher mountains, although you know they are not higher. You are too near to it; but when you look at it from a distance, let us say from the plains of Piedmont or Lombardy, then Monte Rosa rises before your dazzled eyes in all its lofty loveliness and grandeur. Then we trace on the pure Italian sky its bold outlines, its diamond-like peaks, cupolas, and immense sun-lit snowfields—and also some dark spots, indicating hidden abysses, for in this world there is no light without shadow.

And so, no more detained by public duties, although already a very old man, in order to see well Great Britain, I set out for Greater Britain. And what did I see? I saw your country. Men at work—men in the humblest stations of life, others belonging to the middle classes, and so on to those who are standing on the top of the social ladder, one and all of them animated by the same spirit, guided by the same instinct, and in the hour of trial supported by bodily strength and undaunted energy. Then I discovered what I had not seen before; I discovered that you are a nation of individuals. In his celebrated order of the day, on the eve or on the morning of the day destined to witness his victory and death, one of your greatest heroes said, "England expects every man to do his duty." He did not say, England expects all the officers and all the crews of the fleet to do their duty, but he said every man, every single man, and so it is; every one of the hundred thousand of the Englishmen who have left or leave daily their native shores for all parts of the British Empire and the States, carrying in his big trunk, or in his modest portmanteau, or in his hand-bag, a large provision of what I call the three cardinal virtues of the British nation—self-reliance, daring, and perseverance; and to

these virtues, my lords and gentlemen, England owes her greatness, power and wealth.

Mr. H. H. JOHNSTON in also responding to the toast, said:—Mr. Freshfield has, with kindness, associated my name with African Exploration, and has asked me to respond to that part of the toast. There are few things so wearisome in after-dinner speeches as the laboured modesty of self-depreciation, so I will not trouble you with the stereotyped phrases of ingenuous wonderment at my being associated with so grand a theme or being called upon to reply to the toast when there are so many more distinguished explorers present. But I nevertheless feel that men like Mr. Stanley or Colonel Grant, must somewhat resent my being called an explorer, for I cannot claim to have opened up much new ground in Africa. I have rather been the diligent little jackal who has followed in the tracks of these lions, and gathered up many a choice morsel left from their hasty feed. I have been able to supply a few fresh facts about anthropoid apes; to confirm Mr. Du Chaillu's discoveries; to note some most interesting Bantu languages, which Mr. Stanley has passed unnoticed in an agonising crisis of his work. I have given details about mountains that other people have discovered, and painted portraits of savages who had already tried to murder a preceding traveller. Lately, too, I have had the honour of completing the work long since commenced and carried on by Livingstone and his disciples in British Central Africa.

Still, though fate has often been unkind in keeping me on the beaten track, and though my journeys in Africa have been less for exploration than for political purposes, I have yet occasionally tasted the perfect happiness of gazing on new lands where no white man—to my knowledge—has preceded me. I, too, have panted to the summit of some hilltops, and have seen blue peaks and jagged sierras girdling-in a new horizon, mountains never before placed on a map. I have seen, through a parting in the forest trees, new lakes and lakelets lying stretched before me in dream-like azure. I have crossed a watershed and arrived at the banks of unknown streams flowing I knew not whither. I have stumbled on new races, new languages, new and very nasty customs, and the joy of these discoveries, small as they ever were, has been so great as to make me forget at the time sore feet, ulcers, mosquito-bites, sun headaches, rheumatism, bad food, bad water, and grumbling servants. I also have felt the "cooking" anxiety, as the French would say, of critical moments, the excitement of fighting for one's life, either with man or with nature, or the shame of more prudently running away, or such relatively commonplace thrills as you feel when, after long days of travelling across a deserted plain, or through an uninhabited forest, or down a silent river (going into the unknown), you first see the smoke of native villages and are doubtful of the reception you will meet with from people to whom the white man is unknown.

What little work I have done—what *very* little work—in original exploration has, I feel, been only too kindly appreciated by the Royal Geographical Society, from whom I have received such practical intuition into the method of exploration as I possess. Like most of the younger generation of travellers, I have sat at the feet of our father-in-geography, "dear old Bates," who is here present to-night—a man too much loved to be spoken of as "Mister," and I owe what little knowledge I have of surveying and map-making to the instruction given me by Mr. John Coles; to whom, I fear, at times I proved a wayward, inattentive pupil, for I remember I would always wander off from sines and arcs to discussions on the existence of an All-wise Creator, and had not infrequently to be recalled from a consideration of the Decalogue to a sum in decimals.

However, if I have figured little as an explorer myself, my work in Africa has enabled me thoroughly to understand and appreciate the work of other and greater

explorers—of Livingstone, Stanley, Cameron, Thomson—whose work, by following in their footsteps, I have been enabled to elucidate and annotate.

I have no ambition, however, to become a great explorer. The time for these pioneers is passing by. The main facts of geography are made known. What we want now is a series of *exploiters*, of practical, resolute men who shall turn to the advantage of the British Empire—and the advantage of the British Empire is the advancement of civilisation and the benefit of the world at large—the discoveries, the experiments, the sufferings, the knowledge, often so cruelly and dearly acquired, of those great explorers who have passed away, or who are now resting from their labours in well-earned rest and retirement, like him whom we are feasting to-night.

The FOURTH TOAST, "OUR SISTER SOCIETIES," was proposed by General R. STRACHEY. He said:—The branch of knowledge to promote which we are associated, and to recognise and honour the latest advance of which we are to-night assembled, is, if not the very oldest, certainly one among the oldest to which human intelligence has been applied. The interval that separates us from the days when the first Greek geographer recorded the extent of his knowledge of the world, nearly twenty-four centuries ago, has brought us to a condition in which it may almost literally be declared that, with Stanley's latest exploits, the possibility of further geographical discovery in the old sense of the words is at an end.

This growth of geographical knowledge, however, has been accompanied by and has largely contributed to the development and perfection of important groups of physical and biological sciences which now surround and, it can hardly be denied, overshadow their elder sister, Geography.

In proposing to you the toast entrusted to me of the "Sister Scientific Societies," I desire to pay my tribute to the graces and charms of these, the younger sisters in the beautiful family of Science, to some innocent flirtation with whom I must perhaps plead guilty, and to recognise freely the special attractions of youth with many of which they are endowed, but to which their elder sister Geography, who came out so many seasons before them, can perhaps no longer make much claim.

I may, however, venture to remind the younger ladies that their introduction into Society, where they are so well received and so much admired, is very largely due to the self-sacrifice, the courage and perseverance of those who, like our guest of this evening, have been faithful votaries of their more simple and rougher elder sister Geography, or to the leading of others, who, like Humboldt, Darwin, or Hooker, have been under the influence of her teaching.

As the representative of their chaperon, I therefore propose to you the health of the "Sister Scientific Societies," coupling with it the name of Sir G. Stokes, the President of the Royal Society.

Sir GEORGE STOKES, in reply, said he would confess that he was somewhat surprised to hear his friend General Strachey seem to claim for the Royal Geographical Society the place of honour in respect of age among scientific societies. He had always fancied the Royal Society was prior in date to the other kindred societies in this kingdom. But we must take him to mean that geography as a science was one of the first to attract the human intellect, and that Herodotus was among the first of physical authors. We all feel how much we are indebted to geography for opening new fields of physical research, and particularly to Mr. Stanley for his great discoveries in Africa. As representing the Royal Society, he trusted that our scientific societies might all continue to work together as they have in the past to the promotion of research and knowledge.

The FIFTH TOAST WAS "LITERATURE." The Hon. GEORGE BRODRICK, Warden of Merton, in proposing the toast, spoke as follows:—Mr. President, my Lords, and Gentlemen,—A toast has been entrusted to me which at first sight may appear

somewhat foreign to the object of our present gathering, but which, in truth, is as closely related to it as that which has just been drunk. I give you the toast of "Literature," and I couple with it the names of Mr. Lecky and Professor Jebb, of Cambridge. The connection between Literature and Geography is no remote or fanciful connection. Not only is Mr. Stanley himself a prolific and successful author—not only have earlier travellers, from Herodotus downwards, enriched Literature with graphic descriptions of their experiences, but the resources of Literature itself, in all its branches, have been vastly increased by the progress of geographical discovery. I think we hardly realise how contracted was the horizon, and therefore how narrow—I might almost say, how provincial—were the sympathies of those great writers in olden times, whose masterpieces are still justly regarded as perfect models of style—proving, as they do, what the human mind is capable of constructing out of the scantiest possible materials. And let us remember that for more than 1000 years after the fall of the Roman Empire, this horizon was not sensibly widened, and no important addition was made to the geographical knowledge of mankind. To Dante and Chaucer, to Roger Bacon and Thomas Aquinas, no less than to Homer and Demosthenes, Virgil and Cicero, the earth was practically the *Orbis Veteribus Notus*, an irregular block of countries curtained-in by a veil of mystery, and mostly grouped around the Mediterranean Sea. Under such limitations, that larger conception of human nature which inspires modern Literature was just as impossible as that larger conception of natural science which has been set forth by the President of the Royal Society. And so, in spite of their matchless form, the poetical and other literary works of the ages before Columbus are not to be compared in range of thought, or in breadth of human sympathy, with the literary works of the last three centuries. The discovery of America was immediately followed by a marvellous literary revival, the expansion of literature has kept pace ever since with the expansion of geography, and the humblest newspaper writer of to-day has at his command a stock of ideas, directly or indirectly derived from geography, which neither Plato nor Aristotle nor any other philosopher could ever have evolved from the recesses of his own mind.

But the gentlemen whose healths I couple with this toast do not belong to the class of newspaper writers. Having long been a member of that class myself, I should be the last to disparage the art of journalism—especially in the presence of Mr. Stanley—but I am glad that on this great occasion, both ancient and modern Literature are worthily represented by men of the genuine scholarlike type, who study form as well as substance, and have left a permanent mark on the subjects which they have treated. Professor Jebb is known far beyond the bounds of his own University, and even of his own country, as the learned editor of several Greek poets and orators, a scholar of scholars, yet deeply imbued with modern culture, as the leading spirit among our modern English Hellenists, and as the biographer of Bentley, one of the greatest among many great Cambridge scholars. As for Mr. Lecky, we all know that his numerous historical works are already standard works, and that, as the phrase goes, no library is complete without them. I am sure he will forgive me when I add that, as I peruse the last of these—his excellent and monumental "History of the 18th Century"—and as I follow him through the mazes of Parliamentary intrigue, and the dreary waste of Irish politics in the reign of George III., I feel that he must have been endowed with a patience almost equal to that of Mr. Stanley in forcing his way through that dismal forest of Central Africa.

However, we may congratulate him, like Mr. Stanley, on having come out, safe and sound, on the other side, and I know you will all agree with me that we are doing justice to Literature when we associate its interests with such names as those of Professor Jebb and Mr. Lecky.

The toast was responded to by Professor JEBB, and Mr. W. E. H. LECXY.

Prof. JEBB said:—The toast which has been proposed in such graceful terms by the Warden of Merton may naturally remind us, on an occasion such as this, of the different ways in which the spirit of literature has been affected at different periods by the influence of geographical discovery. In ages when the marvels of strange lands became gradually known by dim rumours, which mingled fact with fable, perhaps the chief result for literature, as such, was to quicken the creative fancy: so it was in the days of the *Odyssey*; so it was, four centuries ago, when a new continent was found beyond the Atlantic, and men were dreaming of Utopia or an Eldorado.

At the present day, geographical exploration has lost nothing of its poetry or its romance; but the romance and the poetry are no longer those of twilight or dream-land: they are such as belong to steadfast effort recorded in its minutest details, waging a battle with the forces of nature or of barbarism in the full light of attentive science, and amid the suspense of expectant civilisation.

It will hereafter be remembered as a distinction of this century that it has developed a higher and more varied excellence in the literature of action. Skill in writing, joined to active daring, has produced vivid pictures from the battle-field, from perilous alps, from the awful solitudes of the Polar Sea, from the still more terrible depths of the African forest. Readers of that thrilling narrative which your guest of this evening has just given to the world must feel that it performs an intellectual office better still than that of stimulating the unfettered fancy; it places before the imagination truths more wonderful and more invigorating than any fiction, enabling us to see, as if with our own eyes, what, in moments of supreme trial, men can do,—and reminding us that the most impressive scenes of nature acquire a new significance when, in the words of a great writer, they are “dyed with the deep colours of human endurance, valour, and virtue.”

Mr. W. E. H. LECXY said:—I cannot help thinking that a separate toast of “Literature” on the present occasion is somewhat superfluous, for there can, I suppose, be no doubt that at the present moment the most popular author in England is the guest of the evening. Let me congratulate Mr. Stanley on the appearance of his new work in so many lands and languages, and express my hope that it may not be his last appearance in literature. I do not know what may be the character of Mr. Stanley’s future writings, but there is at least one element of attraction that in future they need never want. I mean the illustrations of a most skilful and charming pencil—a pencil whose works we have often admired on these walls. Mr. Brodrick has spoken in kind and flattering terms of my own services to historical literature. Whatever else history may do, it at least does something to place events in their true perspective, and to enable us to judge them according to their real importance. Many noisy reputations, many eager party conflicts, sink into small dimensions at her touch, but those who by good means have largely assisted in extending the limits of civilisation and contracting those of barbarism need fear nothing from her verdict. The period of history with which I have been specially occupied is by no means barren in achievements that bear some analogy to those we have been commemorating. The eighteenth century was the age of Captain Cook and of Commodore Byron. It witnessed the birth of those Australian Colonies, which now seem moving rapidly towards a gigantic federation. It, above all, decided in two great continents the ascendancy of the English race. There was a time when it was very doubtful whether France or England would be the guiding power in North America, but the sword of Wolfe and the genius of Chatham decided the doubtful issue in favour of the English race, though not ultimately of the English Crown. In India the balance of the two rival powers long hung still more doubtfully, but

Coote and Clive and Poccoke established the supremacy of England in that great Indian Empire which is now the brightest jewel in the British Crown. And now, gentlemen, the curtain seems rising over another continent and another partition, to be followed, perhaps, some day by the foundation of other empires. Let us hope that the events which are about to unroll themselves may be marked by less bloodshed, less ill-feeling, and fewer errors than in the past, and may be not less prolific in real good! Let us hope, above all, that whatever changes and chances the future may reserve to us, the English historian of the coming age may at least not have to deplore any decline of that Imperial spirit by which this great empire was created, and by which alone it can be permanently maintained.

"OUR GUESTS" was next proposed by Mr. E. DELMAR MORGAN. He said, that after proposing the health of *the* guest, that of the guests taken collectively came next in importance, for a banquet without its guests was like the play of Hamlet with the part of Hamlet omitted. On the present occasion, when among those who had accepted our hospitality there were so many distinguished names, the honour of proposing this toast was specially great. Nearly every profession and science was represented that evening: the Army and the Navy by several officers distinguished not only for their service to their country, but to geography. To these professions geographers were so much indebted in all parts of the world, that it would be no exaggeration to say that all naval and military men were *ipso facto* geographers. Travel and exploration, science and literature, had all been duly honoured by previous speakers; there yet remained one class of guests who were entitled to special mention. We were honoured by the presence of two eminent judges, men of great learning and high reputation. It might be asked what connection there was between law and geography? why were lawyers entitled to the consideration and regard of geographers? He would say, turn to the history of geographical exploration, and you will find the lawyer treading closely upon the heels of the explorer of a newly discovered country. The judge and the magistrate are charged with the duty of introducing settled institutions and a respect for justice, and right of establishing order where all before was chaos and confusion. He had seen this process at work in Central Asia, and during the last few years it had been begun in Central Africa. Upon its successful development depended in a great measure the prosperity of the new state, colony, or province. Nor can we forget that within the precincts of the Temple were laid the foundations of the history of geography and travel. It was in repeated visits to a cousin and namesake at some chambers in the Middle Temple that Richard Hakluyt first planned the work by which he became so famous—the earliest collection of voyages and travels printed in England; and in the Middle Temple Library to this day are preserved a pair of the first globes ever produced in this country. In associating with this toast the name of Lord Justice Bowen, he would speak not only of his brilliant career at the university, the bar, and on the bench, but he would also mention his high literary attainments. One of the latest of his published works—a metrical version of Virgil—enabled us to follow in elegant modern English the fortunes and adventures of the storm-tossed hero of Troy, "*per varios casus, per tot discrimina rerum*"—and he (Mr. Morgan) would venture to draw a parallel between that hero and our honoured guest, Mr. H. M. Stanley, who, like his classical prototype, had founded a state and had proved the successful suitor of the Lavinia of his choice. He concluded by proposing the health of "Our Guests," and called upon Lord Justice Bowen to respond.

The toast was replied to by Lord Justice BOWEN in the following words:—Among all the tribes of Central Africa, which Mr. Stanley has depicted, the happiest probably is a tribe called the *Wahuma*, who, having no word in their language

which expresses thanks, are relieved for ever from the necessity of returning thanks after dinner. Speeches on such occasions have inflicted on the human race wrongs of a nature wholly irreparable—but if there ever was a time at which guests would desire to acknowledge the hospitality they have received, it is upon an evening like the present, when we are met to do honour to a courageous traveller, who has carried the English flag into the darkest quarters of the globe. The late American Minister used to tell a story of a Transatlantic orator from the Far West, who was accustomed to describe the Empire and the enterprise of his countrymen as “bounded on the West by the setting sun, on the East by the rising Ditto, on the North by the Aurora Borealis, and on the South by the Day of Judgment.” Mr. Stanley has not travelled so far: but he has gone far enough to attract the entire interest of the civilised world. One would like to say to him, and to those like him, that there is no Arctic field of ice so impenetrable, no Eastern solitude so barren, no African forest so tangled and so gloomy, that the English traveller who seems lost in it—in his hour of danger he remembers England—may not feel an abiding confidence that England also remembers him. We who have followed Mr. Stanley’s fortunes with a sympathy like your own, who have had faith in his star, and believed in his triumph and return, desire to thank you for allowing us to-night to share in the tribute you have paid to his heroic fortitude and his almost ideal perseverance.

The SEVENTH and last TOAST, “THE ROYAL GEOGRAPHICAL SOCIETY,” was proposed by Professor J. TYNDALL, F.R.S. He said,—I rise to propose with due brevity, but with all heartiness, a Toast worthy of your acceptance—Prosperity to the Royal Geographical Society; coupling with the Toast the name of its honoured President, the chairman of our dinner here to-day. I am no geographer, but as an outsider I have been for a considerable time an observer of the progress of the Society. I have seen it year by year extending the area of human knowledge, and adding to the renown of this Empire. In the present case, I am a believer in the doctrine of uniformity, holding that the experience of the past will prove the experience of the future; and that the Royal Geographical Society will go on conquering and to conquer, as long as new discoveries are to be made, and new territories are to be won. At bottom, therefore, this Toast is, in my opinion, a work of supererogation. Still it will be a just, graceful, and dignified act to receive the Toast with acclamation. I have observed the Society from the “spacious times” of Murchison, to the present hour. I have seen it sending forth men of prowess and resource, provided with such means as human foresight could suggest, to meet the difficulties and dangers sure to be encountered. And I have seen it, on their successful return from perilous adventure, handing over to them the reward which they prize above all others—the admiration and applause of their fellow-countrymen. You have had an “unprecedented” meeting in the Albert Hall, and now, in true British fashion, you sit down, over honest food and wholesome wine, to welcome a hero whom it would be difficult to overtop. The great French mathematician, Laplace, is said to have expressed his envy of Newton, because, in bringing the solar system under the dominion of the human mind, Newton had solved a problem greater than any which could afterwards fall as a prize to the intellect of man. Some such state of mind may well be experienced by the successors of Mr. Stanley; for the problem of unparalleled endurance, of matchless daring, of unconquerable will, and of final triumph which he has solved, is hardly to be repeated. The Royal Geographical Society acts, I take it, in two different ways: it adds to the stores of knowledge, and it opens up sources of material wealth and power; but it acts in another and even a higher way. Who can read the account of these achievements without feeling his pulse beat stronger and his courage increased? Every Briton worthy of the name must have felt a strengthening of the moral fibre, an augmentation of that patriotic spirit without which nations become

rapidly effete. This has been the work of the individual Stanley and of his brave companions. Our noble Laureate told us in 'Looksley Hall' that "the individual withers and the world is more and more"; and writers on the interaction of social forces seem sometimes disposed to efface the individual. In a certain sense their position is a true one, but it must not be pushed too far. The great man as well as the small, the strong man as well as the weak, is the product of such interaction, and takes his just place in the natural texture of things. I'd sooner accept the help of a robust pagan faith, than renounce my belief in the influence of the individual. If called upon to choose between them, I would accept the dictum of Carlyle that "the history of what man has accomplished in this world is at bottom the history of the great men who have worked here," rather than the doctrine of individual effacement. The sphere of Stanley's influence is, I repeat, not measured by the dangers he faced and the regions he explored. A truer measure is that wave of valorous fortitude, that revival of national energy, that exhilaration of the heart of every Briton who has read the account of what a handful of Britons have accomplished in those distant savage lands. This spiritual result of the great explorer's labours, is, to my mind, the truest measure of their value. One addition I should like to see made to these triumphs. I should like to be alive when some native of these Isles—an Englishman, a Scot, or an Irishman, or, better still, all three together one and undivided—shall be found supplementing the labours of the Welshman in the forest, by facing with sharp axes, sound cordage, and strong hearts, those snowy solitudes where no trees can grow; planting their flagstaff on the highest summit of those grand ranges discovered by Stanley, and pledging there the health of Her Majesty the Queen.

I now revert to the Toast committed to me: Prosperity to the Royal Geographical Society, coupling with it the name of a man of culture, a man of honour, a patriot, and an administrator—the name, that is, of Sir Mountstuart Grant Duff, President of the Society and our Chairman here to-day.

Sir M. GRANT DUFF, in response, said,—I beg to return to Professor Tyndall and to all who are present my most cordial thanks for the manner in which this toast has been proposed and received. The Royal Geographical Society has never had a more prosperous year than that which has just come to an end. The number of its Fellows has largely increased; its treasury is well filled; it has succeeded in bringing together far the greatest and most brilliant gathering recorded in its history; it has listened to papers of much interest and very varied character, from Mr. Stanley's account of his long and adventurous expedition through regions never before penetrated by civilised man, to Mr. Theodore Bent's careful and almost exhaustive examination of a small district in Cilicia, once civilised and close to places famous since the dawn of history, but now given up to barbarous nomads. Things have gone well with us of late, but I trust they will go still better. I consider that the present gathering is of good omen for the decade that will commence in the autumn. We have the presence of an explorer who has become more famous in his lifetime than any of his predecessors, and of many other travellers, to encourage us in extending the bounds of human knowledge. We have the presence of three of the most distinguished persons connected with the diffusion of knowledge in this country—the Master of Trinity, the Provost of Eton, and the Dean of Westminster—to encourage us to hope that our efforts to make geography a far more important element in English education may be eventually crowned with success. Lastly, we have the good-will of this large and representative company, so eloquently put into words by the successor of Faraday himself, one of the men of science whose name will be always most closely connected with the reign of the Queen. With all these helps and excitements to exertion, it would be unpardonable if we did not take

to heart the words of Goethe, which, as it happens, I read for the first time under a portrait of the great geographer Carl Ritter:—

“Wouldst thou advance into the infinite,
Go into the finite upon all sides.”

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—April 25th, 1890: M. A. DAUBRÉE, Vice-President of the Society, in the Chair.—This was the first general meeting of the year. The first part of the proceedings consisted of the distribution of the various medals and prizes for the year.

M. CAPUS ON THE PAMIR.

M. Capus afterwards read a paper upon his travels in the Pamir, in company with MM. Bonvalot and Pepin. The Aryan tribes living in the neighbourhood of the Pamir have given it the name of “Bam-i-douniah,” or “roof of the world.” The Pamir separates three different worlds and three different civilisations. It has never been conquered. Marco Polo, Hiouen-Tsang, the Chinese pelerin, and Benoit Goëz, the fervent Catholic, scaled its passes before the English, and then the Russians undertook the scientific conquest of this mountain mass, and although its outlines are known, its giant peak of Mustag-ata, or “the father of ice mountains,” remains untrodden by the foot of man. Notwithstanding that the valleys of the Pamir lie at an altitude of over 13,000 feet, that the summer lasts only two months and the winter ten, and that the temperature descends to the freezing-point of mercury and below, the traveller is astonished to note the presence of animals and plants. The panther, bear, wolf, fox, wild goat, and especially that magnificent wild sheep, the most beautiful of all, which is called the “*ovis poli*,” are found in the valleys in winter. The spiral horns of the *ovis poli* or “*arkar*” as the natives call it, attain a breadth between the extreme points of 10 feet, and its body the size of a large calf. It is the finest game in the world, but the most difficult to approach and kill, as it dies hard, is quick of sight, and fleet of foot. Under the snow covering, often three feet in depth, a dry grass grows; there is also a dwarf plant, the “*terskenne*,” which can be used as fuel. In the summer, the snow having melted, the flowers expand under the rays of the burning sun. Differences of temperature amounting to from 126° to 135° between the day and night may be observed. The lowest reading of the thermometer recorded by the traveller in winter (March) was 47° below zero (Fahr.). After leaving Sarhadd the party crossed the Hindu-Kush by the Baroghil Pass, which possesses an altitude of 11,000 feet, and arrived at last at the fortress of Mastudj, having been without guides, pack-horses, and almost without food. Here the Chitralis opposed their march towards India. While M. Bonvalot remained at Mastudj, M. Capus and Pepin proceeded to Chitral, the capital, situated three or four days' march to the south-west. The king or “*mehtar*,” Amman-oul-Moulk, made them prisoners as soon as they entered the town. He is 65 years old, and has 30 wives and 60 children. While at Chitral, M. Capus saw Kafirs and Yaguishtanis, Indians, Afghans, and Kaka-Khels. The Kafirs, or S'aposh, so-called because they are not Mussulmen and are clothed in black, are one of the least known mountain tribes of the Hindu-Kush. M. Capus was able to study them, and obtain a vocabulary of their language, while M. Pepin obtained some drawings of them. They are the dreaded robbers of the mountains, and consider it an honour and duty to kill the Afghan merchants whom they surprise on the road. They spare the Meahganes or Kaaka-Khels, the merchants of India, whose patron saint

avenged one day the murder of a caravan which had been attacked by the Kafirs, by letting loose among them a terrible epidemic, which they still remember, and they consequently respect the Kaaka-Khels.—In conclusion the results of the election for the Bureau of the Society for 1890–91, and for a member of the Central Commission, were announced, as follows :—President, M. de Quatrefages, of the Institute; Vice-Presidents, M. A. Milne-Edwards, of the Institute, and General Th. Parmentier; Scrutineers, MM. E. Blanc and M. Monnier; Secretary, M. Louis B. Binger; Member of the Central Commission, General Derrécagaix. It had been stated by the Chairman at an earlier stage of the proceedings that M. de Lesseps, having declined to be re-elected President, the Central Commission had decided that he should be designated Honorary President.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

ASIA.

Leclercq, Jules.—Du Caucase aux Monts Alai, Transcaspie—Boukharie—Ferganah. Paris, E. Plon, Nourrit & Cie., 1890: 12mo., pp. viii. and 267. [Presented by the Author.]

An account of a visit to Central Asia, by way of the Transcaspien Railway to Samarkand, and from thence, by Jizak and Khojend, to Kokand and Margilan; the return journey being made by way of Tashkend. Although having nothing specially new to tell, the author, who is a careful observer, gives some useful notes on the places visited, which may be taken as trustworthy. A map of the route followed by M. Leclercq is given at the end of the volume.

[**Palestine.**]—La Palestine Illustrée. Lausanne, G. Bridel: oblong 4to. [Presented by Professor Paul Chaix.]

This handsome volume consists of a series of 100 magnificent photographs reproduced from a collection of views made by F. and E. Thévoz, of Geneva. These photographs convey a good idea of the scenery, places, buildings, streets, people, &c., of the particular region embraced, in each case being accompanied with descriptive text. The volume illustrates the country between Jafia and Jerusalem, and between Jerusalem and Hebron.

AFRICA.

Stanley, Henry M.—In Darkest Africa; or, the Quest, Rescue, and Retreat of Emin, Governor of Equatoria. 2 vols. London, Low & Co., 1890: 8vo., pp. (vol. i.) xv. and 529, (vol. ii.) xv. and 472, maps and illustrations. Price 2l. 2s. [Two copies: one in Morocco, presented by the Emin Pasha Relief Committee; the other in cloth, presented by the Publisher.]

Mr. Stanley told the members of the Geographical Society a little while ago, in an after-dinner speech, that some critics of his recently-published book had found fault with him for the paucity of the scientific results obtained from his last great journey across Africa. He protested on this occasion—and the protest crops out occasionally in the two volumes of the book we are reviewing—that he was not a scientist, neither a botanist, nor a geologist, nor any other 'ologist, but simply the leader of men who has to do his duty and does it; stopping not to gather flowers by the way; heeding not the gorgeous night-moth, except when it falls into his soup; observing not the ant-armies, unless they sting him; and never leaving his path to pursue and capture the anthropoid ape who leaves him severely alone.

We confess that any such observation on the part of Mr. Stanley's critics would be unfair; but after glancing through most of the published reviews on his new book, we have not succeeded in finding the hypercritical phrases to

which Mr. Stanley objects: rather, we note that all opinions worth alluding to concur in praising 'In Darkest Africa.' To make any such reproach as the one which Mr. Stanley supposes would have been obviously unjust: first, because the exigencies of rapid publishing and the impatience and *légereté* of the modern reading public render it impossible—or, what is equivalent, unremunerative—to produce nowadays a popular record of exploration in five or six volumes, like the works of Barth or Nachtigal; and Mr. Stanley had much difficulty in cramming the bare record of the main incidents of his marvellous journey into two volumes, and may consequently be reserving for us other material to be published more at leisure: secondly, because the Emin Pasha Relief Expedition was not sent out for scientific purposes, but rather, as Gordon was sent to Khartoum, and Wolseley was sent after Gordon, "to rescue and retire." Incidentally, it was hoped that interesting geographical information would be obtained, and the Royal Geographical Society gave expression to this hope by dowering the expedition with a subscription of 1000*l.* It has certainly every cause to be satisfied in the results attained. Entomologists may specially bemoan the loss sustained in the death of the accomplished naturalist, Mr. Jameson, and argue that if he had survived and visited the Mountains of the Moon with Stanley they would have been the richer in knowledge by the collections he would have brought home; philologists may keenly regret the perversity of Emin Pasha in returning to the heart of Africa before imparting to them his unique store of linguistic knowledge; but geographers have nothing to complain of. The course of the Aruwimi-Ituri mapped-out for a distance of over 500 miles, the delineation of the north-eastern boundaries of the Congo watershed, the discovery of the Semliki river and of the Albert-Edward Lake, the finding of Ruwenzori, a snow-mountain apparently superior in height and spectacular effect to Mount Kenia, and a worthy rival of Kilimanjaro, the indication of the south-western loop of the Victoria Nyanza—all these great results, and many minor ones, form a sum total of indebtedness on the part of geographers towards Mr. Stanley, that should cause them to be profoundly grateful for the manner in which he accomplished his task. Looked at solely from the mapper's point of view, Mr. Stanley's journey and the record of it which he has just published, are wholly satisfying. The politician, moreover, has cause to be grateful, for did not Mr. Stanley make treaties with the lords of those pleasant lands round the mountains and the lakes, which have secured them to us as future fields of British enterprise? And anthropologists must not grumble—though we admit that they are greedy of knowledge and hard to satisfy—for Mr. Stanley has placed the dwarf races of Central Africa on a more definite footing, has enlightened us somewhat as to the extent of the Bantu language-field, and given us short vocabularies of new languages. Apart from all this special interest, Mr. Stanley's latest book will fascinate the general public as a stirring, palpitating record of adventures as wonderful and terrible as ever happened to the heroes of Charles Kingsley's or Rider Haggard's romances; with the additional attraction of being real, gruesome truth instead of exuberant fiction.

Another sore point with Mr. Stanley is the idea that some of his English critics have taken Emin's part in the unfortunate dissidence which arose between the German *savant* and his rescuer. Here again, so far as we can judge, and to the best of our knowledge, Mr. Stanley shows himself needlessly sensitive. In all serious criticisms by men whose judgment is worth considering, full justice has, we believe, been done to Mr. Stanley in this matter. To be sensible to Emin's good qualities need not imply any blindness to his defects. Emin's weaknesses cannot blind us to the greatness of his attainments as a naturalist, as a careful and reliable observer and recorder of the languages, human races, fauna and flora of the Nile basin. As a scientific man, as one of the few scientific men who have made their home in Central Africa, Emin will always take a high rank in our estimation. As a leader of men, we are quite prepared to believe that he proved a failure, though indeed, it is wonderful—as Mr. Stanley himself more than once points out—that the poor purblind Pasha could maintain his position at all in such difficult circumstances, and it argues much for the sweetness of his disposition, that he existed so long on sufferance among his rascally Egyptians; indeed, it seems to have been

chiefly owing to the better nature of the black soldiery that his life was spared, and that he was eventually set at liberty. His irresolution must have been perfectly maddening to Stanley, who certainly cannot be blamed for the strong measures he eventually took towards hurrying the Pasha out of the country, and quelling the spirit of treachery and insolent mutiny among the Egyptian officers; but, nevertheless, these flaws in his disposition should not lead us to overlook the scientific work he has accomplished.

Mr. Stanley's chapter on the Ancient Geographers and their knowledge of the Nile Sources is an interesting compilation, but it does not in our opinion establish much more than that during the days of enterprising Greek exploration—or rather inquiry, not personal exploration—and after the Portuguese researches in Abyssinia some four hundred years ago, vague rumours were spread abroad about the three lakes which gave rise to the Nile, and the clump of snow-peaks between them. By a slip of the pen, Mr. Stanley writes about the "Chartographers of Homer's time." The map of "Africa in Homer's world," produced by a modern commentator on Homer hardly does justice even to Homer's geography. It is not until we come to the times of the Ptolemies, that any correct guess is made about the Nile sources, and then certainly a fair approximation of reality is given by Hipparchus, in a map which was probably based on the information of unusually intelligent negro slaves, or of some Nubian traveller. It is possible, that in Hipparchus's day—100 B.C.—the Bantu tribes had not yet reached the Nile Lakes, and that the country was only sparsely inhabited with feeble pigmies, and consequently that travellers from Egypt up the Nile would not have met with the determined resistance from the natives which must have afterwards tended to bar the way of rediscoveries. Nevertheless, it has always been our opinion that the Ancients knew but little at first hand of the geography of Africa, Europe, and Asia, outside a charmed circle represented by the utmost extent of the Roman Empire, and that their lakes and fountains, and Mountains of the Moon were to a great extent guesswork. It is the same with the early Portuguese maps of South Central Africa. They are simply crowded with lakes, which, in defiance of hydrostatical principles, are joined by a network of rivers, and serve as the common sources of the Congo, the Niger, the Nile, and the Zambesi. It would have been odd indeed, if after covering the map with lakes, they had not placed some few in places where lakes actually exist; but this chance correctness does not seem to us sufficient evidence that the Portuguese really knew of the existence of Lakes Victoria Nyanza, Tanganyika, Rukwa, Nyassa, Bangweolo, Moero, Albert Nyanza, Leopold II., and Tahad.

In the same way, it is quite possible that the classical tales about pigmies* were really based on some definite knowledge of dwarf races inhabiting Central Africa, but it is also conceivable that they had no more real foundation than the stories of *cyclopes*, hydras, and "men whose heads do grow beneath their shoulders."

It is an interesting question yet unsolved, whether these dwarf races of the Central African forest—these pigmies, discovered by Du Chaillu, de Compiègne, Schweinfurth, Stanley, Lenz, and Wissmann—belong to one homogeneous race, and are, again, racially connected with the South African Bushmen, or whether they are but local degenerations of diverse tribes, which have originated independently. The Akkas who were brought to Italy and examined there as to their language, were found to speak, we believe, but a local dialect of Niam-niam, or some other west-Nilotic tongue. The languages recorded of Mr. Stanley's Wambutu, and Batwa, and of Mr. Du Chaillu's A-bongo,† belong to the Bantu group. It may be that these pigmies are merely locally degenerate Bantu or Nilotic tribes, or they may belong to an independent dwarf race who have lost their own language, or who employ the tongue of their normal-sized neighbours in their contact with strangers, and still retain a peculiar language of their own. The Bushman tongue, in spite of all apparent dissimilarity, is indisputably

* In which case the "cranes" may have been ostriches.

† Obongo, as he calls them, is the singular form of the word.

connected with the Hottentot, and offers not the least connection with any form of speech as yet recorded among the Central African pigmies.

The language recorded by Mr. Stanley as spoken by the Balega or Barega * is really a dialect of the Lur or Alur language, spoken on the west shores of the Albert Nyanza, and related to the Shuli, Shiluk, and Dinka tongues. Kirega, the proper language of the Barega, is a thoroughly Bantu tongue and closely related to Lu-ganda and Ki-nyoro. Mr. Stanley, by-the-bye, strongly objects to the use of the term Bantu as a comprehensive name for that singularly homogeneous closely interrelated family of South African languages which extend uninterruptedly over the southern half of the continent, from the Cameroons to Mombasa, and from the Victoria Nyanza to Natal; but his objections seem inadequate, and the name Bantu (which is quite as reasonable as Aryan, Mongolian, Basque, or Libyan) will probably continue to be used by philologists until Mr. Stanley can furnish them with another term more expressive, distinctive, compact, and easier to pronounce.

The illustrations of 'In Darkest Africa' are singularly good in drawing and engraving. The maps are most of them clearly delineated, but it would have been better to indicate the sheets of water by a flat blue tint, and not by those irritating blue lines which get mixed up in whirlpools with islands and promontories. There is a good index to each volume, and interesting appendices. In one of these there is a statement of the receipts and expenditure of the Emin Pasha Relief Fund, which shows that some 33,000*l.* were subscribed (of which the Egyptian Government gave 14,000*l.*, Sir William Mackinnon 3000*l.*, and the Royal Geographical Society 1000*l.*), and the total amount expended was about 29,000*l.*, leaving a balance of some 4000*l.* to be disposed of. A marvellously cheap expedition as compared to our expensive and fruitless wars in the Soudan, and a wonderfully successful one considering the difficulties encountered.—
H. H. J.

AMERICA.

Davidson, Prof. George, Ph.D., Sc.D.—Identification of Sir Francis Drake's Anchorage on the Coast of California in the year 1579. San Francisco, 1890: pp. 58, with 15 illustrations.

The advance of accurate knowledge of our earth, its sea-coasts and its continents, is ever throwing new light upon the voyages and travels of the early navigators and explorers. Mr. Justin Winsor's valuable collection of documents and treatises relating to the discovery of America has done a vast deal in this direction, but there are points which even his learned work left doubtful or obscure. Such a question is the identification of Drake's bay on the coast of California, which forms the subject of this treatise written by an officer of the United States Coast Survey, and published by the California Historical Society. Drake, after avenging the injuries he had received from the Spaniards, left their coasts in South America, and sailed northwards along the coast of California to 43° of N. lat., when finding the cold as inconvenient as the extreme heat had been in the South Sea, he turned back and sought a good harbour. This he found in 38° N. lat., where he landed and stayed many weeks, finding the inhabitants well disposed, and the country, which he called New Albion, rich in minerals. The question as to what bay he entered has been discussed with much learning and ability by the Rev. Edward Everett Hale, in the work above mentioned. His arguments and deductions were in favour of San Francisco Bay. The present author, from his intimate acquaintance with the coast and elaborate study of the subject, is able to show with even greater force and more convincing argument that Drake could not have been in San Francisco Bay, and that the harbour of refuge where he anchored the *Golden Hind* before attempting the voyage across the Pacific was in the large gulf

* We prefer this spelling to Baregga, the double letter being unnecessary, as indeed it is in most of the native words wherein Mr. Stanley employs two consonants instead of one. L and R in most African words are absolutely interchangeable.

extending to the eastward of the promontory of Point Reyes, and known as the Bahia de los Pinos. In the north-western part of this great gulf is the harbour known as Drake's Bay. Here, comparatively recent charts have shown, there is good protection for vessels and admirable anchorage.—[E. D. M.]

NEW MAPS.

(By J. COLES, *Map Curator* R.G.S.)

EUROPE.

Bayerischen Hochland, Nordtirol und Salzkammergut zwischen Bodensee und Traunsee, München und Innsbruck nebst Brennerbahn.—Touristen-Karte vom —. Von C. Benhard. München, Keller. Price 1s. (*Dulau.*)

England and Wales.—Photo-relief Map of —, by Henry F. Brion and Rev. Edmond M'Clure, M.A. Scale 1 : 506,000 or 6·9 geographical miles to an inch. Published by the Society for Promoting Christian Knowledge, London.

The principal object in view, in the publication of this map, appears to be to exhibit the physical features of England, and if this be the case it is by no means a successful attempt. The hill shading is confused, and in some instances misleading, while, in the absence of any explanatory letterpress, the selection of names, and the size of the letters in which they are printed is utterly confusing; for instance, Douglas in the Isle of Man is printed in much larger type than Liverpool or Manchester; some districts are overcrowded with names, while in others hardly any appear, and the names of some bays and headlands are printed in letters altogether out of proportion to their importance.

France.—Carte de la —, dressé par le Service Vicinal par ordre du Ministre de l'Intérieur. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Sheets:—VIII.—15, Dinan; VIII.—16, Rennes; X.—28, Pauillac; XII.—12, Lisieux; XII.—13, Vimoutiers; XIV.—27, Thiviers; XVI.—26, Ussel; XVIII.—7, Douai; XIX.—6, Flines; XXIV.—32, Digne; XXIV.—33, Valensole; XXV.—22, les Echampés; XXV.—33, Castellane; XXVI.—32, St. Martin-Vésubie; XXVI.—33, Puget-Théniers; XXVII.—32, Fontan. Price 7d. each sheet. (*Dulau.*)

Italia a rilievo da Capitano Cav. G. Roggero.—Scale 1 : 200,000 or 2·7 geographical miles to an inch. Della misura di metri 1·10 × 0·80. Milano, A. Vallardi. Price 1l. 15s. (*Dulau.*)

Monti Pisani.—Carta geologica levata dal vero nel 1832, aumentata e coretta nel 1858 da Prof. Paolo Sivi. Pisa, A. Pellecci. Price 3s. (*Dulau.*)

Tirol und Salzburg.—Spezialkarte von —. Scale 1 : 600,000 or 8·2 geographical miles to an inch. Von F. Handtke. Glogau, Fleming. Price 1s. 6d. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued since the 15th June, 1890.

1-inch—General Maps:—

ENGLAND AND WALES: New Series: Sheet No. 131 (in outline), containing Cromer, &c., 1s.

25-inch—Parish Maps:—

ENGLAND AND WALES: **Yorkshire:** CXLIII. 1, 4, 6, 3s. each; CXLIII. 12, 4s.; CXLIII. 16, CXLIV. 3, 5, 7, 3s. each; CXLIV. 9, 16, CLXXI. 13, 15, 16, CLXXXVIII. 1, 7, 4s. each; CCXXV. 1, 2, 5, 3s. each; CCXXXVI. 2, 4, 7, 13, CCXXXVIII. 9, 5s. each; CCXXXVIII. 1, 5, 4s. each; CCLL. 4, 5s.; CCLL. 14, 16, CCLII. 1, 8, 10, 12, CCLIII. 2, 5, 6, 9, 4s. each; CCLIII. 3, 5s.; CCLV. 10, 4s.

Town Plans—10-foot scale:—

ENGLAND AND WALES: Chorley, LXXVII. 8, 12, 4s.; LXXVII. 8, 16, 5s.; LXXVII. 8, 17, 4s.; LXXVII. 12, 1, 2, 3, 7, 8, 11, 12, 21, 5s. each. (This town is now complete.) Halifax, CCXXX. 8,

20, 25, 2s. 6d. each; CCXXXI. 5, 1, 2, 14, 18, 19, 21, 22, 23, 2s. 6d. each. Huddersfield, CCXLVI. 11, 18, 4s. Leeds, CCXVII. 4, 24, 25, CCXVII. 8, 3, 4, 5, 8, 9, 10, 2s. 6d. each. Warrington, CVIII. 16, 20, 24, 25, CXVI. 1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 2s. 6d. each. (This town is now complete in 32 sheets.) Widnes, CXV. 5, 23, 24, CXV. 8, 2, 3, 4, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 21, 22, 23, CXV. 13, 1, 3, 6, 7, 2s. 6d. each. (This town is now complete in 22 sheets.)

(*Stanford, Agent.*)

ASIA.

Indian Government Surveys:—

Oudh Revenue Survey. 1 inch to 1 mile. Season 1862-63. Sheet 192, District Fyzabad.—Assam Survey. 1 inch to 2 miles. Seasons 1870-71 and 1873 to 76. Sheets Nos. 104, 106, 120, and 121. (Second edition.) Naga Hills.—Bhagalpur Division, comprising the Districts of Monghyr, Purneah, Bhagalpur, Maldah and Sonthal-Pergunnaha. 1 inch to 8 miles. 1890.—Preliminary Map of Minbu District. 1 inch to 4 miles. Season 1888-89.—District Hazaribagh. Lower Provinces, Bengal. 4 miles to an inch. Corrections to 1888.—Upper Burma. Preliminary Map. 1 inch to 16 miles. (5th edition.) 1889.—South Eastern Frontier. 1 inch to 4 miles. Seasons 1886 to 88. Sheet No. 1 N.E. (3rd edition.) Parts of Districts Upper Chindwin, Yeu, Katha, and Shwebo (Upper Burma), and of Manipur (Assam).—Upper Burma Survey. 1 inch to 8 miles. Sheet No. 1, s, E, T, F Series. (Preliminary.) Parts of the Lushai and Chin Hills, and the Districts of Upper and Lower Chindwin, Katha, Shwebo, Yeu, Pakokku and Sagain (Upper Burma); of the Arakan Hill Tracts (Lower Burma); of the Chittagong District and Hill Tracts and Hill Tipperah (Bengal).—Levels in the Punjab. 1 inch to 2 miles. Sheet No. 66. (Second edition.) Parts of Umballa, Karnál, Patiála, Nábha, &c. 1889.

Java en Madoera.—Kart van —. Scale 1 : 950,000 or 13 geographical miles to an inch, naar de nieuwste bronnen bewerkt van Dr. J. Dornseiffen. Amsterdam, Seyffardt. Price 4s. 6d. (*Dulau.*)

AFRICA.

Aequatorial-Ost-Afrika.—Die Deutschen und Britischen Schutzgebiete und Interessensphären im —, nach den Vereinbarungen vom Juni 1890. Von Richard Kiepert. Scale 1 : 3,000,000 or 41.6 geographical miles to an inch. Berlin, Dietrich Reimer, 1890. Price 1s. 10d. (*Williams & Norgate.*)

This is a very clearly drawn map of Eastern Equatorial Africa, on which the boundaries of the Spheres of Influence of European Countries within its limits are laid down. The area it includes extends from the east coast to longitude 33° east of Greenwich, and from latitude 3° N. to 12° S.

Afrika.—General-Karte von —. Entworfen und gezeichnet von F. Handtke. Nach den neuesten Materialien revidiert und ergänzt im kartograph. Institut der Verlagshandlung. Masstab 1 : 14,500,000 or 199 geographical miles to an inch. 51. Auflage. Glogau, Verlag von Carl Flemming, 1890. Price 1s. (*Dulau.*)

Having gone through numerous editions, this little map is so well known that it will only be necessary to say that on the present issue the present boundaries of the "Spheres of Influence" in Africa, so far as they have been settled, are accurately laid down.

Central Africa.—Map of —, showing New Boundaries according to the Anglo-German Agreement, June 1890. Scale 1 : 7,650,000 or 104.7 geographical miles to an inch. G. Philip & Son, London and Liverpool, 1890.

The boundaries of the "Spheres of Influence" in Africa, as agreed to between the English and German Governments, are accurately laid down on this map; in addition to which, notes are given with reference to the changes, that will be found useful to those unacquainted with the subject.

Kongo.—Karte des mittleren —. Auf Grundlage der Original-Skizzen der österr. Kongo-Expedition, aufgenommen von Dr. Oscar Baumann, mit Benutz-

ung der vorhandenen Quellen entworfen und gezeichnet von Paul Langhans. III. Blatt. Scales 1:400,000 (or 5·5 geographical miles to an inch) and 1:200,000 (or 2·7 geographical miles to an inch). Mittheilungen der k. k. geogr. Gesellschaft in Wien, 1890, Taf. XIX. (*Dulau.*)

ATLASES.

Hachette et Cie.—Atlas de Géographie Moderne, édité par —. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, figures, diagrammes, etc. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Hachette et Cie., 1890. Parts 15 and 16, 10*d.* each. (*Dulau.*)

The first map contained in the fifteenth issue of this atlas is one of Europe orographically coloured. The elevations above sea-level are shown by seven different shades and contour lines, and the depths of the sea are indicated by five shades of blue. The letterpress which accompanies the map is written by Mr. E. de Mergerie. No. 34 is a map of Eastern Russia and Roumania, which is accompanied by a historical sketch by Mr. D. Aitoff, illustrated by diagrams exhibiting the extension of the empire at different periods, from the ninth to the eighteenth century. No. 39 is a map of Turkey in Asia with letterpress by Mr. Léon Rousset, nicely illustrated by diagrams having reference to climatic conditions, density of population, and ancient sites of cities. In Part 16, Sheet 3 contains a physical map of the world on Mercator's projection, with letterpress by Mr. L. Poiré. No. 33 is a map of Russia in Europe, and No. 40 a very nicely drawn map of Persia, Afghanistan, and Baluchistan, with letterpress by Mr. Marcel Dieulafoy. This atlas is now fast approaching completion.

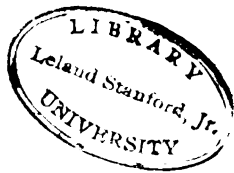
Stieler's Hand-Atlas.—Neue Lieferungs-Ausgabe von —. 95 Karten in Kupferdruck und Handkolorit, herausgegeben von Prof. Dr. Herm. Berghaus, Carl Vogel and Herm. Habenicht. Erscheint in 32 Lieferungen (jede mit 3 Karten, die letzte mit 2 Karten und Titel). Dreiundzwanzigste (23) Lieferung. Inhalt: Nr. 7, Süd-Polar-Karte, Breiten-Massstab 1:40,000,000. Von A. Petermann. Nr. 63, Ost-China, Korea und Japan in 1:7,500,000. Von A. Petermann. Nr. 75, Polynesien und der Grosse Ozean, westliches Blatt, von A. Petermann. Gotha, Justus Perthes, 1890. Price 1*s.* 6*d.* each part. (*Dulau.*)

Sheet No. 7 is a map of the Antarctic region, including all that portion of the globe lying between latitude 30° S. and the south pole. It contains a large amount of information with regard to the movements of the ice, such as the position of pack-ice at certain seasons, and the drift of icebergs, while in connection with this are shown the usual tracks of vessels between England, China, and Australia, both on the outward and homeward voyages. The tracks of Cook, Bellingshausen, Ross, Wilkes, D'Urville, Biscoe, Kemp and Nares are laid down, and numerous insets of islands are given. No. 63 is a map of the eastern portion of the Chinese Empire, including Korea and Japan, which also contains plans, on an enlarged scale, of Shanghai, Tokio, and Canton River and neighbourhood. No. 75 is the western sheet of a map of Polynesia, half of which is occupied by insets of the different groups of islands.

PHOTOGRAPHS.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.





PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

The Karun River and the Commercial Geography of South-west Persia.

By the Hon. G. CURZON, M.P.

(Read at the Evening Meeting, May 12th, 1890.)

Map, p. 576.

THE first duty that a traveller owes—the last, too often, that he thinks of paying—is a tribute of acknowledgment to those who have preceded him, and have both assisted and lightened his labours by their own. In the case of the subject with which I am about to deal, such a tribute is the more gratefully rendered that it has been so pre-eminently well deserved. Among those who have previously visited and written about the Karun river occur the famous names of Rawlinson and Layard, whose explorations in Persia, though conducted half a century ago, still supply the basis of our knowledge about many parts of that country, and whose names alone are a guarantee for adventurous research and painstaking observation. I append a list of the English or English-writing travellers, not more than a dozen in number, who have described in print their experiences on the Karun river or at Shushter; * and it is

* The English writers who have dealt with the Karun river, Shushter, and the surrounding districts, are as follows:—

Dean Vincent, 'The Commerce and Navigation of the Ancients in the Indian Ocean,' 2 vols., London, 1807.

J. M. Kinneir, 'A Geographical Memoir of the Persian Empire,' London, 1813.

Captain R. Mignan, 'Travels in Chaldæa,' London, 1829.

J. H. Stocqueler, 'Fifteen Months' Pilgrimage through Untrodden Tracks of Khuzistan and Persia,' 2 vols, London, 1832.

Major Estcourt (who in 1836 ascended the Karun as far as Ahwaz in the s.s. *Euphrates*), 'A Memoir and Survey presented to the Court of Directors of the East India Company.' [This cannot now be traced.]

Sir H. C. Rawlinson, "Notes on a March from Zohab to Khuzistan in 1836," 'Journal of the R.G.S.,' vol. ix., 1839.

Lieut. W. B. Selby, I.N., 'Report of an Ascent of the River Karun as far as Ahwaz in the s.s. *Nitocris* in May-June, 1841, presented to the Court of Directors of the East India Company.' [This cannot now be traced.] "Account of the Ascent of the Karun

from an attentive perusal of their often conflicting accounts, as well¹ as from the personal experiences of a recent visit to the same regions, that I have derived the conclusion that a paper may not be unacceptable to this Society which shall collate, and so to speak consolidate, previous sources of information, and shall also provide an accurate description of the existing state of affairs. In the catalogue of earlier travellers, the names, in addition to those already mentioned, which claim most frequent and honourable reference, are Lieutenant Selby, an officer of the Indian Navy, who twice ascended the Karun river, in 1841 and again in 1842, accompanied on the latter occasion by Mr. (now Sir Henry) Layard;* and Mr. Ainsworth, who was surgeon and geologist to the Euphrates Expedition in 1836, and who has published both an

and Dizful rivers and the Ab-i-Gargar Canal to Shuster, in the *ss. Assyria*, in March-April 1842," 'Journal of the R.G.S.,' vol. xiv., 1844.

Sir A. H. Layard, "Ancient Sites among the Bakhtiari Mountains" (with remarks on the Rivers of Susiana, by Professor Long), 'Journal of the R.G.S.,' vol. xii., 1842; "A Description of the Province of Khuzistan," 'Journal of the R.G.S.,' vol. xvi., 1846; 'Early Adventures in Persia, Susiana, and Babylonia, including a residence among the Bakhtiari and other wild tribes,' 2 vols., London, 1887.

Baron C. A. De Bode, "Notes on a Journey through the Mamaseni, Khogilu, and Bakhtiari Countries," 'Journal of the R.G.S.,' vol. xiii., 1843; 'Travels in Luristan and Arabistan,' 2 vols., London, 1845.

Colonel F. R. Chesney, 'Expeditions for the Survey of the Rivers Euphrates and Tigris in 1835-37,' 2 vols., London, 1850.

W. F. Ainsworth (Surgeon and Geologist to the Euphrates Expedition), 'Researches in Assyria, Babylonia, and Chaldæa,' London, 1838; 'A Personal Narrative of the Euphrates Expedition,' 2 vols., London, 1888; 'The River Karun,' London, 1890.

W. K. Loftus, 'Travels and Researches in Chaldæa and Susiana,' London, 1857.

Captain G. H. Hunt, 'Outram and Havelock's Persian Campaign' (1857), London, 1858.

'Proceedings of the R.G.S.,' March 1883, containing:—Paper by Colonel J. Bateman-Champain "On the various means of Communication between Central Persia and the Sea;" Speech by Mr. G. S. Mackenzie; "Surveying Tours in South Persia," by Major H. L. Wells.

Colonel M. S. Bell, v.c., "A Visit to the Karun River and Kum," 'Blackwood's Magazine,' April 1889.

Gen. Sir B. Murdoch Smith, "Address to the London Chamber of Commerce upon the Karun River and British Trade with India," 'Chamber of Commerce Journal, March 5th, 1889. "Address on the Karun River as a Trade Route," 'Journal of the Society of Arts,' May 10th, 1889.

* So far as I can ascertain, the ascents of the Karun river, by boat or steamer, recorded by English travellers prior to the concession of 1888, were as follows:—

In 1830, Colonel Chesney in a large Arab vessel.

In May 1831, Mr. Stocqueler in an Arab boat, as far as Wais.

In September 1836, Major Estcourt and party in the *ss. Euphrates* as far as Ismailiyah; in November 1836, as far as Ahwaz, and thence in a native boat to Bund-i-Kir.

In May and June 1841, Lieut. Selby in the *ss. Nitocris* as far as Ahwaz.

In February, March, and April 1842, Lieut. Selby and Sir A. H. Layard in the *ss. Assyria* as far as Shushter.

In March 1857, in the Anglo-Persian War, the *s.s. Comet, Planet, and Assyria*, under Captain Rennie, with 300 men and three gunboats in tow, as far as Ahwaz.

interesting personal narrative of the expedition, and a separate but less authoritative volume upon the river Karun. The 'Journal' of this Society for 1883 contains among the sequels to a paper read by Sir J. Bateman-Champain, the report of a speech by Mr. G. Mackenzie, formerly a member of a large trading firm in Persia, upon journeys twice made by him, in 1875 and in 1878, between Ispahan and Mohammerah. There also is printed the account of a similar journey made by Major Wells in 1881, as well as a chart by that officer of the famous rapids of Ahwaz. Since the opening of the Karun river to the commerce of the world by the Shah's edict of October 1888, Colonel Bell, v.c., late head of the Indian Intelligence Department, whose extraordinary travels over almost the whole Asian continent, though little known to the public, entitle him to be considered the territorial Ulysses of this age, has published in 'Blackwood's Magazine' a condensed but vivid account of his journeys in the region between Mohammerah and Teheran. A year ago Sir R. Murdoch Smith, late Director of the Indo-European Telegraph Department in Persia, delivered two addresses, before the London Chamber of Commerce and the Society of Arts, upon the commercial aspects of the Karun river-and-inland route, to which any student of that aspect of the question may unhesitatingly be referred. Finally, if a personal reference be permitted, I may mention that in the 'Fortnightly Review' for April and May of the present year, I have related my own experiences in a more detailed and colloquial fashion than is here permissible; whilst, if any too censorious critic should suspect me, either in those articles or in my remarks to-night, of having plagiarised from a long article on the Karun Question which appeared in the *Times* last February, suffer me to reply that, so far as I know, the ethics of literary propriety do not yet—whatever they may come to in the future—prohibit a writer from quoting from himself.

The Karun question may be contemplated in any of three aspects—geographical, political, or commercial—according as an attempt is made to describe the physical features of the river and surrounding country, to define the relations existing between its nomad peoples and the central government at Teheran, or to relate the steps that are being taken, or require to be taken, in order to develop the important trade route thus opened into the interior of Persia. In addressing a Geographical Society it will be expected of me that the first of these subjects should receive the greatest attention; although I shall not, I am sure, be denied the permission to make such political references as are necessary to a general understanding, or be excluded from the discussion of those practical corollaries of the laws of physical configuration which are in process of forming a new science under the title of Commercial Geography.

As regards orthography, let me say that, although the most correct form of the name Karun, viewed in the light of its derivation (Kuh-i-

rung), appears to be Kuran, yet, in deference both to local pronunciation in Arabistan and to popular custom, I shall write and pronounce it Karun. As regards sequence of narrative, I shall invert the customary order; and instead of tracing the river from its source to the sea, shall follow it upwards from the mouth, that being the line which travellers take for convenience, and which commerce must take of necessity, in their mutual ambitions to penetrate into the interior.

The factors—physical, political, and historical—with which I shall require to deal are few in number, are easily ascertained, and are already widely known. The Karun river is described in text-books of geography as the only navigable river in Persia. Rising in the knotted mountain range to the west of Ispahan, it pursues a westerly course through wild gorges and upland plains, until, emerging from the hills immediately to the north of Shushter, it turns sharply to the south, and after adorning that town with the waterworks that have rendered it famous in history and still leave it respectable in decay, pursues a sinuous course over the wide alluvial plain that stretches to the Shat-el-Arab and the Persian Gulf. On the way it receives, at Bund-i-kir, its main affluent, the Ab-i-diz or river of Dizful; whilst lower down its channel is interrupted, and navigation is impeded, by the renowned rapids of Ahwaz. At the river-port of Mohammerah it flows into the estuary, by which, 40 miles lower down, at Fao, the combined waters of the Tigris and Euphrates enter the Persian Gulf. The provinces which, in the course of this devious transit, it touches or traverses, and ought to, but at present does not in any appreciable degree, irrigate, are those of Luristan and Arabistan. The former is the country of the Lurs, those warlike and turbulent tribesmen of whom the Feili division inhabit Luristan proper, i. e. the mountain ranges between Kermanshah, the Tigris, and Dizful; while the better known Bakhtiari people the region between the Ab-i-diz and the western confines of Fars. Arabistan, i. e. the country of the Arabs, indicates its population by its name. There, on the flat plains reaching from the mountains to the sea, are settled various Arab tribes, who at different times have migrated in this direction from Turkish or Arabian territory, and of whom the principal are now the Ka'b or Cha'b Arabs, living around Mohammerah and Fellahieh. Arabistan is also called Khuzistan, the two names being interchangeable, and the province includes the ancient Susiana and Elymais, or Elam. These are the main features of country and population to be borne in mind.

With ancient history, and with the disputed questions of the Ulai or Eulæus, the Coprates, the Choaspes, the Pasitigris, and their identity with the modern river-beds, I shall not trouble myself or you. The channels, and even the entire course of the rivers of Susiana—where from time to time great masses of snow-fed water are suddenly propelled through a sandy and friable soil, and where vast artificial irrigation works have sometimes reversed the dispositions of nature—have shifted

frequently and irrecognisably. Unless we adopt this explanation, which charity as well as nature recommends, we shall be forced to the conclusion that the ancient chroniclers and geographers who dealt with these rivers were a very muddle-headed set of people; a hypothesis to which I am only inclined by the discovery that the majority of their modern successors have been guilty of confusions at least as startling, but over which the impulse of common impartiality tempts me equally to draw a veil. I take up the history of the Karun river at the moment when it first concerns ourselves, and when its commercial advantages began to be recognised, not by the British public, who are habitually ill-informed, but by the few pioneers whose invariable fate it is to be snubbed by their own generation and applauded by the next.

It was just fifty years ago that the immense latent value of the Karun trade route, as an avenue of expeditious approach to the great cities and centres of grain cultivation in the west of Persia, and as an opening more especially for British and Anglo-Indian commerce, was first brought prominently before the attention of Englishmen by the united labours and writings of Sir H. Layard and Lieut. Selby. The former of these explorers, from his intimate relations, both with Mohammed Taki Khan, the great Bakhtiari chieftain, and with the merchants of Shushter, was enabled to guarantee Persian reciprocity in any such enterprise; and he penned at the same time a report to the Home Government, and a letter to the Chamber of Commerce at Bombay, urging the prompt utilisation of so favourable an opportunity. Political convulsions in Persia frustrated the further prosecution of the design, and it was not till thirty years later that the opening of the Karun river to foreign commerce appears to have been made the subject of formal official communications between the Governments of Downing Street and Teheran. After seventeen years of diplomatic fencing, with feint and counterfeint, and all the diversified tricks of the Oriental school—in the course of which France at one time appeared as a combatant in the arena, and all but carried off an exclusive concession for the navigation of the river and the development of the surrounding lands—the matter was at last settled by a decree of the Shah, issued in October 1888, by which the Karun river, as far as Ahwaz, was, subject to certain somewhat vexatious conditions, opened to the mercantile marine of the world.

Ten years earlier, Hussein Kuli Khan, the second redoubtable Ilkhani whom the Bakhtiari clans have produced in this century, had made offers of co-operation to Mr. Mackenzie not less cordial than those which his famous predecessor had made to Layard. The independent action, however, and conspicuous authority of these chieftains in each case excited the jealousy of the central government. Layard's friend died in imprisonment at Teheran; Mackenzie's friend was put to death at Isfahan by the son of the present Shah. Hence it arose that when the

concession was finally granted, and the firm of Messrs. Lynch detached a boat from their Tigris flotilla, to run at regular intervals from Mohammerah to Ahwaz, no such local assistance was rendered to the British as might in earlier days have been forthcoming, and the subsequent prosecution of traffic has only been continued in the face of obstacles and discouragement which I have elsewhere described. With the remark that by the exercise of patience, and by fortunate appeals to the sincerity of the Persian Government, these impediments are gradually being overcome, and that by the lately accorded permission for a steamboat to navigate the upper river from Ahwaz to Shushter in correspondence with Messrs. Lynch's steamers on the lower river, and by the expected commencement of a wagon road, under the auspices of an English company, from Ahwaz to Teheran, a notable impulse has been given to the chances of success,—with this remark I will take leave of the historical aspect of the Karun question, and will proceed to the main or geographical portion of my paper.

The Karun river may be divided into six sections, which I will successively discuss. These are—(1) its mouths, past and present; (2) the section next above, as far as Ahwaz; (3) the rapids of Ahwaz; (4) the section between Ahwaz and Bund-i-kir, at which point the hitherto undivided river is split up into three confluents; (5) the section or sections formed by the two streams which reunite at Shushter; (6) the course of the river above Shushter in its passage through the Bakhtiari mountains. At Bund-i-kir I shall also diverge for a brief while to follow the course of the third confluent, or Ab-i-diz, which descends to that point from the mountains of Luristan, passing on its way the important town of Dizful.

1. About 60 miles above the bar outside the Shat-el-Arab, 40 miles above the entrance to that estuary at Fao, and 20 miles below the Turkish port of Busrah, the present main exit of the Karun river flows into the Shat-el-Arab from the north-east by an artificial channel, whose etymology testifies to its origin, known as the Haffar Canal.* When this canal was cut no one knows, and I shall not attempt to conjecture. The reason for its construction was presumably to open a communication between the Karun, which then entered the Persian Gulf by an independent mouth, and the Shat-el-Arab, and thus to promote trade between Arabistan and the then existing predecessors of the Turkish ports of Busrah and Baghdad. Where it flows into the Shat-el-Arab, the Haffar Canal is about a quarter of a mile in width, with a depth of from 20 to 30 feet. The town of Mohammerah is situated a little more than a mile up the canal, on its right bank, and is a filthy place with about 2000 inhabitants (Ka'b Arabs), and consisting mainly of mud huts and hovels, backed by a superb fringe of date-palms. Lower down on the same shore, at the angle of confluence between the Haffar and the Shat-el-

* Haffar is said to signify "canal-digger."

Arab, the Persian authorities have just built a large warehouse and governor's house and a primitive quay, which are to be the centre and depot of the trade of the future.

Some two miles above Mohammerah, and, therefore, three miles from the mouth of the Haffar, we come to the *Bahmeshir* (derivation disputed), or alternative channel, by which a portion of the waters of the Karun still enter, and the whole, in all probability, once entered the Persian Gulf. It runs in a line, from north-west to south-east, parallel with the *Shat-el-Arab*, for a total length of over 40 miles, and flows into the sea by a wide mouth at a distance of several miles from the embouchure of the estuary. I desire to invite your especial attention to the *Bahmeshir* channel, because it occurs to me as not impossible that it may assume a new and specific importance in the future. I have, in the 'Fortnightly Review,' dwelt at some length upon the jealousy with which the Turks at Busrah regard the probable development of Mohammerah and the Karun trade route, and upon the aggressive and offensive action which they are taking in erecting fortifications on the *Shat-el-Arab* at several points, where it will be in their power either to block the entrance to the river or to overawe and imperil Mohammerah. Should this attitude lead at any time to positive collision, it may be of incalculable importance to Persia to have an alternative and independent way of entry into and exit from the Karun. Such a channel is provided by the *Bahmeshir*. With both its banks and its mouth exclusively Persian, and safely removed from risk either of Ottoman menace or violence, it may be that the *Bahmeshir* will once again be utilised for navigation. It was ascended by the steamship *Euphrates* under Major Estcourt, in connection with the *Euphrates* expedition of 1836. In 1841 Lieut. Selby steamed down it from Mohammerah to the sea and back, and found a channel of not less than nine feet at low water.* Layard described it as having a good navigable channel to its junction with the sea of not less than four fathoms depth, and over half a mile in width, and said that its entrance at low water, during spring tides, was more than three fathoms deep, and therefore practicable for ships of large burden.† Since then shoals appear to have formed outside its sea-mouth, pierced only by a tortuous and shifting channel. There is a rise and fall of tide of about nine feet, and the water throughout its course is said to be growing shallower. It would be well if a careful survey were made of the *Bahmeshir* channel; and it is possible that by dredging or other artificial means it might again become accessible to ocean steamers of light draught, and thus provide an exclusively Persian entry to the Karun. I doubt if the Persians themselves, who are commercially apathetic, except in the cause of obstruction, have at all realised the possible value of this stream. By us, however, it should not be overlooked.

At a distance of from 10 to 12 miles above the *Bahmeshir* occurs a

* 'Journal of the R.G.S.,' vol. xiv. p. 221.

† *Ibid.*, vol. xvi. p. 55.

third, but now choked and disused channel of the Karun, by which also, in days probably anterior to the Bahmeshir, it once sought the sea. This dried-up bed, which is supposed to be that up which the fleet of Nearchus sailed to join Alexander the Great at Susa, is called the Karun-el-amrah, or Blind Karun. It was followed by the officers of the Euphrates Expedition in 1836 towards the sea, and was found by them to consist of a depression 200 yards in width, in the middle of which still existed a small channel that was filled by the flowing tide, but left with only one foot of brackish water at the ebb. The probability of this having been the original or earliest mouth of the Karun is enhanced by the fact that the Oriental geographers describe the Haffar Canal as being four parasangs, or about 15 miles in length, figures which almost exactly correspond with the length of the present stream from the mouth of the Karun-el-amrah to Mohammerah; so that we should be justified in regarding the entire river-bed below the former point as an artificial creation.

From the Karun-al-amrah has been cut a canal conducting to the former Ka'b capital of Fellahieh, on the Jerrahi river, and variously known as the Kaban or Gobban. In the last century a dam was thrown across the Karun at this point by a Sheikh Salman, i. e. Suleiman, of the Ka'b tribe, with the object of diverting its waters either into this canal or into the Karun-al-amrah. In the Persian invasion of Karim Khan this dam was destroyed, and the Blind Karun consequently achieved blindness. The canal is still navigable at seasons to Fellahieh.

Such is the position and, so far as I can ascertain, the origin and chronology of the various mouths, past and present, of the Karun. I pass to the second section, extending northwards to Ahwaz.

2. From Mohammerah to Ahwaz, i. e. upon the lower river, the distance by water is about 117 miles, by land it is less than 80—a difference which gives some idea of the extent to which the river twists and bends. Throughout this distance the Karun is a broad and stately river, commonly from 300 yards to a quarter of a mile in width, flowing between low banks, upon which little vegetation is visible except at the rare spots where Arab camps, moving upwards from the palm-groves of Mohammerah, plough and sow the fertile but neglected soil in the winter, and extract an ample harvest in the early spring. But for these fitful evidences of a spasmodic cultivation, the entire country, though of surpassing richness, is allowed to lie waste. The charts of Colonel Chesney and Lieut. Selby depict an abundance of timber upon the banks between Mohammerah and Ahwaz, and Sir H. Layard also testified to the same feature. Much of this appears since to have been destroyed by the Arabs, presumably for firewood; and whilst in most parts the banks are absolutely bare, elsewhere they support only a low scrub or jungle consisting of tamarisk and brushwood, which gives shelter to wild boar, jackal, lynx, hares, francolin, sandgrouse, and in the marshy places

to every variety of wild fowl. In this part of the river there is commonly from 12 to 14 feet of water at high water, and from six to seven feet at low water, a depth which sinks in the dry season to from three to four feet and less upon the shoals and sand-spits, which are always shifting and are a great obstacle to navigation. The native boats or *mehalas*, which, in the absence of wind, are towed up stream by trackers, continually run aground, and the entire cargo has frequently to be taken out and carried along the bank while the boat is being hauled off. These peculiarities render it desirable that vessels of very light draught, drawing i. e. not more than three feet when laden, like those which are employed on some of the Indian and Burmese rivers, and with a maximum length of 150 feet, should be specially constructed for the Karun navigation; and it is within my knowledge that plans of such a character have been specially prepared by Messrs. Lynch. Fifty years ago the only two places of any importance on the river-stretch between Mohammerah and Ahwaz appear to have been the small towns of Idrisieh and Ismailieh.

These riparian villages or camps enjoy a flickering and precarious existence. At present the chief settlements are those of Braichia, Kut Omeirah, and Kut Abdullah, where small camps of Ka'b Arabs reside under the rule of sheikhs who are subordinate to Sheikh Mizal Khan, the principal chieftain of the tribe, who lives near Mohammerah, and is also, by favour of the Shah, Persian Governor of the latter port. Lieut. Selby, in the *Assyria*, a paddle-wheel steamer 100 feet long, in 1842, ascended from Mohammerah to Ahwaz in 30 hours. In the *Shushan*, Messrs. Lynch's stern-wheel river-boat, I occupied 23 hours in the ascent, and 11½ hours in the descent, there being a great deal of water in the river. The average time occupied by the *Blosse Lynch*, a much larger paddle-wheel vessel, with which the same firm commenced the navigation, was 16½ hours in the ascent and 10½ in the descent, in the high waters of last spring. The velocity of a full current is from four to five miles in the hour; of a low current from one to 1½.

3. For miles before reaching Ahwaz, the red sandstone ridge that suddenly crops up from the level plain to the north-east of the town and stretches in a long and jagged line towards the east horizon, is visible from the river. That two independent travellers,* 60 years ago, should have mistaken this ridge for the ruins of a large city that is known to have once existed in these parts, and which one of them relates that he followed for over 30 miles, and subsequently again encountered on the shores of the Persian Gulf, would be surprising did it not appear that almost all early visitors to the Karun must have worn spectacles designed to invert the objects that came beneath their vision; further examples of which phenomenon I

* 'Travels in Chaldæa,' by Captain R. Mignan, p. 303; 'Fifteen Months' Pilgrimage through Khuzistan and Persia,' by J. H. Stocqueler, vol. i. pp. 62, 84.

have elsewhere supplied. To science and to commerce the main interest of this same ridge consists in the fact that just below the village of Ahwaz—a small cluster of mud-hovels with about 700 inhabitants, situated on the left bank—the sandstone obtrudes itself in the shape of a number of rocky ledges right across the river-bed. Of these reefs five are distinctly perceptible in low water; and it is the water eddying above their summits, or tearing between the gaps by which they are separated, that constitutes the famous rapids of Ahwaz, and creates that practical barrier to continuous navigation which has always impeded, and continues to impede, the mercantile development of the Karun route. Major Wells' survey and map of these rapids was published in the 'Proceedings' of this Society for March 1883, and I shall therefore refrain from any further description. That his chart does not quite accurately represent the river-bed and islands as I saw them, may be due to the fact that both are constantly changing, and that the islands, composed of silt and sand, have acquired quite different proportions in the passage of nine years. The sight and sound of the river at Ahwaz are both remarkable. For on the one hand the channel is swollen to nearly three times its ordinary width, and on the largest reef are visible the massive remains of the great *bund* or dam that was built across the river, probably in the Sassanian epoch, to hold up the waters for irrigation purposes. On the other hand, the noise of the waters hurtling over the ledges and through the gates, can be heard for some distance, and in the stillness of the night is always humming in the ear.

Steamboats have more than once (the *Assyria* in 1842, the *Susa* in 1889, and the *Shushan* in the present spring) been taken, partly by steam power, partly by tow-lines, up the main rapid; but this is an operation that can only be performed without considerable risk in certain seasons of the water. Consequently proposals have been made for blasting away the rocks in the river-bed—an idea which was favoured by Sir H. Layard; for constructing a canal with locks, as recommended by Major Wells; and for running a tram-line between the upper and lower river above and below the rapids. Anything so revolutionary as blasting or canal-cutting is not likely to commend itself to a people who have lost all taste for public works, and are only careful of those that exist in being careful that they should fall into decay. A tram-line may come in the future; but, even so, will only facilitate without obviating transhipment, which is the nuisance of the present situation. It is no doubt to meet the difficulty thus created that the new wagon road, a concession for which has lately been bought by the Imperial Bank of Persia from a Persian Minister who had obtained it from the Shah, and which will be constructed by an English company, will start upon its overland course to Teheran, a distance of 550 miles, from Ahwaz. Should a railroad at any time in the future be laid upon this line, it is a question whether it should not

be continued as far as Mohammerah, so as to prevent any break of bulk at all in transhipment at that port. In such a case, the navigation of the Karun would cease to be remunerative. But the railway scheme, though feasible, is still so much *in nubibus* that for the present we may discuss far less ambitious proposals, and even regard a tramway less than two miles in length as a covetable *desideratum*.

4. I now pass to the upper river and to the stretch, about 45 miles in length, that intervenes between Ahwaz and Bund-i-kir. Of this there is little to be said except that the Karun is here narrower in width, averaging from 200 to 350 yards; that it flows between loftier banks, rising from 10 to 20 and even 30 feet in height; that these sustain a thicker growth of scrub than on the lower river; and that the course of the stream is as sinuous as an impaled worm. Only one village of the slightest importance is passed, and this, whose name is Wais, is worthy of mention only as marking the northern limit of Sheikh Mizal's jurisdiction, which henceforward is succeeded by that of the Governor of Arabistan. Above Wais for about 12 miles the river is as straight as it was previously serpentine, until we come to Bund-i-kir (i. e. the dyke of bitumen, a dam so cemented having doubtless once existed at this spot), where three smaller streams converge to form the large river, of which we now take leave.

5. These streams are the Ab-i-diz, or river of Dizful, that runs from Dizful on the west; the Ab-i-shateit, or Karun proper, that runs from Shushter, in the centre; and the Ab-i-gargar, originally an artificial canal, that runs also from Shushter, on the east, and constitutes the eastern boundary of the island so formed. I will add a few words about each of these tributaries.

The Ab-i-diz descends from a distant source in the mighty Zagros range. What is really its parent stream I am quite unable to say, because no two maps give it anything like the same direction, some tracing it to Khoremabad, others to Kermanshah and even Hamadan. Here, however, I am only concerned with its lower course, when, after passing the town of Dizful, it meanders through a jungle-grown and untilled plain until its union with the Karun at Bund-i-kir. This river has only once been ascended in a steamer, namely, by Lieutenant Selby and Sir H. Layard in the *Assyria* in the late spring of 1842, after their successful ascents of the Shateit and the Gargar. Pursuing with some difficulty an exceedingly tortuous channel, they at length came to a spot called Koleh Bunder, about 25 miles in a direct line, and a good deal more by water, from Bund-i-kir. There they found the river divided into two branches by an island, and a natural bund or rocky reef stretching across both. Penetrating by an opening in the right barrier, they continued their ascent for a few miles further, and then finding the stream very shallow and the current strong, turned round and steamed back to Bund-i-kir.

Layard in his report described Koleh Bunder as half-way to Dizful,* but in his book speaks of having ascended within 13 miles of the town †; calculations which cannot both be correct, if the entire distance by river between Bund-i-kir and Dizful be, as alleged, 70 miles, or as I incline to think, a good deal more. So far as I know, the Diz has never since been ascended or explored by an Englishman. The jungle on its banks is said to abound in lions, and I recommend it to any adventurous sportsman.

The second river of the trio that unite at Bund-i-kir, though locally known below Shushter as the Ab-i-shateit, is in reality the main channel of the Karun. It was the first of the channels navigated by Selby in the *Assyria* in 1842. He ascended it to within six miles of Valerian's bridge at Shushter, where the boat ran aground, and was only got off by a lucky freshet of water descending from the hills. Both he and Layard described it as admirably adapted for steam communication, and as having a deep channel; but I fancy that the bed must have altered a good deal in the last fifty years, as it is now deserted by native craft, and about half-way to Shushter, was reported to me as being broken up into numerous shallow channels, separated by shoals or islets, and impassable to navigation. In my march to Shushter, I struck it at a point about 12 miles above Bund-i-kir, and there I found it a fine river about 250 yards in width.

River traffic to Shushter is now conducted, and the main interest is therefore centred, upon the third of the confluent streams, i.e. the Abi-i-gargar, which was originally an artificial canal. This stream may be ascended by a steamboat drawing three feet of water, to a point known as Shelailieh, between six and seven miles below the town of Shushter. There, owing to the presence of semi-natural, semi-artificial, barriers in the remaining section of the canal, it is customary to cast anchor, and thence all merchandise is at present carried on donkeys or mules to the city. I descended the Abi-i-gargar from Shelailieh to Bund-i-kir in the Persian steam launch the *Susa*, and calculated the distance as about 45 miles. The present channel is a much narrower one than that of either of the two other rivers, covering only from 50 to 75 yards in width. But it is evident from the configuration of the surrounding country that it once occupied a much wider bed; as the ancient banks are still visible, standing up like clay ramparts at a distance of from a quarter to one mile apart. I have elsewhere explained the cause, both of the original expansion and of the subsequent contraction, and have adduced reasons for believing that the entire body of the Karun was once temporarily diverted into this canal, which was therefore swollen to quite abnormal proportions, but which, upon the restoration of the river to its proper bed, assumed the more modest dimensions which it now displays. It is by this canal, or by a land march of

* 'Journal of the R.G.S.' vol. xvi. p. 59. † 'Early Adventures,' vol. ii. p. 362.

32 miles from Bund-i-kir, that the traveller approaches the interesting but unutterably dilapidated town of Shushter, the capital and seat of government of Arabistan.

I have, in the 'Fortnightly Review' for May, given so minute and exhaustive a description of Shushter, its external features, population, and celebrated works of ancient hydraulic or engineering skill, commonly, but, as I think, erroneously, connected with the name of the captive Roman Emperor Valerian, that I will not here recapitulate my own remarks. I will merely summarise them by saying that the town of Shushter occupies a commanding position on a rock in the angle between the two streams which we have observed to reunite at Bund-i-kir; that it is the most decayed and melancholy among considerable centres of human habitation that I have ever seen; that it contains a population of about 8000 persons, distinguished for alleged descent from the Prophet, and for a swagger and superstition quite in keeping with that illustrious origin; that its trade, which might be great, is comparatively insignificant; that its surrounding cultivation, which possesses incomparable advantages of soil and climate, has lapsed into shocking neglect; and that at present it only retains its prestige because of its commanding natural position, its selection as the seat of provincial government, and the magnificent waterworks which were constructed here by the Sassanian monarch Shapur, 1600 years ago, to supply the city and its suburbs and gardens with water, and to economise the superfluous extravagance of the Karun. For a discussion of the character and object of those stupendous undertakings may I refer my hearers to the pages of the 'Review' which I have already mentioned?

6. Here I will resume the interrupted ascent of the river, and proceed to a brief *résumé* of the final section of the Karun from above Shushter to its source in the Zardah Kuh mountains to the west of Ispahan. In this part of its course I am not concerned on the present occasion to follow it with minuteness; since, the channel not being navigable in these regions, its importance as a trade route ceases here, and passes to the overland mule-tracks by which at present communication is kept up with Khoremabad, Burujird, and other larger towns further north.

In its upper course, however, the Karun, which flows alternately through precipitous gorges and elevated plains, traverses a country that is interesting both from its inhabitants and from the ancient ruins that exist upon its banks and in the neighbourhood.

The rugged mountain system here encountered, which presents a succession of lofty, snow-capped ridges and craggy defiles, extending eastwards from Shushter to the neighbourhood of Ispahan, is the home of the Bakhtiari subdivision of the great tribe of nomad Lurs, occupying the province of Luri Buzurg or Greater Luristan. Their history in the first half of the present century, which was one of romantic incident and

heroic struggle for the preservation of an immemorial freedom, has been related by Rawlinson and Layard, the latter of whom was on terms of intimacy with the tribal chieftains, rarely permitted to a stranger and an Englishman. I hope that there may sometime be presented to this Society an account of the subsequent history and present condition of these celebrated highland clans, before the encroachments of the Persian Government, which has for long devoted itself to the extinction of the independence and authority of their principal chiefs, have finally crushed them into the dull mould of uniform subjection.

The ruins which are visible on the upper course of the Karun, or upon the banks of its tributaries, include the relics of the prosperous and princely rule of the Atabegs in the Middle Ages, which are themselves, in many cases, restorations of the far earlier structures of the Sassanian or of the Kaianian kings. Here are visible a second Susan, and a second tomb of Daniel, which led Sir H. Rawlinson to conjecture that they must mark the site of the royal Susa of the ancients, and of "Shushan the palace" of the prophet Daniel—a hypothesis which has been invalidated by later explorations. In an adjoining plain are the far more considerable remains of Mal Amir, consisting of four groups of rock-sculptures, which were first visited and described by Layard, and found to belong, three to the Kaianian, and one to the Sassanian epoch. These, viz. the people and the ruins, are, along with the fine forests of oak, beech, and plane there met with, the chief features of interest upon the upper waters of the Karun.

Till quite recently this belt of country has possessed an independent interest, connected with the opening of the Karun trade route, inasmuch as through it runs the shortest mule track from Shushter to Ispahan, by which, if safeguarded and improved, it was hoped that a new and speedier overland route might be found to Ispahan from the sea. Slightly different tracks have been followed across this region by the various travellers, including in recent years Mr. G. Mackenzie, Major Wells and Mr. W. Baring, General Schindler, and private friends whose itineraries I have seen; but they unite in calculating the distance as about 260 miles. Their versions of the difficulties, physical and otherwise, encountered, differ somewhat, according to the temperament of the traveller, the season of the year selected, and the professional interests concerned. There can be no doubt, however, that though this road is secure, the Bakhtiari being favourably disposed and peaceful, a good deal of road repair, and of bridge and caravanserai building, would have been required to render it passable for caravans, while it would have been liable to be closed by snow in the depth of winter. It is probably owing to these considerations that the large scheme of road construction, of which I have previously spoken as about to be undertaken by an English company, includes a branch road to Ispahan, not along this route, although it is considerably the shortest from the sea, but farther

north from Burujird, whence there already exists a well-worn mule track by Khonsar to Ispahan, a distance of 210 miles.

While writing this paper, I have heard from Ispahan that the merchants of that place are looking forward with sanguine anticipation to the completion of this new road. I do not see that, as regards distance, it will help them much for merchandise coming from the sea, as the distance from Ahwaz by road to Burujird and thence to Ispahan will be about the same as, if not a little more than, the present distance *viâ* Shiraz from the Gulf, *viz.* 500 miles; although being, according to present intentions, a wheeled track, the Burujird road ought to provide both a speedier and safer transit than do the horrible *kotals* or rock-ladders between Bushire and Shiraz. In any case it must facilitate trade distribution in the interior, and, as a branch of a great system, will contribute to the success of the whole; whilst, in later days, a Bakhtiari caravan road may perhaps follow.

Returning to Shushter, I will now trace the main line of through communication to the western and northern provinces which will shortly be opened out in connection with the traffic on the Karun. The only publication, in English, available to the general reader, in which this route is explained and described by a competent authority, is the series of admirable articles contributed by Colonel Bell to 'Blackwood's Magazine,' in April, June, and July, 1889. To them may safely be referred any student of the question, or even any would-be shareholder in the new venture that will shortly be submitted to the public. The information therein contained, dating from the year 1884, I am able to supplement by details communicated to me when in Persia by travellers who had themselves made the journey in the past year!

From Shushter the road, crossing the Karun—or rather, at the present moment, not crossing it, for the famous Bridge of Valerian is broken down—runs over a level plain for 36 miles to the important town of Dizful, which is situated on the left bank of the river, already alluded to as bearing the same name. Dizful resembles Shushter in many respects; in its architecture, its population, its possession of a fine ancient bridge, its general neglect of trade and tillage, and its universal and incorrigible decay. As an illustration of what the new route by the Karun may here be expected to do, I may mention a fact, which I have nowhere seen stated, *viz.*, that the import and export trade of Dizful, which might easily be doubled or trebled in volume, is at present conducted by an overland track from the Turkish landing-place of Amarah, on the Tigris, merchandise being brought up the river from Busrah, and despatched by mule caravans starting twice a month for Dizful. Now, all goods passing this way have to pay customs dues to Turkey as well as to Persia; from which may be inferred the advantages of a new route which shall avoid both Ottoman territory and Ottoman officials—a tribe whose victim is of all men the most

to be pitied—and which shall traverse Persian soil and Persian waters alone.

After leaving Dizful, the next section of the road, 156 miles in length, to Khoremabad, is both the roughest and hitherto the least safe. It crosses a steep and mountainous region, rising from 580 feet above the sea at Dizful to 5500 feet on the highest pass. Colonel Bell classified 50 miles of it as bad; and here some blasting will be required, and a good deal of boulder-lifting from the road. I have often wondered, when riding in Persia, at the apathy with which tracks that are used daily by hundreds of camels, horses, and mules, are left as thickly covered with huge jagged rocks, that could be removed by the expenditure of a few shillings, as a porcupine is with quills. No one ever takes them away; and a workman with pick or shovel is a phenomenon that you will not stumble upon in the whole of Persia.

The insecurity of the Dizful-Khoremabad road is due to the lawless vagaries of the Ilyat or nomad tribes in this quarter. They recognise no authority, are always fighting among themselves, and subsist when they can upon pillage. In January of the present year the Derikwand tribe were out plundering, and cutting the telegraph wires, and I heard of a caravan for Dizful that had been stopped for two months at Khoremabad before it dared to start. Guard-houses will require to be built, and guards to be stationed upon this section of the road, which should then be traversable by mules without difficulty in six or seven days. Khoremabad, though the seat of government of the province of Luristan, and surrounded by a fertile valley, is at present a small and decaying place, its decline being due to bad government and to the local conditions which I have just described. It is, however, the first of the cluster of inland cities and centres of manufacture or cultivation, hitherto isolated from the sea, which the new route aspires to open up and develop.

Of these the next in order is Burujird, 63 miles from Khoremabad—a large and thriving town of 17,000 inhabitants, situated at a height of 5400 feet above the sea, in an extensive and well-watered plain, in which are grown vines and cereals of every description, and whose productiveness might be indefinitely multiplied. I have already mentioned Burujird as the starting-point of the projected branch road to Ispahan, and its position marks it out as the natural centre whence other roads will radiate forth to the not less important cities of Kermanshah and Hamadan, at present served only by the caravan-line that runs from Baghdad to Teheran. Kermanshah, said to have 60,000 inhabitants, is distant 130 miles from Burujird; Hamadan, with 15,000, only 90 miles; and both are places of great trade and greater possibilities.

From Burujird, the main road which I have been following, will, I presume, be continued eastwards, 60 miles to Sultanabad, a very prosperous place in a district rich in pastures and grain, and celebrated

as the centre of the Persian carpet manufacture in the west provinces. Thence it will be produced for 80 miles to Kum, the well-known sacred city, on the main postal-line from the south to Teheran. Kum is only 100 miles distant from the capital, and is already connected with it by one of the two made roads which are all that the kingdom of the Shah can at present boast of.

I have thus conducted my hearers from the mouth of the Karun river to the Persian capital, and have shown the points and places between, which the utilisation of the river channel in the first place, and of the land roads about to be constructed in the second, will bring into novel communication both with each other and with the Persian Gulf. Let me state the case, and the advantages possessed by the proposed over the existing system, in terms of miles, regarding Ahwaz as the new maritime base, just as Bushire and Baghdad are the old. Burujird is distant from Baghdad 350 miles, and from Bushire 700 miles. From Ahwaz it is distant 310 miles. Sultanabad is distant from Bushire 700 miles, from Ahwaz 370 miles. Hamadan is distant from Baghdad 320 miles, from Ahwaz 400 miles; but Turkish river, territory, and custom-houses have not in the latter case to be passed between. Kum is 700 miles from Bushire, 450 miles from Ahwaz. Kashan is 640 miles from Bushire, 510 miles viâ Kum from Ahwaz.

These figures serve to show the greater expeditiousness of the new route; but it should further be remembered that the gain is not to be estimated in mileage only, but that the contrast will be between narrow and sometimes perilous mule-tracks upon the old line, and a cart-road with a probable wagon service upon the new.

If I be asked what is the particular use that is likely to be made of the Karun and inland route, and what are the prospects of mercantile return in the shape of traffic, customs, and tolls, I answer that under proper management it ought to result in a fourfold development, each pregnant with future wealth.

In the first place, a great impetus will be given to local production and manufacture. In traversing the Karun country, whether by river or on horseback, I passed through thousands of acres of splendid soil, capable of producing wheat, barley, cotton, rice, maize, tobacco, indigo, opium, sugar-cane, and with every facility for abundant irrigation, but lying naked and desolate, or else encumbered with tangled undergrowth and marshy pools. Further north, vines and fruit of every description can be grown with ease, and medicinal plants of considerable value. There also are to be found pastures for large flocks of sheep and goats, producing wool that fetches a high price; whilst the Bakhtiari country is celebrated for its breed of horses and mules, hundreds of which are even now brought down to the coast and shipped for sale to Bombay. Mineral resources are believed to exist in considerable extent in the provinces thus opened up; and naphtha springs are well known

in the neighbourhood of Shushter and Ram Hormuz. All these products are only at present turned out in scanty volume, and there is not one among them whose annual output might not be many times multiplied were communication rendered simultaneously more easy and more secure.

Secondly: there would in time be a large increase of population in the districts affected. The population of Persia has been woefully diminished by the neglect and breakdown of the water-system upon which it depended. But in this corner of the Shah's dominions, and in this alone, nature has not stinted the most generous supplies; and the plains over which the traveller may now roam for hours without encountering a single human soul, ought under altered conditions to teem with busy life and industry.

Thirdly—and this is a consideration which specially affects ourselves—the opening of this route, if vigorously carried out, should result in an enormously increased import into Persia of British and Anglo-Indian goods. As it is, the import trade of the whole of Southern Persia is almost exclusively in British hands. Steamers of two British or Indian companies run weekly from Bombay to Busrah, and there is also a direct though irregular service between Busrah and London. The cities of Southern and Central Persia, as far north as Ispahan, already derive the bulk of their luxuries, and almost the whole of their clothing, from Manchester or Bombay; and each fresh town, we may even say each new village, that is brought into communication with the Persian Gulf, will thereby be drawn into the mesh of the Lancashire cotton spinner or the Hindu artisan.

Fourthly: should the line thus opened be succeeded at any time by a railway, the returns from passenger traffic would constitute no mean item. Asiatics generally are childishly fond of railway travelling; and the Asiatics of Persia, in particular, are addicted to immense journeys, extending over months of time, in order to gratify their pious desire to gaze upon the last resting-place of some departed saint. When they have reached the holy spot and have paid the becoming devotions, they enjoy what in England is vulgarly described as a spree; after which they return home in the odour of accomplished sanctity, and are known ever after as Hajis if they have been to Mecca, as Meshedis if to Meshed, or as Kerbelais if to Kerbela. I am a Meshedi and a Kerbelai myself, though I confess to being still a stranger both to the turbulent sweets of initiation and to the consecrated joys of reminiscence. A railway running between the Karun and Teheran would carry many thousands of such pilgrims to Kum, to Kerbela, to Najaf, to Kazimein, to Samara, and even in the direction of Mecca itself—all of them shrines of extreme sanctity and popularity. It would thus in time be supported by the superstition against which it might at first have to contend.

Such is the commercial geography of south-west Persia, and such are the advantages, both to Persia and to Great Britain, that may be

expected to result from the active development of the Karun trade route. If it be asked why I have not laid greater stress upon or devoted more space to railways, I reply that sufficient for the day is the good thereof. There is a natural sequence of events which no diplomatist can revolutionise or invert. Mule-tracks must precede cart-roads; cart-roads must precede railroads. We shall not conquer Persia by lightning, or convert her by steam. It will be time to discuss a Karun railway when we have seen what becomes of a Karun road. In the meantime it rests with British enterprise to make worthy use of an opportunity which we owe to the successful efforts of British diplomacy and to the friendly disposition of an allied sovereign.

Mr. H. F. B. LYNCH asked permission to make a few remarks, in order that he might lay before the Society some of the information which he was able to collect during a journey last summer, from the mouth of the Karun to the furthest mountains in which it took its source, and also because he felt he might have gained some useful knowledge on the general question during a three months' sojourn in Teheran, devoted to an attempt—in some measure, he hoped, successful—to remove those obstacles under which the navigation of that fine river had hitherto seemed a vain labour to those who had conducted it. Many of those present knew the terms on which the Karun river to Ahwaz was thrown open to general commerce in November 1888. The present was not the occasion to dwell on those subsequent restrictions and rescissions which, in the eyes of many, long held the balance doubtful between progress and abandonment. But they must not forget that whatever progress might have been achieved, and whatever results were likely to ensue, were due to the enlightened, if perhaps over-cautious, policy of his Majesty the Shah, and to the energetic initiative of the British Minister in Teheran, Sir Henry Drummond Wolff. The medieval gate which severed Persia, weak in her isolation, from the busy expansion of the modern world, had been thrown ajar, and they might attribute many of the difficulties which had been met with to the protracted absence of his Majesty the Shah from his dominions. He was thankful to be able to inform the meeting that many of those difficulties had now been removed. He had heard by telegraph that a steamer belonging to the company navigating the Lower Karun had been successfully taken above the rapids, and was about to commence, in the service of the Persian Government, to ply continuously between Ahwaz and Shushter, in conjunction with the company's steamers below Ahwaz. Shushter, the point from which the trade routes to the interior would naturally commence, was thus brought into immediate contact with the commerce of India and of Europe. If the goodwill of the Persian Government continued; if the British Government would support, as they had already supported, the interests of general commerce on those waters; and enable those to continue the navigation who had striven their utmost to establish it; then the tracks which Mr. Curzon had described were likely to be beaten by the tread of caravans, or furrowed by the novel roll of wheels.

From a short sketch of the progress and the actual position of commerce, which, it seemed to him, it was important to state in connection with a paper dealing largely with commercial geography, he passed to a very brief examination of the ground which Mr. Curzon's paper had traversed. He felt that the thanks of all those who were interested in the East were due to Mr. Curzon, for the diligent research and the intelligent observation which he had brought to bear on these subjects. Following his general division, he would attempt to offer a few brief

remarks by way of supplement or suggestion. Mr. Curzon had dwelt on the importance of the Bahmeshir Channel as an alternative entrance to the Karun. It was the opinion of those who had recently explored that channel that it was navigable for a distance of 30 miles by the large ocean steamers which now plied to Busrah. At that point the river steamers could meet the ocean steamers, and although the banks were low and muddy he was informed that it would be possible to erect a depôt upon them. At Bund-i-Kir, as Mr. Curzon had told them, the two branches of the Karun and the river of Dizful converged and met. With regard to the river of Dizful, he had found it in August exceedingly shallow, and a long bank of sand extended almost across its entrance. In the month of May it was a river of broad and ample volume, and he noticed the contrast between its red and loam-charged stream and the white waters of the Karun. While on the subject of the Dizful river, he might mention that he saw no reason why, as had been suggested to him by an Indian officer last summer, who had carefully travelled through the country between the Kerkhah and Diz, the Kerkhah should not be turned into the Diz, and so give a good navigable channel. The river Kerkhah lost itself in a marsh. But such schemes belonged to a future which might be distant, and those who in spring and after rain had traversed those tracks, when from the rich soil a fairy growth of grass and flower tinged the white flanks of the rider's Arab, and again in summer, beneath the fierce sun, had struggled over the bleak expanse of endless desert, with noble rivers everywhere and a parched plain around, could best realise what this wonderful country might produce, what blessings it might enjoy, were only an ordered system of irrigation and navigation introduced—or, in honour of the great past, he would say restored. He had followed the Karun proper for many miles on horseback from Shushter. He thought the river might be rendered navigable by opening up the main channel, and conveying smaller channels into it. With regard to the Ab-i-Gargar, it might be navigated with luxury to 2½ miles from Shushter and beyond Shelailieh. He had followed the river from Shelailieh to Shushter, and found no obstacle of any importance, and his little had party marked a place 2½ miles from Shushter, which would, he hoped, be the terminus of the new line. He would now pass on to a consideration of the trade routes which led from Shushter into the interior. He was glad to see present Mr. George de Reuter, to whose energy and success in Teheran the Imperial Bank of Persia mainly owed its origin. It might be within the knowledge of those present that a group connected with that bank was now engaged in making a road from Shushter to Teheran. The main obstacle they would have to contend with was the ruinous condition of the noble bridge of Shushter. The Sassanian builders had no successors in Persia. A well-ordered ferry would, he had no doubt, soon be made, but while he sincerely admired that great project which brought many towns of Persia into direct contact with the Persian Gulf, he must express surprise that nothing had yet been projected to improve and develop the direct road from Shushter to Ispahan. There they had no broad river to cross, and at their limit they had the populous town of Ispahan, the former capital of Persia; there they were in touch with the fertile districts of Yezd and Kerman, and some present might live to see the day when Ispahan might be restored to her former condition and her walls and avenues to their ancient beauty. The modern Ispahan was a considerable city, whose population numbered some 80,000 souls. He had traversed the mountainous country from Shushter to Ispahan viâ Malamir, but by a short route, and he estimated the total distance as under 250 miles. The ascent to the Persian plateau, wherever it was commenced, was arduous, and any one who in midwinter had seen the caravans plodding their way through the deep snow over the Kharzan Pass on the best known road in Persia, would not be inclined to over-estimate the difficulties which those high altitudes undoubtedly presented. His

little party consisted of two, with a guide and a few muleteers, and yet they had felt themselves as safe as in Switzerland or the Cevennes. The Prince of the Bakhtiari, Isferdiar Khan, their friend and afterwards their kind host, during a pleasant sojourn in his mountains, was, with his uncle the Ilkhani, supreme and respected throughout the country he had traversed. To indulge the thought of a cart road through those mountains might perhaps be luxurious, but he might mention that on portions of the journey he had enjoyed the well-paved ancient road which led from Elymais to the Persian plateau. A little removal of the boulders, and a few boats at the first passage of the Karun river, would render those routes passable for a more extended commerce. In winter the people returned from their summer pastures to the villages along it, and in summer there were always a few left to supply provisions. He crossed one pass 7420 feet high, and on the high uplands before Dopulun his aneroid registered 6070 feet.

Mr. GEORGE DE REUTER said that unfortunately he had had no personal presentation to the Karun. He had only been within 400 miles of it; but he had known the river more or less for the last eighteen years, and it was a subject of very great interest to him. With regard to the trade route from Ispahan to Mohammerah, the shortest route would be straight to Shushter, but the engineering difficulties were very great. With regard to the new road from Teheran to Mohammerah, it was proposed to have a branch at Burujird, joining that city with Ispahan. Of course that was a long way, but by avoiding the almost impassable mountains between Shiraz and Bushire, although the distance was greater, there would be actually a gain in point of time. The Shah was quite alive to the importance of having roads through his dominions, and he had granted a concession for making one which should join Teheran with Tabriz, the great north-western capital of Persia. Tabriz was at present the second if not the first commercial centre of Persia. That road, from a commercial point of view, would be a great advantage, but not so good as the one from Tabriz to Bushire. When that was made one might go straight from England to the interior of Persia, and British trade would go to the furthest removed parts of that country. He also hoped that roads would be extended still further to the Russian and Turkish frontiers, because what Englishmen desired was not what they were now and then accused of, namely, everything for themselves. Of course, like most people, they wished to benefit themselves, but they also wanted to see Persia a flourishing country. They did not want to do anything with a rotten, decayed, or corrupt State. The greater the advantage to Persia, the greater would be the reward to Englishmen, and by extending roads in all directions in Persia, England would get enormous advantage to her commerce, and before very long he hoped to see Cook's excursions to Teheran, along roads not infested with brigands, and where it was not necessary to go all the way on horseback.

Mr. WILFRID BLUNT congratulated Mr. Curzon on his very lucid and admirable paper. He wished to ask him a question about the Kerkhah river, which he believed was an affluent of the Karun. Mr. Lynch thought it went into the Shatel-Arab, but ten years ago he (Mr. Blunt) was informed that it went into the Karun. No doubt it fell into a series of marshes. He also wished to ask a question about the state of the country in the neighbourhood of Shushter. When he travelled through it about ten years ago there was really no safety at all except just in that part which was under the protection of the Bakhtiari chief. He travelled from Baghdad to Shushter, and thence to Behbahan and Bushire. That included pretty nearly the whole of the country the commerce of which would be affected by the new enterprise, and certainly at that time the communications were very little safe, and the villages were so devastated by robbers, that unless something were done to improve the state of affairs, it would be very difficult indeed to open up

commerce. No doubt things had improved during the last ten years, and he believed that the Shah was doing all he could in that direction, but he would like to know from Mr. Curzon what the present state of the country was about there, as it was a very important factor in the question of whether the commerce of the country could be opened up.

Mr. CURZON said he was much obliged to Mr. Blunt for having raised those two points. With regard to the Kerkhah river, Mr. Lynch was certainly correct in saying that it did not flow into the Karun. It ended in swamps, near a town which was now in ruins, known as Hawizah, from which the overflow once ran into the Shat-el-Arab. It ran at one point close to another stream known as the Shaour, which flowed into the Ab-i-Diz, but in recorded times he did not think there had been any connection with the Karun. To his mind it was extremely doubtful whether, if it could be turned into the Karun, any advantage could be derived therefrom, the course being so tortuous. Under any conditions he thought that the caravan traffic would be found the cheaper of the two. With regard to the danger of the country, Mr. Lynch had spoken of the district between Shuakter and Ispahan, and Mr. Blunt bore him out in saying that years ago, owing to the greater public spirit of the Bakhtiari chieftians, it was safe, but it was quite true that that could not be always predicted on the northern road. The Feili division of the Lur tribe were more turbulent and lawless than the Bakhtiari. Only a week before he was there, in January, the caravan road had been blocked by a section of the tribe. It was true that this difficulty had to be confronted, and the roads, if opened up, would require to be provided with guard-houses and guards; but in granting the concession, the Shah had guaranteed the safety of merchandise travelling on that route, by which of course was meant that he would provide guards. It was only recently that robbers were found on the Shiraz roads, but all goods stolen there were made up for to the full value by the Persian Government, whose method was simple and efficacious. For instance, if goods to the value of 400*l.* were stolen, 600*l.* would at once be levied from the nearest villages, 400*l.* of which would go to the injured merchant, and 200*l.* to the Government. The unhappy people who had to pay the price were in many cases the friends and neighbours of the robbers, and in some cases the actual robbers themselves. There was, therefore, a likelihood that under the guarantee of his Majesty, sufficient safety might be secured to enable caravans to pass along.

Sir FREDERIC GOLDSMID, as an old Persian traveller, wished to express his very great satisfaction at the work done in Persia and the neighbouring regions by the present generation of explorers, of whom Mr. Curzon was so able a representative. He thought the meeting should express their special thanks to him for bringing forward, in the manner he had done, the subject of a country the people of which were by no means effete, but capable of high intellectual and material development. Although he himself had entered and quitted Persia on the north, east, south, and west, it had never been his lot to light on the Karun river; and therefore he approached that particular question with diffidence. He was, moreover, afraid that if he were to talk about roads he should revert to the old question of railways; for although he acknowledged that there had been good road-making in the north of Persia, he was not sure that the operation was a sufficient one for actual requirements. He was of opinion that a stronger treatment was desirable, and that the railway would, in this case, prove a great civilising agent. It was impossible for him to look at the map before his eyes without observing the splendid possible line of railway from Constantinople to Baghdad and Karachi, or another one from Port Said, in Egypt, running across the Arabian continent, and down the coast to Persia. Perhaps Mr. Curzon could tell them whether he knew of any practicable route by which a railway might pass from Khuzistan to Shiraz, from which city it would take an oblique direction to the coast.

From Shiraz it would be a simple matter to reach Bunder Abbas, whence they could continue the route through maritime Beluchistan to India.

Mr. CURZON said it was undoubtedly true that a track led from Shiraz viâ Behbahan to Shushter, and that route had been explored by Colonel Bell. He believed that the physical difficulties of that portion of the route were not great. They, of course, entered a different region when they came to the main trunk railway approaching Persia, and Sir Frederic Goldsmid was inviting him to enter on very thorny ground indeed when he suggested a discussion of the Euphrates Valley Railway, a railway through Asia Minor, or a railway from Port Said across Arabia. It appeared to him that the difficulties in carrying out any of those schemes were, in the present condition of the countries, and still more of the Governments, so great as to render it almost impossible that either Sir Frederic Goldsmid or himself would ever see them fulfilled. He would not banish the idea of connecting India with England by railway, but the immediate prospects were small. Certainly they would be improved by getting railways introduced into Persia and Turkey.

The PRESIDENT said he did not think it had often happened in the history of the Royal Geographical Society that in two successive years they had had communications, both excellent, from one of the most active, most rising, and he would add, because it was not a matter about which there was any difference among parties, one of the most deservedly rising Members of the House of Commons. It was to be observed that both the papers had required a great amount of arduous trouble and of personal observation given during the time which most persons gave to recreation after the arduous labours of modern sessions. He had regretted that a previous engagement prevented Sir Henry Layard from being present, for he entirely agreed with the writer of the paper in thinking that many of his countrymen had not sufficiently appreciated the prescience of that distinguished public servant; too many of them, in fact, were like the great lady in London who, when Sir Henry Layard first appeared upon the political scene, said she should never forgive Nineveh for discovering that Layard. They had, however, been favoured by the presence of several gentlemen who had addressed them with very great care and considerable authority. He thought he might especially congratulate Mr. Lynch on account of the very valuable observations he had made, which were couched in a form that showed no small amount of study, and gave no small amount of promise of success in public speaking. They had also had some excellent observations from Mr. de Reuter, interesting questions asked by Mr. Wilfrid Blunt, and some valuable observations from their old and tried friend and colleague, Sir Frederic Goldsmid. He was sure that the meeting would instruct him to give the best thanks of the Society to the writer of the paper, and to all the gentlemen who had taken part in the discussion.

Across Luristan to Ispahan.

By HENRY BLOSSE LYNCH.

Map, p. 576.

IN the late summer of 1889 the writer ascended the Karun river in an English steamer to Ahwaz, and thence proceeded by horse to Shushter, a distance of fifty miles. The early spring had been devoted to an examination of the river both above and below Ahwaz: and now it was purposed to follow the direct road which leads from Shushter to the Persian plateau and to Ispahan. Varying accounts had already been given of the nature of the country which extends between the natural terminus of the Karun navigation and the most populous city of southern Persia; however limited the education and resources of a traveller may be, it is more satisfactory to himself in such a case to rest his conclusions on personal observation. An invitation to the court of the Bakhtiari princes among the mountains, held out to me the prospect of pleasing incident, and at the end of August Mr. Holland—who is, I think, the first European resident in Shushter—a guide, two or three muleteers, and myself crossed at evening the waterfalls of the Gargar, and encamped on the naked plain.

I propose, as succinctly as I can, to furnish some account of our journey. After attempting briefly to describe the character and leading features of the mountain range, I shall pass to a short consideration of its inhabitants, and shall conclude with some more particular information which I have thought it proper to embody in a separate analysis.

Of the political and commercial value of a good track or road across this country little need here be said. The total distance between Shushter and Ispahan is estimated in this paper, by the stages it describes, as 250 miles. By the alternative route *viâ* Dizful, Khore-mabad and Burujird, the two cities are distant one from the other about 470 miles. No doubt the altitudes which we crossed are higher than those on the Burujird road, and it is reported that the passes are often blocked by snow during three consecutive months in winter time. I believe this report to be a fact, and those who seek the development of Persia will give it due weight; at the same time they will do well to reflect that there is at present no continuous traffic by this route, and that where there is a constant flow of caravans the tracks are less easily closed and sooner opened. The communication between the plains and the plateau is always liable to be interrupted in winter, even on the most frequented paths. With regard to the safety of the road—for convenience I shall call it a road—I have nothing to say but what stands to its advantage. The supremacy of the Persian Government and of its representatives, the governors of Ispahan and of Shushter, is not called

in question by the mountaineers. The Bakhtiari princes of Haft Lang, who rule both nomads and villagers with a strong hand, have attained the government of their tribes and dependencies by the active support of the Shah; and in the endless rivalries of individuals, by which he knows to profit, they may be said to retain it at his will. The power of the Chehar Lang and of Kalah-i-Tul is much broken; and, in fine, a pass from the Persian authorities is sufficient to ensure for the traveller both safety and hospitality. Caravans may pass without hindrance, and the Persian prime minister has assured me that, in case of claims for pillage, his Government would adopt the same attitude as in similar cases on the present trade route viâ Bushire. Indeed, the central Government can strike at any point throughout the country, and the compensation which it grants it can on its part exact from its vassals.

The mountain range of southern Persia, part of the great system of Europe and Asia, presents a succession of parallel ridges and valleys from north-west to south-east. To reach the Persian plateau from the plains of Khuzistan you cross the grain of the range; but the steep ascents are followed by more gentle declivities: each wall of rock is but a step to higher levels: until, after a tedious march of about 200 miles, you discern the features of the open table-land at an altitude of about 6000 feet above the sea. Ispahan lies east of Shushter, and over half a degree of latitude to the north of it. To avoid a continual escalade you follow the valleys in a general course of S. by E. to S.E., till one valley gives access to a further valley either through a natural break or over a gentler pass. The traveller may have commenced to despair of ever reaching the latitude of Shushter, and far more that of Ispahan, when a pleasing change of feature allows him to steer a more direct course: the valleys open, the country is less enclosed, he encamps on high uplands. After the passage of the Bazuft river this change of feature is remarked.

Leaving Shushter we passed for awhile across the gentle undulations which rise and fall from the high banks of the Gargar. During the spring rains they are clothed with cereals; but at this advanced season, and in the disuse and ruin of the irrigation system, one bleak and bare expanse of plain stretched to the horizon. Soon the soil became more stony, and we wound between low sandstone spurs—broken lines parallel to the range whose taller outlines we lost among them. After a march of nearly 18 miles, we crossed by an easy path the back of the first continuous ridge, and here, if I may use a metaphor from music, the first theme of the mountain scenery was developed. A succession of parallel walls, each higher than the last, enclose long valleys of varying breadth. For a distance of 124 miles we followed the valleys or scaled the ridges, yielding to them. Beyond the Bazuft river the valleys are very high, the expanse is greater, the mountain walls around you break or turn towards each other, ridge puts out link to ridge. So we passed northwards to Dopulun.

The vegetation of the country may be divided into three sections. Between Shushter and Gergir, a distance of 52½ miles, the sides and summits of the two backs crossed are bare, and the plainer lands, watered by salt or brackish streams, present a forlorn appearance. Here and there, as at Derebistan, a few trees may be found, and the Konar or Nebuk tree, or bush, affords at times a scanty shade beneath the fretted tracery of its leaves. Among the sandstone ridges near Shushter the shrub which is known, I believe, by the name of St. John's apple * relieves at times the yellow glare, and in the plain of Malamir it flourishes in abundance. The second section begins in the pass beyond Gergir and ends abruptly on the slopes of the eastern mountain wall which confines the Karun at Dopulun. Throughout its sides and summits are clothed with low mountain oaks; except indeed that the walls which confine the level plain of Malamir are for the most part naked. Sometimes the growth is sparse, and here and there a hardy oak springs from among the boulders. At others, where the soil favours, you pass through pleasant glades by even paths: each tree seems planted by the hand of man, and, but for the want of turf, you seem to wander through an English park. Within this section shrubs and trees of many varieties flourish, nor have I seen more beautiful myrtle beds than in the wild valleys which lead towards Malamir. After this pleasant zone of verdure it is indeed a bleak prospect which meets the view from the summit beyond Dopulun; bare limestone ridges close it, nor on the further journey to Ispahan are the hill-sides overgrown. The valleys or uplands are fertile, and large tracts of rich brown soil lay exposed by the plough. It was only when we reached the water system of the Zendah Rud, at Daulatabad near Ispahan, that we were again able to enjoy the vegetation; there it is artificial, and melons, peaches, and many varieties of luscious fruit, grow in the pleasant gardens beneath the hot sun.

None of those terms which we apply to the features of Alpine scenery are, as I think, appropriate to the range where we crossed it. The summits of the successive ridges are round, but the chain across which we passed between Char Khor and Paradomba is precipitous.† Caravans would certainly avoid its steep and long ascent, during which I was often obliged to lead my active Arab horse. They march to the north or south of the track we followed. At this pass the section reached its

* The botanical name of this shrub is, I think, *Prosopis stephaniana*. I am indebted to Professor Haussknecht, of Weimar, the leading authority on the subject, for having helped me, most kindly, to the identification of the plants I saw.

† This I suppose to be the chain which separates the watershed of the Karun from that of the Zendah Rud. Both Schindler and Wells crossed it further north at Quaw-i-Rukh, and the pass is given by the former at 7930 and by the latter at 6850 feet. I made the pass to Paradomba 8650 feet, and it will perhaps be found that the reading of my Cary aneroid is too low if Ispahan be indeed fixed at 5400 feet; for at Ispahan I registered 5070 feet.

highest altitude; thence the uplands gradually decline until a gentle descent a few miles beyond Paradomba leads to an open plain. Beyond the town of Daulatabad this plain is broken by the irregular forms of naked peaks or chains; but the road passes between them, and the features of the great Persian plateau may be recognised some fifty miles from Ispahan.

The landscape, which spreads from any summit before the passage of the Bazuft river, resembles ocean waves flowing to the horizon after the storm is spent. Peak formations are rare. After we had crossed the eastern wall of Malamir we skirted the northern slopes of a lofty mountain which rises from the high uplands and soars with almost vertical ascents. It is of the Mungesht range. But the long parapets rarely break to isolated summits, and where the forms change beyond Paradomba the dimensions are insignificant.

Snow may be seen in scanty patches wherever after Malamir an ampler prospect is obtained. In the valley of Char Khor the deeper drifts still lay on the mountain skirts. The temperature is sensibly altered by the time Gergir is reached, and the morning breeze at Malamir blew cold upon us as we woke on the flat roof of the little fort. But the freshness of the atmosphere lay in comparison; we had spent the summer in the burning plains of Mesopotamia, and on the fierce rocks of Shushter the needle had reached the surprising height of 116° in the shade. On the high uplands between Malamir and Char Khor we felt the cold at night, and were glad to have the shelter of a tent. At sunrise our horses' coats stood up, and our muleteers looked pinched and pale. To have slept on the open ground in the valley of Char Khor would have been most unpleasant: there, for the first time for many months, we lived within a room. At Paradomba and at Daulatabad the enclosure of four walls became as agreeable as on the plains it had been intolerable. When we arrived at Ispahan, in the month of September, the difference between the life of a great town on the plain and on the plateau became apparent; we missed the vaulted caves by day and the cool housetops by night, nor do the summer heats preclude the more convenient shelter of a house.

Of the geology of the range I am not qualified to speak, except in general terms. The prevailing strata are of limestone, naked or overgrown. I have noticed the low sandstone spurs which herald the range: from these you pass to the long limestone walls which I have before described. The first valley is remarkable. It is some miles broad, and it stretches between the bare ridges without visible limit to north or south. Its wide and bleak expanse is broken by conical hills or hummocks; their sides are yellow with a burnt growth of scanty grass; on their summits the white gypsum (hydrated sulphate of lime) lies exposed, and coherent masses of pebbly rubble are bedded upon the upper slopes. Through this, the valley of Labahri, a salt stream winds towards the

Karun: the eye can scarcely follow its bare banks; but where the brackish rivulets permit a growth of reeds, the tortuous lines of each green fringe are seen for many a mile. The eastern wall of this blighted valley is seared with deep furrows: sharp shadows start beneath the western sun. Over some burnt uplands you pass to the village of Gergir, and in the narrow valley beyond it you enter the zone of oak.

It is at this period of the journey that its difficulties commence. The face of the limestone strata is broken: the rock has crumbled, and the track winds among boulders which often obstruct the passage of loaded mules. As you follow down the long valleys or cross the ridges these fragments render progression both difficult and slow. Sometimes the uplands present an even path; or, if there is some depth of soil, a level road will lead between the oaks. But where you touch the rock the same zigzag paths arrest the pace. So it is until you cross the high ridge beyond Dopulun.

It is there that the forms of the mountain scenery, upon which throughout my journey it was a rich pleasure to dwell, abruptly change. Eight miles off a long, steep, and naked limestone cliff stretches across the horizon. The plateau which it lines had been in part ploughed, and the dark soil made contrast to the amber tints which the autumn sun shed on the bleak ridge. Such was the contrast of light and shade, such was the alternation of stretching uplands and widely distant chains which lent its feature to our further course. At the foot of the cliff, and on this, the plateau of Ardel, lies the little village of Naghun.

Two leading barriers cross the road beyond the ridge of Dopulun. I have just mentioned the one, and to the other, the lofty pass before Paradomba, I have before alluded. Except for these, an even path would lead to the precincts of Ispahan, a distance of 95 miles. The Naghun chain is but a step to the high levels of Char Khor: the eastern slopes lead gently to a long valley, which in its turn gives passage to a second valley broader and ampler than it. The direction of these valley walls is from west to east; they are of bare limestone. The northern wall of the first valley rises abruptly from the level strip of plain; at its foot a white deposit of lime marks the bed of a long lake which, when we passed, was dry or nearly dry. To this white line a stretch of tillage extends. In the eastern valley the soil is rough and stony, or clothed with green pastures, or covered by an extensive marsh. Round this, the valley of Char Khor, the bare mountains circle with broken forms. Its length is nearly five miles, and at its widest point it is about two miles broad. A pleasant opening at its eastern verge leads to a country of high uplands; the soil seemed rich: large tracts were newly ploughed. On all sides there are mountains, but the prospect is not confined. After a long and steep ascent of the highest ridge we had yet surmounted, we followed down a narrow defile, whose slippery sides and giant boulders invited ambuscade. An hour's march down this, the eastern

mountain slope, brought us to a broad and level plain, and along the winding skirts of the broken range which rises from its northern limit we rode for many a mile over it beneath the risen moon. On our left hand, and behind us, the dark rock masses closed the dim scene; but before us, where we rode, it seemed an endless stretch of level country on which the mild light fell. Two hours before midnight we reached the palace of Paradomba, having left Char Khor at two o'clock.

The natural features between the last passage of the Karun river and the city of Ispahan are so extremely simple that I have allowed myself to describe them in their entirety. Our further course from Paradomba was smooth and easy. Among low hills, across gentle undulations, it led to where the high ground opened to a vast expanse of plain. For some twenty miles we travelled over it: the mountains had rolled away: we were on the table-land. This plain lies barren for the greater part, but here and there patches of tillage may be seen. Before us, on the horizon, a belt of trees and verdure held out the hopes of a pleasant evening's rest. The rills or channels which feed the vegetation are drawn from the Zendah Rud; we had passed into the northern watershed. From this, the village of Daulatabad, the road winds among rich gardens. Irregular masses of naked rock rise from the plain: toy mountains, pigmy alps. So we came to a higher chain and a broad open cleft. Thence expands the plateau of Persia and the plain of Ispahan; groves of poplars line the distance, and but for the taller outlines of its needle minarets the city lies embowered in a forest of lofty trees.

The hydrography of the section is simple. From the long western watershed of the Karun, and its parallel parapets of splintered rock, you cross at the latter end of the journey to even plains and to the gentler basin of the Zendah Rud. The course of the Karun through the mountains is remarkable: where it yields to the laws of nature it defies them. The point where we last crossed it is nearly due east of Shushter, and about 115 miles in a straight line from it. Throughout the whole distance the range is thrown across the river's path. This apparent contradiction between watersheds and orography, a feature not confined to this section of the Persian mountains, although perhaps best illustrated by it, has been noticed by Major St. John in his lucid sketch of the Physical Geography of Persia, from which I will quote a short paragraph* :—"A comparison between the hydrographic and oreographic diagrams will show that the disposition of the hills affords little indication of that of the watersheds. There is nothing in the latter to show which of the many parallel ridges form the water-partings of the plateau. Indeed the general outline would seem to point rather to

* See 'Eastern Persia; Account of the Journeys of the Persian Boundary Commission, 1870-71-72.' London, 1876, p. 11; and compare Loftus' 'Geology of portions of the Turko-Persian Frontier,' p. 282.

a great river flowing to the sea in the south-east than to a series of depressions receiving the surplus drainage."

It will perhaps at once occur to those who are anxious to see a road or railway cross these regions to Ispahan, that the way the river has made it would be best to follow. Once you are on the Ardel plateau you would deal with simple features as far as Ispahan. From Ardel to Shushter the road might pass along the river or overhang its course. But further knowledge is necessary to estimate the ease or difficulty of such an undertaking. Travellers have touched the river at various points along its western course: none, I believe, have marched along it for any length of time. Our little party crossed it twice, and on both occasions I observed the same change in the scenery. The valleys open, larger lines close an ampler space, just as in modern music a leading motive heralds the hero's approach. The noble valley of Godar-i-Balutak, the stretching uplands before Dopulun announce the Karun before ever its thin glass-green line is seen. At the first passage it is deep, and some thirty to forty yards broad; at Dopulun it bursts on the plain from a narrow gorge which seems a freak of nature in the broad landscape around.

The Karun river rises in the mountains of Zerdeh Kuh, and pursues a south-easterly course towards Dopulun.* In its upper reaches it bears the name of Kuh-i-Rung. The design was formed by Shah Abbas the Great of cutting a passage through the Zerdeh Kuh, on the eastern sides of which the Zendah Rud has its source, and of uniting the waters of the Karun with those of the river of Ispahan: the unfinished work still remains.† The upper waters also bear the name of Ab-i-Kadj,‡ which draws its origin from the village of Kadj, north-west of Ardel. In the plain of Ardel it is joined by the river which comes from Shamsabad and Shelamzar, in the district of Chehar Mahal,§ and at Dopulun it receives the affluent which we crossed on our ride to Naghun, and which is called by Schindler Ab-i-Sabzu: our people knew it by the name of Dahinur. Beyond Dopulun the Karun turns to south-west, and after a long bend, reverses its original direction and flows north-west to the plains above Shushter. Wells saw it between Dopulun and the Bazuft river,|| and its general course between Godar-i-Balutak and Shushter is known from the testimony of several travellers. The direction from which the rivers flow at Dopulun I give in the analysis. Between Dopulun and Godar-i-Balutak the Karun is fed by two considerable tributaries—the Ab-i-Bazuft and the Ab-i-Bors. The Ab-i-Bazuft flows south-east from the district of Bazuft; the Ab-i-Bors enters the Karun

* Travellers have passed the Karun above Dopulun, but I know of none who has followed it. A reference may be made to Dr. Rodler's letter in the 'Akademischer Anzeiger' of Vienna, No. xxi.

† See Layard, *Khuzistan*, p. 50.

§ See Wells, pp. 145, 146.

‡ See Schindler, p. 51.

|| Wells, p. 147.

on its left bank, coming from Felat and Sadat, but the point of junction seems only vaguely known.* North of Shushter the Shur-i-Labahri taints or tempers the glacier water with its salt stream. The Karun during its course among the mountains is swift and deep; its colour, and that of the Bazuft river, is a glass green. At Godar-i-Balutak it was delicious to bathe in, but the temperature of the Ab-i-Bazuft was very low, and it would have been dangerous to remain long in its waters. Between Shushter and Malamir the streams are for the most part brackish, but there are springs of fresh water at convenient distances.

The valleys which are enclosed within this section of the range are various in feature and character. Of their beauty I am less concerned to speak here, yet to each belongs a different type of beauty. Something has been already said of that long strip of barren soil confined by naked limestone walls which bears the name of Labahri; thence, in a brief survey of leading forms, you turn to contrasting scenery in the plain of Malamir.† There, a broad stretch of grass-grown land, level as water, is surrounded on all sides by bare and lofty mountains; towards its northern confines a quiet lake extends. Its breadth, where we crossed it, was about six miles. Malamir has been often described, and the sites of the great fire-temples of the Sassanian city of Aidij, and perhaps of Sosirate, have been placed there.

I was unable to visit the cleft on the eastern side of the plain, which has been described as very rich in bas-reliefs and inscriptions by Layard and De Bode. In the western wall there is a lofty cave of grand dimensions which commands a wide view over plain, and lake, and mountain; spring water wells within it, and giant maidenhair fern grows on the oozing rocks. In the cave recess two niches have been cut, and on the face of one we could still discern a sculptured figure and inscriptions. Above us on the northern mountain-side two further niches had been chiselled out, the one with two, the other with three figures, in better preservation than those within the cave. The water which rises from the cavern's floor flows underground to the little village where we encamped; there it forms a small stream. This cave is situated in a cleft of the mountain; the road to it is very stony, and is lined with the remains of ancient buildings, a *débris* of fallen masonry or ruined vaults, which date probably from the Sassanian epoch. To the left, as you ascend, there is a small but well-preserved ruin. We were told that a long subterranean passage led from it far inland, but as the place is sacred, we refrained from entering it. The bas-reliefs and inscriptions in the cave belong to the Achæmenian period, and the writing

* For a description of the Ab-i-Bors, see Layard, *Khuzistan*, p. 50.

† The name of Malamir is rendered "house" or "wealth" of the Amir. The first portion of it might also be a contraction of the word "Mahal," signifying "rest." Compare the same idea in the expression of Diodorus, *τάποι ἡδισταὶ πρὸς ἀνάπαυσιν*. Diod. xix. 21, edit. Firmin-Didot.

is, I am told, of the Persian form of cuneiform. I am not aware that any of the inscriptions which throughout these mountains Layard and De Bode copied with so much difficulty, and often at great personal risk, have ever been deciphered. The Malamir inscriptions are printed in the British Museum collection, but they still hold their secrets. It must, no doubt, be difficult to read characters which have been copied by hand, and if impressions on prepared paper are necessary, the writer could probably obtain them. So little is known of the country and people of Elymais, so keen is the spirit of modern science, that it may be hoped that means will be found to encourage scholarship in the translation of such important records, and that the honour of these revelations will belong to the country which owns the illustrious names of Layard and Rawlinson.

Another interesting relic of a great antiquity is the causeway which climbs with winding terraces the eastern wall of Malamir. Its pavement is built of large hewn stones supported at intervals by transverse slabs. In the steep descent to the valley beyond Malamir we again met it. It is called *Jaddeh-i-Atabeg* (highway of the Atabeg) or *Rah-i-Sultani* (Sultan's way) and probably dates beyond the period of the Atabegs. Its course is traced by De Bode* from information supplied by natives. I trust that it will soon form the subject of a particular investigation. At present it only serves to mock the insignificance of modern Persia; and it is in the sculptured cave or on this noble pavement that the traveller feels the awe of a great past, contrasts it with present squalor, and draws from it refreshing hopes that what has once been grandly done may yet be done again. Eastwards from Malamir the track emerges from narrow glens into the broad expanse of the Karun Valley at *Godar-i-Balutak*. The northern limits are closed by mountains which give the river a narrow passage; towards the south and east lofty uplands and loam-covered hills overgrown with oak rise to the level of the harder boundary lines. The two ridges which confine the valley are naked at the summit: their hard severity contrasts with the gentle rolling hills between. The left bank of the Karun is high. We encamped on a cliff plateau. In parts the land had been ploughed, but the only village that we saw was that of *Deh-i-Diz*. The black tents of the returning *Ilyat* dotted the plain. They come and pass onwards. The elevation of this valley, and of the plain of Malamir, must give to each a temperate and a delicious climate. Higher than these, and not less beautiful than either, the *Serhun* valley presents a smaller space and widely different features. Mountain walls enclose it on all but the eastern side, and springs and artificial channels clothe it with rich fertility. The water rises at its western head and feeds a clear and rapid stream, whose course is lined by a close growth of various and lofty trees. Tiny rills are led from this stream and irrigate extensive rice-fields. A few miles beyond the

* De Bode ii. pp. 36 *et seq.* Rawlinson, p. 83. Layard, 'Khuzistan,' pp. 74 and 80.
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northern ridge of Serhun we commenced a long descent over stony uplands to the Karun. Of this, the valley of Dopulun, and of the plain of Char Khor, this paper contains elsewhere some brief but attentive notice.

Of the aspect of the sky during our passage from the plains across the mountains, a short mention may not be inappropriate. Over the level tracks of Khuzistan and of Mesopotamia the sun rises and sets unveiled: the air is vapourless. At Shushter a fringe of settled cloud, white films high and still, had drawn for weeks a broken line above the mountain range. The barren prospect which spread from the eastern wall of Labahri was varied by the light and shade which fell from floating clouds. At Malamir dark masses rolled above us, and it seemed to threaten rain. At Ispahan dense banks of undissolving vapour hung over the plateau; the grandeur of a Persian sunset is known, and is not easily described.

The section is thinly populated, and the inhabitants of the mountains are, for the most part, nomads. They have some fixed settlements to which they return in winter, and in which a few remain during the summer months. It is, therefore, difficult to make any sharp distinction between villagers (Deh-nishins) and nomad tribes, but no doubt the large majority live in tents. In summer they encamp on the lofty plateaus around Char Khor, in winter they descend to Malamir and towards the plains of Khuzistan. Those that have taken to agriculture gather their crops in spring, and leave them unthreshed until their return in autumn. Flocks and herds are the principal source of wealth, and they cannot pasture these in summer except at high altitudes. Level but scanty stretches of grass are watered by mountain rills, and on them the sheep and cattle are brought to graze. Fairs, in the proper sense of the word, there are, I believe, none; but the market of Ispahan draws to it some of their produce, and small dealers travel to Malamir to purchase colts and clarified butter. In the absence of communications their trade is insignificant. Their flocks of sheep and goats are very numerous; the sheep are large, and their wool abundant, but coarse.

Between Shushter and the little Persian town of Daulatabad we only passed through ten villages; and the term must be somewhat stretched to include the more humble among them. It was not until Gergir was reached that we saw the distinctive dress and character of the Bakhtiari tribes; the villages in the valley of Labahri, Dara Kul and Derebistan, are peopled by a mixed race. Not that at either of these two places the Arab element asserts itself: the Aryan type and dress are at once apparent. The men shave their heads behind, but allow the hair to flow to either shoulder: the women wear the loose blue trouser and an upper drapery of red and blue. The men are tall and lank. At Derebistan we noticed that the hair and beard of the village chief was worn in little curls that recalled the Assyrian sculptures. And there alone I saw a face which seemed to realize the

Persian type of female beauty: the full curves, the pink and white complexion, dark eyes and black tresses.

Derebistan and Dara Kul are each composed of a few huts built of mud and long reeds. Each has a little shrine and graveyard: the inhabitants do not, I believe, migrate. Dara Kul lies in a cleft or hollow, and on the mountain side a more solid structure crowns a convenient peak. To this stronghold, a Persian capitolium, they can retire when attacked. Below it, but on rising ground, the white face of the shrine is seen; a white recess of arched alcove is flanked by two tiny towers cut and niched in Saracenic style. Round the recess a rude frieze runs: a painting of Ali* in full array of war. On either side wall, peacocks in hues of red and blue have been drawn, and we noticed and admired the bold outline sketch of a lion rampant. The uncovered space was spattered over with finger marks of henna, which the several devotees had stamped thereon for luck. In the graveyard a few small vaults of mud marked the burial places of worthier or richer men. The village of Gergir is perhaps larger than either of these, but it more resembles an encampment than a village. It has no shrine, and the only solid thing is a wall or two against which the frail huts lean. The flocks and herds which are pastured on the banks of neighbouring streams are gathered at night within a camp circle for protection. The people are poorly clad and uncouth in manner, and they beat a descendant of the prophet who had joined our little party because he had ventured to draw water from the spring whence their women take it. The men wear the round felt hat of the Bakhtiaris; a shirt of blue calico clothes them to the knee, and a brown abba or cloak hangs from the shoulders. Their feet are enclosed in supple shoes and they scale the rocks at a run with the body bent low. At Malseyidi, a small place on the confines of Malamir, a considerable quantity of grain is harvested, and large and level spaces have been made on which the corn is thrashed.

The people of this village are most fanatical; they have built a little mosque, and from it all night long their panting calls on Ali broke on the silence. Of the two small aggregates of sordid hovels through which we passed along the lake of Malamir it is unnecessary to speak; near the more southern of them a small fort with the usual corner turrets has newly been built, but is not occupied. The villages beyond Malamir, Deh-i-Diz and Naghun, are built more solidly of mud and stone: in the former there is also a little fort. In the valley of Serhun there is no doubt a village, but it was hidden from our view. As for Paradomba, it is outside the proper confines of the Bakhtiari country, and its little huts or houses resemble those that are usual on the Persian plateau.

Of the nomad tribes who migrate at the approach of winter and of summer, with their flocks and herds and droves, some belong to the clans

* Nomads and villagers alike are of the Shiah persuasion.

of Bakhtiari, but others come from the east and the confines of Shiraz. All acknowledge the jurisdiction of the Bakhtiari princes while they are within their territory, and those whose native seats are without it pay, I believe, a small tax for the rights of pasture they come to enjoy. From Malamir to the neighbourhood of Char Khor we stemmed a continuous stream of men and women, of sheep and cattle, who were leaving the high lands against the approach of winter. The women bestrode the horses, and carried, besides the children, the muskets and arms of the men. The men, clothed in a loose blue shirt and cap of felt, were busied with their drovers' duties, an arduous and absorbing task. Men and women were deeply tanned; the men were lithe and often handsome, but on the girls a laborious life had pressed too hardly to allow the expansion of natural beauty.

The Bakhtiari tribes, who wander over the extensive mountain tracts of Greater Luristan (Luri Buzurg),* are divided into two clans, the Haft Lang and the Chehar Lang.† The seat of the princes of Chehar Lang is at Kalah-i-tul, and when Layard visited them in 1840, the power of their chief, Mehemet Taki Khan, embraced the greater portion of the country. The misfortunes which were fatal to that great man reduced the supremacy of his clan,‡ and their rivals the Haft Lang now supply the reigning dynasty of the Bakhtiari. The right of Mehemet Taki Khan to the legitimate title of Ilkhani is denied by the ruling house, who represent him as a bold but cruel robber§ who had usurped the name and office of supreme authority. But the lineage of the Chehar Lang chief had aspired to the throne of Persia,|| and we have abundant testimony of the commanding position which he himself held. On the roof of the little fortress of Char Khor I listened to an animated description which fell from the lips of Khosro Khan, how the forces of the Chehar Lang had once attacked this stronghold of the Haft Lang; how, out of nine thousand men who were led against it, one thousand perished before its walls, and in what confusion the remainder fled to the western door of the valley. But this event belongs to a period which he knew from familiar history, and not from personal experience, and the Chehar Lang of the present day help to decide the battles of those two parties who dispute the chieftainship of their rivals.

Three brothers have, within recent times, successively held the title

* See Layard, 'Description of the province of Khuzistan,' p. 6, for the boundaries of this country. Also De Bode, 'Luristan and Arabistan,' ii. pp. 82, 83; and Schindler, p. 53.

† See Layard, 'Description, &c.,' p. 7.

‡ He was, by origin, of the Chehar Lang dependency of Janeki Garmesir. Ibid., p. 10.

§ It is curious but not unnatural that Sir H. Layard, the friend of Mehemet Taki Khan, should describe in almost the same language the grandfather of the prince who gave me this account of the Chehar Lang chief. See 'Early Adventures,' ii. 241.

|| See Layard, 'Description,' &c., p. 8. De Bode, 'Luristan and Arabistan,' p. 74; and Malcolm's 'History.'

of Ilkhani of the Bakhtiari. Hussein Kuli Khan, the father respectively and the brother of the two reigning princes, enjoyed the reputation of a strong and capable ruler. His portrait, which hangs in the dining-hall at Paradomba, does not belie the commanding character which he is said to have possessed. The immunity from brigandage which the country now enjoys is due, perhaps, in a great measure to the firm qualities which throughout a long period he exercised with success. He fell beneath the ban of the royal governor of Ispahan, the Zil-es-Sultan; dark suspicions were whispered into the Shah's ear, and in 1882,* while on his annual visit of homage to Teheran, he was put to death by the secret agency of poison. He was succeeded by his brother, Imam Kuli Khan; and of his sons, some were imprisoned, while others were allowed to live in obscurity. The eldest, Isfendiar Khan, our host, was confined for seven years, while the youngest of those I met, Khosro, was educated in retirement beyond his native mountains. But the lapse of years saw that influence, to which these princes owed their fall, impaired: the favour which the Zil-es-Sultan had long enjoyed was partially withdrawn, and the same designs which he is said to have imputed to the Bakhtiari chief were used as weapons against himself by the envy of his enemies. The intercession of Riza Kuli Khan, the brother of the Ilkhani, in favour of his imprisoned nephew was well received by the Shah, whose fears had been excited against his powerful son at Ispahan; the dictates of clemency were approved by those of policy, and his Majesty declared himself the protector of the children whose father he acknowledged to have fallen by an unjust conspiracy. In 1888 the sons of Hussein Kuli Khan, accompanied by their uncle Riza Kuli, were enjoined to take possession of their native country at the head of a Persian army. Descending with their followers and Persian allies from the northern slopes of Char Khor, they surprised and defeated the Ilkhani who had refused to evacuate his country at the mandate of the Shah. The settlement of the country in their favour was effected with energy and without delay. Durub Khan, the ally of the defeated chief, was ejected from Kalah-i-Tul; and the marriage of Isfendiar's sister with the Chehar Lang prince, Mirza Agha Khan,† served as some bond of union between the two clans. The joint rule of Riza Kuli and Isfendiar was recognised by the Persian Government, and while the former took the name of Ilkhani, the latter adopted, with the substance of power, the Persian title of Samsun-es-Sultaneh. The dispossessed prince is now in Teheran, where he is known as the Haji Ilkhani, and against the plots of court intrigue the hopes of the present rulers seem to rest on the slippery reliance of royal favour.

* I take this date from a useful genealogical table which has been compiled from various sources by Mr. Curzon, and which he has very kindly placed at my disposal.

† I have recently heard that Mirza Agha Khan has been shot dead by his younger brother Saif Allah Khan, but I have not ascertained the cause.

The summer quarters or court of the Bakhtiari princes is in the valley of Char Khor. On a low mound, or rising ground, which probably marks the seat of ancient fire-worship, a castle or fortress has been built, renewed, or repaired by successive generations. A few rooms have been reserved and decorated for the reception of strangers, but the chiefs themselves reside in tents among their tribesmen and followers. The black tents cluster round the fort upon the green turf where the cattle graze, and in their midst the white canvas of the princes is from afar conspicuous. The austerity of a life in camp is varied, and perhaps sweetened by the luxury of a sumptuous country house, which, within 20 miles from the fortress, but without the confines of their territory, is in course of completion at Paradomba. I am not aware that any European has visited or described this charming little palace, on which many years of careful labour and all the resources of Persian art have been no doubt bestowed. The most pleasant days I passed in Persia were spent within its walls, and the manifold interest of this richly-coloured vista we shall not easily forget.

It remains to notice briefly the difficulties and the requirements of the road over which we passed. The consideration of railway schemes may instruct our leisure: cart roads have not yet been constructed, nor can I be quite certain that the ancient and well-tried method of mule transport will be wholly superseded by them. The Bakhtiari route to Ispahan offers no obstacles to loaded mules that may not be, at small expense, removed. When the Karun river was opened to commerce, and the prospect of a trade route through Shushter became clothed with the semblance of reality, it might have seemed that the Persian Government would be likely to consult the interests of a more extended traffic by taking such measures as the world would know to attribute to the dictates of patriotic intelligence. It may be hoped by those who desire the development of Persia as an integral State, that the wisdom of improving the present communications may speedily be realised by the Shah and his ministers; nor should this paper close without a brief but detailed statement of what these obstacles are, where they may be encountered, and how they may be overcome.

Between Shushter and Ispahan ten mountain backs must be crossed, ten larger steps ascended. I mention them in order: the eastern wall of Labahri, the ridges of Murdeh Fil, of Malamir, of Deh-i-Diz, of the Bazuft river, of Serhun, the ridge before Dopulun, and that beyond it, the ridges of Naghun and of Paradomba. The western sides of most of these are steep, but the zigzag paths are fairly worn, and the removal of boulders here and there would relieve the muleteers of constant effort with their packs and frequent deviation. Of the more level portions of the road the following stretches are blocked by large rocks, some of which require to be blasted. A space of $12\frac{1}{2}$ miles between Gergir and the Murdeh Fil ridge, the descent to the valleys beyond Malamir, and the

track along them for about 12 miles before Godar-i-Balutak. The descent to the Karun before Dopulun is over rocky and difficult ground for the space of about 10 miles. The remedies are simple, and such are the points to which they should be applied.

Of the rivers, the Karun is spanned at Dopulun, and at Godar-i-Balutak it is well adapted for a flying bridge, as Major Wells has suggested. One stout boat would at present be sufficient. Over the Bazuft river a bridge should be built at Pul-i-Amarat. Suitable caravan-serais would follow at convenient intervals.

Analysis.—The journey from Shushter to Ispahan occupied thirteen marching days, but I shall hereafter show that it could be comfortably performed in eleven days. Inasmuch as travellers will make their own stages as they please, I have not divided this brief analysis into days' marches, but have taken larger divisions.

1. *Shushter to Gergir, 52½ miles.*—Our path led over the undulations which slope upwards to the range from the high banks of the Gargar. Here and there we noticed tillage. Low sandstone spurs soon crossed the way, which had now become more stony: brackish streams wound among them. The vegetation was scant: low shrubs (probably *Prosopis stephaniana*), and here and there a konar bush. After riding for about four and a half hours, we came to a tiny stream whose waters are fresh, Berdeh Mil (cold stream). Thence it was one and a quarter hour's ride to the summit of the first continuous ridge, which we attained by a gentle ascent. Winding along its eastern skirts we looked over a long valley of gypsum hummocks to a further mountain wall, and crossed several times the salt stream Shur-i-Labahri. This river flows north to the Karun: it is called by Schindler Shur-i-Zan-i-Murde in its lower, and Shur-i-Medresse in its upper course. The ridges which bound the valleys are of naked limestone. Turning abruptly down a narrow cleft we came to a spot where the broken mountain overhangs a secluded recess; here is the village of Dara Kul, 22½ miles. It is a small village built of mud and long reeds, with a rock stronghold, a shrine, and a little graveyard. Thermometer, evening 92½° (27th August), sunrise 82° (28th August). The district traversed was barren and uninhabited. Altitude 520 feet. From this mountain nook we again passed into the long barren valley, and came to the village of Derebistan, 9 miles. It is composed of mat huts, and has a little shrine built of mud and stone. It is a pleasant place, and two lofty konar trees spread refreshing shade. The water is, I believe, slightly brackish, and we went on to a spring distant an hour's walk to encamp. Thence we headed towards the opposite or eastern ridge, and again crossed the Shur-i-Labahri. The path wound among the gypsum hillocks. After one hour and twenty minutes' march we reached the skirts of the valley wall and ascended by a gentle gradation along them to its summit, one hour. During the ascent we had awhile followed a small stream of brackish water whose margin is covered with a rank growth of grass and tall reeds. Ridge of Derbend (the pass), altitude 1320 feet. The descent eastwards is hardly felt: the ridge is a step to a stretch of yellow upland, closed by distant mountains. At the foot of a lofty rock mass which stands out from the chain we were shown the site of the village of Gergir. Having crossed a brackish stream which was flowing north, we made a forced march over the high lands, and arrived by night at a fresh stream, near which are the straggling mat huts of Gergir, 20½ miles. Altitude 1220 feet. District uninhabited. Next day I ascended the

mountain behind Gergir (Kuh-i-Asmari) to near its summit, and enjoyed a wide prospect of barren lands and bare ridges. The eye followed the green margin of the stream of Gergir as it wound northwards. Thermometer, night 82° (28th August). Sunrise 72°, evening 8.30 p.m. 88° (29th August). Sunrise 77° (30th August). Track fair throughout this section. Forage and provisions obtainable at Dara Kul, Derebistan and Gergir.

2. *Gergir to Malamir, 26 miles (to southern village).*—Starting in a north-east direction across the plain we were soon able to pass through the main ridge by an open cleft or pass. The following is the general configuration of the rocky valley which we here entered: its western wall is the Kuh-i-Asmari, whose direction is broadly west by north to east by south, and its main eastern boundary is the Murdeh Fil ridge which runs from north by west to south by east. Between the two rise lesser parapets, and between and beyond these, parallel ledges of naked rock score the plainer portions. The strata are of limestones. The track first follows the western wall and then crosses the strata. For some hours we followed the course of a salt stream, sometimes riding along its bed, at others overlooking it from the high cliffs or parapets. As we passed along the lower levels we often seemed to ride between the walls of a fortress; such was the appearance of the limestone ledges. In places the salt river washes cliffs of softer sandstone, whose sides are dyed red or green with chemical matter. The margin of the stream itself was white with froth and every dry stone with brine. The valley was uninhabited. A band of robbers was reputed to infest it, so we took a few men, armed with matchlocks from Gergir; they skirmished in splendid form, scaling each eminence at the run with the body bent low. After enjoying their manoeuvres for a short space we dismissed them.

About four hours' march from Gergir brought us to the banks of a fresh stream whose waters are overhung with willows. In this valley which I am describing the oak zone commences: low bushy trees start from among the boulders. On the mountain sides a bush of spinous branches flourishes (*Ephedra vulgaris*), and along the bed of the salt river the tamarisk grows abundantly. We ascended the eastern wall of the valley by a march of one hour and twenty minutes from the fresh stream, and having crossed the summit, which is of gentle curve (altitude 3020 feet), we encamped on its eastern slopes near a little rivulet of fresh water. From this point the country became more open and the path was easy. The leading features of the scenery were the streams, whose margins are clothed with a growth of tall reeds among which you may lose yourself. Here also we passed extensive myrtle beds.

After a march of two and three-quarter hours from the Murdeh Fil ridge we reached the village of Malseyidi, a straggling place situated on open uplands near a stream which was almost dry. This village was perhaps the largest we had hitherto touched: the huts are of mats and nestle against mud walls. It has a small mosque. Distance from Gergir about 20½ miles. Neighbourhood apparently uninhabited. The uplands around were barely covered with a parched growth of yellow grass. The mountains before us enclose the plain of Malamir, and are bare of vegetation. Thermometer, night 80°, morning 76° (30th and 31st August). It is a short ride from Malseyidi to the western wall of Malamir. As at Gergir the ridge opens, and we were surprised to see before us a stretching plain, level as the water of the blue lake which covers a part of its surface, and surrounded on all sides by naked mountains. Where we entered there is a small village, and about two miles further south-east, near the southern limits of the lake, a second and smaller village of huts made with poles and mats. A small fort has recently been built here, but was unoccupied. We spent the night on its roof. Altitude 2570 feet. Distance from Malseyidi about 5½ miles. Thermometer, evening 82°, morning 75° (31st August and 1st September). In this section one great ridge is crossed, that of Murdeh Fil, and the

ascent is obstructed by boulders. Between Gergir and the Murdeh Fil ridge, a distance of about 12½ miles, the track is often bad. From thence to Malamir it is a fair track. Forage and provisions at Malseyidi and at Malamir.

3. *Malamir to Dopulun, 75½ miles.*—From the second or southern village of Malamir we struck across the level plain towards the eastern mountain wall. For awhile we passed along the southern head of the little lake. The surface of the plain was yellow with a burnt growth of grass. On its southern confines, two mountain promontories extend into the smooth levels: to reach the pass we were obliged to double the northern of these two capes. This done we headed for the pass over a neck of plain. There is here a large growth of the low shrub (*Prosopis stephaniana*), which we noticed at the commencement of our journey. At this point we met for the first time the stream of nomads with their droves returning from the summer pastures, a continuous stream which throughout our journey to Dopulun it was hard to stem. The ascent of the ridge occupied nearly an hour: at parts we followed a tortuous path among the boulders, but we often availed ourselves of the gentler terraces of the paved causeway called "Road of the Amir." The summit of the ridge is rounded; altitude 3590 feet. Its eastern slopes, as usual in this scenery, sweep to high uplands. Over these we passed easily towards a second chain which closed the prospect from west by north, to east by south. On our right hand rose a lofty peak of the Mungesht range. A short ride brought us to a cleft in the chain: thence a long and a precipitous descent leads to a narrow valley. In portions this descent is made easy by the remains of the old paved causeway. Altitude of the valley 2820 feet. From this point to the open country at Godar-i-Balutak, we followed down long and narrow valleys enclosed by lofty mountain walls. One valley leads into another: the ridges open into side valleys. The surface of the rock is broken; huge boulders lie on the sides and in the hollow. From among the boulders the hardy oaks spring; they overhang the dry watercourses. In places springs well from the ground. The track is very rough and bad throughout this portion, say for about 12 miles. Our difficulties were increased by the stream of flocks and droves, and men and women, that flowed against us. I do not think that the winter torrents would stop traffic along these hollows, and Major Wells passed over this road in the month of November. A cleft in the mountain gave us access to the open valley of the Karun at Godar-i-Balutak. The river is swift, and in colour green as glass. It is about 30 yards wide and tolerably deep. It flows at the base of high banks on which we encamped. Altitude 2320 feet. Distance from Malamir 22½ miles. Having crossed the Karun on small rafts which were in use by the Ilyata, we wound along the northern slopes of the soft hills which rise from the plain between the great chain ridges; they separate from the Karun the course of a little tributary stream. As we rode above it we passed on its opposite margin several pomegranate orchards fenced with stone and brushwood. Further up there is a little flour-mill. We rose continuously along the hill side: on our left hand was the eastern wall. So we came to the village of Deh-i-Diz where there is a small fort. This southern or eastern portion of the valley space is very high; loam-covered oak-studded hills rolled round us. In places the soil lay fallow. Most of the inhabitants of the little village had not yet returned. Distance from Godar-i-Balutak 11½ miles by an excellent path. Altitude 4870 feet. Thermometer evening 78°, sunrise 72° (2nd and 3rd September).

The main eastern ridge rises behind Deh-i-Diz: the hills are almost level with its middle slopes. As we ascended we wound along a broad path whose soft soil had yielded to the tread of generations. The oaks were taller; we seemed to pass through an English park. After one and a half hour's march from Deh-i-Diz we reached the summit, altitude 6270 feet. Eastwards the chains rolled before us in a general direc-

tion of north-west to south-east. They incline to circle, or turn towards each other in links of mountain with mountain—a new feature. The park lands continued across the summit and along the eastern slopes of the ridge; then we wound along opposite mountain sides. Far off we discerned a glass-green stream lying deep down at the foot of mountains; the descent to it occupied us three-and-a-quarter hours. The track is bad for horses, but presents no difficulties to mules. On an opposite mountain-side we saw the road to Pul-i-Amarat going north but turning to east. At that point there is a dangerous bridge of trees, which we avoided. Schindler crossed it; and were there a good bridge there, the road he took might be the better, because the ascent after the passage of the river appears to be a gradual one (see his description), whereas we were obliged to mount the abrupt and stony sides of a mountain ridge. However, our descent to the river seems to have been easier than his. This river, called the Ab-i-Bazuft, is a considerable tributary of the Karun. It is very swift and cold. Its breadth where we crossed it must have been over 50 yards. We forded it but in winter, when the shepherds have returned to the little black huts which nestle among the rocks, rafts may be obtained. Altitude of valley, 2990 feet. Thence we ascended the mountain which overhangs it by a zigzag path; ascent, 2 hours; altitude, 5650 feet. The river flows south by east to the Karun. Direction of ridge, west by north to east by south. Prospect over loam-covered hills to linked mountain chains; hills and ridges are studded with oak. The uplands over which we now passed were dark with tillage: the oaks flourish upon them. Some cultivators supplied us with barley and hay. We encamped on high ground at 5950 feet near a spring. Thermometer: sunset, 72°, sunrise, 66° (3rd and 4th Sept.)

An hour's ride from our camp brought us to a hill-back which bounds these uplands; in the distance the mountains of Chehar Mahal lined the horizon. We now descended to a glen, and thence passed into the beautiful valley of Serhun. It is well watered, and has rich rice-fields. There is a village, but we did not see it; its northern head is distant from Deh-i-Diz about 24½ miles. The ascent of its northern wall occupied one hour (altitude 6270 feet). Wide prospect over the mountains, foreground of hills and uplands. After a march of one-and-a-half hours we encamped among the oaks above a stream. Altitude 6070 feet; thermometer, sunrise, 57° (5th Sept). Thence we came to a hill-back or ridge, the ascent of which occupied 35 minutes (altitude 7420 feet), and from its summit looked across the more open Karun country to the distant ridge beyond Dopulun, about 10½ miles away. The mountains round us were broken: ridge puts forth transverse link to ridge: we were in a country of high uplands. The path often wound among boulders and over stones through groves of oak. Progress was slow, and the Ilyats pressed against us. As we neared the ridge we could see the thin river line. The Karun enters the valley from west by south, 240°; the stream which is its affluent, and comes from the vicinity of Naghun (Dahinur, or Ab-i-Sabzu), flows through the pass, which would seem to be the natural entrance of the main river: it comes from north by east, 10°, and bends eastwards before the confluence. Over the Karun—here a deep but narrow stream—a bridge of one pointed arch, with side arch for a flood, gives a passage; its affluent we forded, but there is said to be a bridge higher up its course. There are a few huts in the neighbourhood, but their occupants had not yet returned. Travelling Ilyats were encamped round us. The valley stretches from north by west to south by east. Distance from Serhun valley, 16½ miles.

In this section we crossed five considerable mountain walls or steps: (1) that of Malamir; (2) of Deh-i-Diz; (3) of the Bazuft river; (4) of the Serhun valley; (5) of the uplands before Dopulun. The second of these affords an easy passage, and the fifth is not a large natural feature like the rest. The ascent of the first, third, fourth, and fifth ridges is by a rough and often precipitous path among large boulders. The

track is bad for a space of about 12 miles before Godar-i-Balutak, and again for 10½ miles before Dopulun, otherwise it is fair. For a traveller who makes the journey in an opposite direction the long but gradual ascent from the Bazuft river to Deh-i-Diz will be tedious and wearisome. I have mentioned the villages which we saw; otherwise, except for a few cultivators here and there, the district appeared to be uninhabited. Provisions and forage at Deh-i-Diz and Serhun.

4. *Dopulun to Ispahan (Julfa) 95 miles.*—The ascent to the summit of the lofty oak-grown ridge which rises from the eastern bank of the Karun occupied us over an hour, the path is bad. Altitude 6380 feet. Prospect westwards over the broken chains; the Karun lies like a silver thread in the glen whence it enters the open country. Eastwards over uplands, partly ploughed, to the bare limestone ridge beyond Naghun. I remarked the wholeness of feature of this open eastern landscape. The zone of oak ceases here. We passed by an easy path over this the plateau of Ardel. Low mounds buttress the wall west of Naghun, and on their surface a strange mineral green was thrown, which proceeded from the withered leaves of a large-leaved plant which the natives call "Tahila." Westwards we could just see the village of Ardel. We forded the affluent of the Karun (Dahinur or Ab-i-Sabzu), but there was said to be a bridge higher up its course. So we came to the village of Naghun, noticeable for its fine walnut tree. Distance from Dopulun 10½ miles. Altitude 6480 feet. Thermometer, sunrise, 62° (6th Sept.). The ascent of the mountain wall behind it occupied twenty-five minutes. Altitude 7320 feet. Thence our course lay along a little stream which waters a narrow valley already described. It was dotted with the black tents of the Bakhtiari. We noticed the tombstones of an Armenian village which once was situated here.* The land was being ploughed. This valley gives a passage to the valley of Char Khor, already described. Distance from Naghun to the fort of Char Khor about 11½ miles. Altitude of Char Khor, 7170 feet. Temperature not accurately observed, but about as at Naghun, getting warmer as we approached Ispahan. The natural features between Char Khor and Julfa have been already described. From Char Khor to Paradomba the distance is about 19 miles. The pass before Paradomba is 8650 feet. From the village of Paradomba to the town of Daulatabad the distance is about 31½ miles. From Daulatabad to Julfa 22½ miles. The track throughout the section is good, except at the ascents of the two mountain walls encountered, the one beyond Naghun and the other before Paradomba. Provisions, &c., at Naghun, Char Khor, Paradomba, Daulatabad.

The following are the stages which I should suggest as most convenient for a traveller:—

	Miles.		Miles.
1st day. Shuakter to Dara Kul ..	22½	6th day. Deh-i-Diz to Serhun ..	24½
2nd day. Dara Kul to Gergir ..	29½	7th day. Serhun to Dopulun ..	16½
3rd day. Gergir to Malamir ..	26	8th day. Dopulun to Char Khor ..	21½
4th day. Malamir to Godar-i-Balutak	22½	9th day. Char Khor to Paradomba	19
5th day. Godar-i-Balutak to Deh-i- Diz }	11½	10th day. Paradomba to Daulatabad	31½
		11th day. Daulatabad to Julfa ..	22½

AUTHORITIES FOR A STUDY OF THIS COUNTRY, ITS HISTORY, AND ITS INHABITANTS.

That part of the mountain range of Zagros which forms the north-eastern boundary of the plains of Khuzistan or Susiana, seems to have been known in the time of Alexander by the general name of Elymais. In the accounts of Alexander's

* For some interesting details regarding it see Schindler, p. 52.

marches it is called the country of the Uxii, who are described as an independent race of mountaineers. It seems probable that while the Elymæans were established in the plainer portions, the mountain fastnesses were held by the Uxians. To the west of these, towards the modern Khoremabad, another mountain tribe, the Cossæans were settled. I have not space to quote or summarize the ancient authorities, but I note:—(1) During the period of Alexander, and that of his successors, we have several interesting notices of the geography and condition of the country. (2) In the era of the Sassanians, under whom it seems to have greatly prospered, it appears impossible to trace its history and development. (3) In the fourteenth century light is again thrown upon it by the Arabian traveller Ibn Batuta, whose works have been translated into English, and who visited it in the time of the powerful Atabegs of Luristan. He travelled from Shushter to Ispahan, and found the road well provided with stations for travellers and provisions.

Among modern sources the traveller will at once turn to A. H. Layard, 'Description of the Province of Khuzistan,' in *Journal of R.G.S.*, vol. xvi., 1846. Sir Henry Layard lived with the Bakhtiari chieftain Mehemet Taki Khan for a considerable time during his visit to these countries in the years 1840–42. How small our knowledge of this extensive and important district was previous to his visit may be realised by a glance at Kinneir's map and a reference to the few words with which he dismisses the Upper Karun (see J. Macdonald Kinneir, 'Geographical Memoir of Persian Empire,' p. 87). Previous to Layard's visit, Rawlinson had visited the southern portion, Tul and Mungeast, in 1836, and published an account of his journey in the article which I shall presently cite. Layard's paper is a very masterly scientific statement; with it should be read that large portion of his 'Early Adventures' which deals with the same subject, 'Early Adventures in Persia, Susiana, and Babylonia,' London, 1887. It is a remarkable work, in which the sympathetic originality of the author sheds itself over the objects which he draws. In 1841 the Baron de Bode, First Secretary to the Russian Legation in Persia, travelled from Behbahan to Shushter over Kalah-i-Tul and Malamir, and in 1845 published the account of his journey ('Travels in Luristan and Arabistan,' by Baron C. A. de Bode, London, 1845). Layard and De Bode met at Kalah-i-Tul and travelled together as far as Malamir. The careful researches of these two travellers seem to have derived their aim and purpose from the scholarly and suggestive article of Sir H. Rawlinson ('March from Zohab to Khuzistan,' by Major Rawlinson. in *Journal of the R.G.S.*, vol. ix., 1839.) To the same period belongs the article of Loftus on the geology of these mountains ('Geology of Portions of the Turco-Persian Frontier,' by A. K. Loftus, in *Quarterly Journal of the Geological Society*, vol. xi., p. 247 *et seq.*) Loftus accompanied the Commission for the Demarcation of the Turco-Persian Frontier (1849–52), and he travelled through the Bakhtiari mountains. The correctness of his geological observations has quite recently been attested by the Austrian geologist, Dr. A. Rodler (see his letter in the 'Academischer Anzeiger' of Vienna, No. xxi., 1888). I may also refer to a paper of antiquarian interest, 'Ancient Sites among the Bakhtiari Mountains, &c.,' by Professor Long, in *Journal R.G.S.*, vol. xii. Previous to any of these we have the travels of Stocqueler ('Fifteen months' Pilgrimage through untrodden Tracts of Khuzistan and Persia,' by J. H. Stocqueler, London, 1832), who crossed the outskirts of this country in a journey from Behbahan to Ispahan, in 1831.

We owe our next notice to the commercial activity of British merchants on the Persian Gulf. British enterprise, following in the wake of the Euphrates expedition, had established a prosperous trade with Mesopotamia and Persia by the Gulf. Petitions to induce the Shah to open the Karun river to navigation had been from time to time addressed to the Persian and to the British Government by the firm

which conducts the navigation of the Tigris. In 1875 a member of a leading firm in Bushire and Busrah, Mr. G. S. Mackenzie, anxious to ascertain the condition of the country and of the roads, travelled from Ispahan to Shushter, viâ Ardel and Dopulun, and three years later he made the journey in the opposite direction, viâ Gotwend and Bazuft. Some account of his journeys may be found in the discussion upon a paper by Colonel Champain in Proceedings Royal Geographical Society, March 1883. In 1877, General Schindler, who was then superintending the Persian telegraphs, proceeded from Shushter to Ispahan viâ Kalah-i-Tul and Malamir. His masterly notice, accompanied by a careful map, is the first scientific account of this road which we have (see 'Zeitschrift der Gesellschaft für Erdkunde zu Berlin,' vol. xiv.).

Shortly after him, in 1881, Major Wells, R.E., performed the journey in the reverse direction, from Ispahan to Shushter: his account and map may be found in 'Proceedings' R.G.S., March 1883. For the Upper Karun generally, reference may be made to, 'The River Karun,' by W. F. Ainsworth, London, 1890. I may also add that within recent years an elaborate map of this country has been made by Professor Kiepert of Berlin from information supplied by Professor Hausknecht of Weimar. This map was published in 1882, and is accompanied by a letterpress containing a general notice of his Journeys, by Professor Hausknecht. The learned professor has not yet given us a more detailed account of his very interesting travels. The article by Major Bell in 'Blackwood's Magazine,' July 1889, may, with profit and with pleasure, be consulted.

GEOGRAPHICAL NOTES.

A New Expedition to Central Africa.—It is announced that M. Crampel, the French explorer, known to geographers by his important journey in the interior of the Gaboon, has started upon a new expedition in the country to the north of the middle Congo. From the northern bend of the Ubangi, or Welle, M. Crampel will cross to the Shari and follow this river down to its embouchure into Lake Chad. The return journey will be accomplished across the Sahara to Algiers, if circumstances permit. If, owing to the hostile disposition of the Tuaregs, he is prevented from taking this route, he will make his way to the Benue. The geographical results of this expedition should be of great interest, as much of the country to be traversed still remains a blank on our maps.

Belgian Explorations in the Region North of the Middle Congo.—Important additions to our knowledge of the country lying between the Congo, the Aruwimi, and the Welle-Mobangi have been recently made by Captains Roget and Becker, officers of the Congo Free State. The former, starting from the Itimbiri, reached the Welle at a spot a little above Dr. Junker's furthest point (Ali Kobbo's Zeriba). Captain Becker, setting out from Yambuya in a N.N.W. direction for the Welle, crossed the Lulu, a northern affluent of the Lower Aruwimi, and the Loika or Itimbiri (identical with Junker's Rubi). A little below the rapids of

the Itimbiri (Grenfell's furthest point in 1884) the river receives on the left the Rukitti coming from the south-east, and above the rapids, the Tinnda; on the right, the Tere and Riketti. The latter is the same as Junker's Rikkiti, or Likkiti, placed by him too far west. This stream, unlike all the streams between the Aruwimi and Welle, flows in a west and east direction, and then turns southwards into the Rubi, which in its upper course flows for some distance parallel to the Welle. At the point where Captain Becker quitted the Riketti it was still over fifty yards broad and navigable for boats. Dense virgin forests lie between the Aruwimi and the Rubi. The Welle where he reached it had a breadth of 1600 yards. The traveller occupied 200 days in marching from the Aruwimi to the Welle.

A New Expedition in the South Congo Territory.—M. A. Delcommune, known for his successful exploration of the Lomami tributary of the Congo, has been entrusted with the command of an expedition to the unexplored parts of the Lualaba and Luapula rivers. The route will be up the Lomami as far as the new station of the Congo Free State, and then overland. Lieutenant Håkansson, Dr. Briart, Lieutenant v. Santsohoff, Baron de Roest d'Alkemade, and M. N. Diderich, will accompany M. Delcommune, who will have an escort of 150 men.

Explorations in the Sahara.—At a special meeting of the Geographical Society of Paris held on the 28th of June, M. Fernand Foureau gave an account of his journey to In-Salah, undertaken in pursuance of a mission entrusted to him by the Ministers of Public Instruction and Commerce. The traveller started from Biskra. At Aïn-Taïba he crossed the route of M. Leon Say in 1878, and of the first expedition of Colonel Flatters. Continuing to the south-west he traversed the region of the Erg. The chains of sand dunes here attain an elevation of 1200 feet, and are separated by "gassis," 20 to 30 miles in length, and from $\frac{3}{4}$ to $1\frac{1}{2}$ miles in breadth, which broaden further in the interior. Vegetation at the foot of the dunes is green and abundant. A species of tamarisk is found on the summits. At the Ued Auleggi M. Foureau struck the route of the second Flatters mission. Ascending an affluent of this Ued he reached the watershed (about 1200 feet high) between the basins of the Igharghar and the Ued Massin. The next range of importance, that of the Baten, running in a north-east and south-west direction, forms the edge of a deeply-eroded plateau. The traveller here turned to the north-east, and skirted the region of the Erg, exploring the estuaries of the numerous streams which descend from the Tademayt. These estuaries are covered with small shrubs and plants, but the expedition found their beds completely dried up, owing to the absence of rain for the last two years. The principal geographical results of this expedition are as follows:—M. Foureau has determined the latitudes and longitudes of thirty-five points, and taken barometrical observations

along the entire route. The length of his itinerary was over 1500 miles, 600 of which were beyond the frontier of South Algeria. M. Foureau has shown that between Uargla and In-Salah there is a practicable route for a railway, on a firm soil, without a single dune along its extent.

D. G. Radde, our gold medallist, in company with Dr. Valentin, the geologist, has just completed an excursion in the southern part of Trans-Caucasia and Northern Persia, in the course of which the travellers ascended the peak of Kapudshich (12,000 feet). Details of this expedition are expected to be published shortly. Dr. Radde is now preparing to start in the suite of the Czarewitch on his journey through Central Asia.

The Upper Irawadi.—We learn from Lieut.-Col. C. R. Macgregor that an attempt was made last May to ascend the two branches of the Irawadi, concerning the length and course of which much difference of opinion has been expressed by geographers. On the 27th of that month Captain Barwick, Mr. Shaw, and Major Fenton started in the *Pathfinder*, a paddle-wheel steamer of thirty-five tons, for the confluence, about 150 miles distant from Bhamo. As far as Maingna the river runs between mountains from 1200 to 2000 feet high, and the little steamer had great difficulty in overcoming the force of the rapids and whirlpools. At the confluence the Irawadi was found to be 500 yards wide. The westerly branch, the Ma-lika, or Nam Kiu, was ascended for some six miles, when rapids were encountered; on the easterly branch, the N'maika, or Nam Dumai, the vessel proceeded only three miles when further progress was stopped by the same cause. Observations were taken at the junction by which the position was determined as $25^{\circ} 56' N.$ lat., and $97^{\circ} 38' E.$ long. It will be remembered that Colonel Woodthorpe and Lieut.-Col. (then Major) Macgregor, in their expedition to the Upper Irawadi from Assam in 1884, struck the Nam Kiu at a point about 120 miles above the confluence of the two branches, where the river was about 85 yards wide and nowhere more than five feet deep.

Unexplored Regions of Canada.—Under this heading Dr. G. M. Dawson, of the Canadian Geological Survey, recently read a paper before the Ottawa Field-Naturalists' Club, from which we take the following data. Beginning in the extreme north-west of the Dominion, Dr. Dawson finds the unexplored areas to be as follows:—(1) Area between the eastern boundary of Alaska, the Porcupine river, and the Arctic coast, 9500 square miles, or somewhat smaller than Belgium. This area is entirely within the Arctic circle. (2) Area west of the Lewes and Yukon rivers, and extending to the boundary of Alaska, 32,000 square miles, or somewhat larger than Ireland. (3) Area between the Lewes, Pelly, and Stikine rivers, and to the east of the Coast Ranges, 27,000 square miles, or nearly as large as Scotland. (4) Area between the Pelly and Mackenzie rivers, 100,000 square miles, or about twice the

size of England. This belongs partly to the Yukon basin, and partly to that of the Mackenzie, and includes nearly 600 miles in length of the main Rocky Mountain range. (5) Area between Great Bear Lake and the Arctic coast, 50,000 square miles, or about equal to England in size. Nearly all to the north of the Arctic circle. (6) Area between Great Bear Lake, the Mackenzie, and the western part of Great Slave Lake, 35,000 square miles, or larger than Portugal. This region was partly traversed by Abbé Petitot. (7) Area between Stikine and Liard rivers to the north, and Skeena and Peace rivers to the south, 81,000 square miles, or more than twice as large as Newfoundland. This includes a portion of the western Cordillera, and, between the Liard and Peace rivers, a large tract of the interior plateau region of the continent, parts of which there is reason to believe consist of good agricultural land. (8) Area between Peace, Athabasca, and Loon rivers, 7500 square miles, or about half as large as Switzerland. (9) Area south-east of Athabasca Lake, 35,000 square miles. This again may be compared in extent to Portugal. (10) Area east of the Coppermine river and west of Bathurst inlet, 7500 square miles. This again may be compared to half the area of Switzerland. (11) Area between the Arctic coast and Back's river, 31,000 square miles, or about equal to Ireland. (12) Area surrounded by Back's river, Great Slave Lake, Athabasca Lake, Hatchet and Reindeer Lakes, Churchill river, and the west coast of Hudson Bay, 178,000 square miles; much larger than Great Britain and Ireland, and somewhat larger than Sweden. The lakes and rivers shown in this great region depend entirely on the result of the three journeys made by Hearne in 1769-72. (13) Area between Severn and Attawapishkat rivers and the coast of Hudson Bay, 22,000 square miles, or larger than Nova Scotia. Several lakes and rivers are shown upon the maps in this region in practically identical form, since Arrowsmith's map of 1850, but Dr. Dawson has been unable to ascertain the origin of the information. (14) Area between Trout Lake, Lac Seul, and the Albany river, 15,000 square miles, or about half the size of Scotland. (15) Area to the south and east of James Bay, 35,000 square miles, which also may be compared to the area of Portugal. (16) Area comprising almost the entire interior of the Labrador peninsula or North-east Territory, 289,000 square miles. This is more than equal to twice the area of Great Britain and Ireland, with an added area equal to that of Newfoundland. Several lines of exploration and survey have been carried for a certain distance into the interior of this great peninsula, among which may be mentioned those of Professor Hind, Mr. A. P. Low, and Mr. R. F. Holme. To sum up briefly, in conclusion, it may be stated that while the entire area of the Dominion is computed at 3,470,257 square miles, about 954,000 square miles of the continent, alone, exclusive of the inhospitable detached Arctic portion, is for all practicable purposes entirely unknown. In this estimate the area of unexplored country is reduced to a minimum

by the mode of definition employed. Probably we should be much nearer the mark in assuming it as about one million square miles, or between one-third and one-fourth of the whole.

The Deep Troughs of the Oceanic Depression.—Prof. J. D. Dana has recently contributed a paper on this subject to the 'American Journal of Science.' After discussing the details he comes to the following conclusions:—(1) The facts reviewed lead far away from the idea that volcanic action has been predominant in determining the position of the deep-sea troughs. It has probably occasioned some deep depressions within a score or two of miles of the centre of activity, but beyond this the deep depths have probably had some other origin. (2) It is further evident that the deep-sea troughs are not a result of superficial causes of trough-making. Erosion over the ocean's bottom cannot excavate isolated troughs. The coldest water of the ocean stands in the deep holes or troughs instead of running, as the reader of Agassiz's volume has learned. The superficial operation of weighting the earth's crust with sediment, or with coral or other organic-made limestone, and filling the depressions as fast as made, much appealed to in explanations of subsidence, has not produced the troughs; for filled depressions are not the kind under consideration. Moreover, the areas are out of the reach of continental sediments, and too large and deep to come within the range of possibilities of organic sedimentation or accumulation. The existence of the troughs is sufficient proof of this. The deep troughs of the West Indian and adjoining seas are in a region of abundant pelagic and sea-border life, and yet the marvellous depths exist. And the depths of the open oceans are no less without explanation. Those close by the Bahamas, extending down to 16,000 and 18,000 feet, are evidence of great subsidence from some cause; and the coral reefs for some reason have manifestly kept themselves at the surface in spite of it. (3) If superficially acting causes are insufficient, we are led to look deeper, to the sources of the earth's energies, or its interior agencies of development, to which the comprehensive system in its structure and physiognomy points. Whatever there is of system in the greater feature-lines, whether marked in troughs or in mountain chains, or island ranges, must come primarily from systematic work within. The work may have been manifested in long lines of flexures or fractures as steps in the process, but the conditions which gave directions to the lines left them subject to local causes of variation, and between the two agencies the resulting physiognomy has been evolved.

CORRESPONDENCE.

The Owen Stanley Range, New Guinea.

CANTERBURY MUSEUM, CHRISTCHURCH, N.Z.
8th July, 1890.

IN a despatch addressed to his Excellency the Governor of Queensland, Sir William Macgregor, the Administrator of British New Guinea—to whom I am indebted for a copy—has given an account of his arduous and most successful ascent of Mount Owen Stanley.* My own experiences in New Guinea place me in a position to know the difficulties and dangers he had to overcome, and to appreciate the perseverance, endurance, and skill with which the expedition was carried out. While envying him the honour of being the first to reach the goal I had ardently aspired to, there is no one to whom I could grudge it less than to an old class-mate and fellow-townsmen, and I beg to offer him my cordial congratulations on the perfect success of the undertaking.

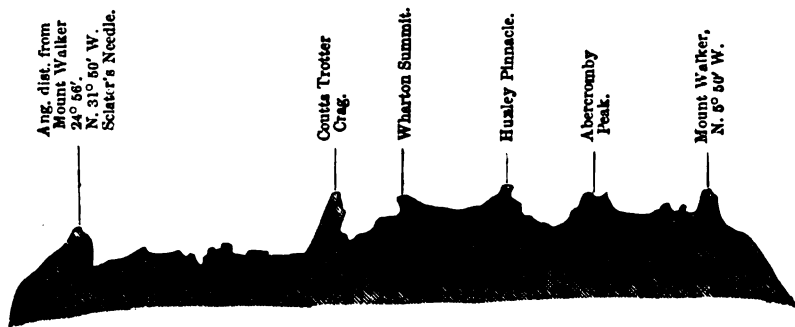
There are several points in the Administrator's despatch on which I should like to offer a few remarks through the pages of the 'Proceedings' of the Royal Geographical Society.

Sir William Macgregor writes, "I regret that neither myself nor Mr. Cameron could identify many of the places named by Mr. Forbes." This must necessarily be so from the route taken by him, which lay far to the north of mine, and roughly at right angles to its direction. Only when he crowned the range could they be seen by him, and even then with great difficulty from his altitude above them. My route traversed no ground of any great elevation; nor did the heights bordering it exceed anywhere 5000–6000 feet. Many fewer points along my route, I regret, were fixed, and these with less exactitude, than would have been the case but for the losing of my dépôt camp on the Goldie river, when I lost one of my most important angle books. From the deserted village of Madilo, on the river Naoro, as far as Ginianumu, my route has been laid out on my map in the 'Scottish Geographical Magazine' by dead reckoning; for during nearly all that way we were buried under deep forest, through which no outlook was possible. Otherwise my positions were fixed by sextant angles and prismatic compass bearings established on coast points determined during the recent marine survey there. During the whole time of my last journey there was no single night clear enough to obtain stellar observations. As Mr. Cameron is a professional surveyor, his plotted work should be more accurate than that of any other previous traveller in the interior of New Guinea. What instruments besides a prismatic compass were used by Sir William Macgregor, who took his own positions after his separation from Mr. Cameron, does not appear from his narrative; but if the position of that portion of Mount Owen Stanley named Mount Victoria by him, has been fixed by compass bearings alone, greater accuracy may not probably have been attained by him than by other careful but non-professional observers. This may account for some discrepancy which somewhere exists between the positions around "Mount Victoria" laid down in the Administrator's map and those taken by me at Ginianumu. My station there commanded a clear outlook on Mount Owen Stanley. My nearest approach to Mount Victoria, by my own map, is between eight and nine miles. The distance certainly did not look nearly so far. Distances estimated by eye in the tropics,

* Vide 'Proceedings R.G.S.,' ante, p. 193.

however, I have found very delusive, as objects appear to approach and recede from hour to hour according to the state of the atmosphere. I have learned, therefore, to place no reliance on apparent distance. That I was looking out on Mount Owen Stanley there can be no doubt. I had too often "shot up" and sketched its peaks from crowds of places to be possibly mistaken. Sir William says truly that I was looking out on the "highest crest, the great and rugged mountain mass," forming "the south-east end of Mount Victoria," but certainly no great mountains or mountain spurs intervened between me and it. Nor was I looking up the deep dark glen that separates Mount Knutsford from the central ridge, as will be evident from the bearings I give below. From Ginianumu, on descending to and crossing the Warumi river below us, access could at once be obtained to several spurs, some of them very broken and rugged, leading directly to the summit. The south-easterly spur was the one I should most probably have attempted. Its extreme termination was hidden from us by the nearly perpendicular buttress of Miago, a mountain of no great altitude, rising close to us on our right, which projected into and on our side of the river. But it was evident that it could be reached by ascending the Warumi for a short distance. If, from the Admiralty chart in which Mount Owen Stanley is depicted, it had been possible to decide with certainty the crest or its summits on which I had taken bearings, it would have been easy to fix, by reverse bearings, my Ginianumu station. The general silhouette outline of Mount Owen Stanley from its southern aspect is very constant in appearance from all points, to one travelling from the coast eastward as far as I reached. Sir William describes "Mount Victoria" as composed of six peaks; from my points of observation, five seemed more prominent than the rest—three to the eastward of a marked central back or depression, and two to the west of it. Of the three easterly I have named two—Mount Walker, the most easterly of all, crowning the spur up which I intended to ascend, and Abercromby Peak, the other end of the easterly half. Huxley Pinnacle, which appeared to me to slightly excel the others, is the eastern top of the western half, while Wharton Summit is the most westerly end of Mount Owen Stanley. Coutts-Trotter Crag lies close to the western end of this crest, and slightly (to appearance) more southerly. It is a sharp-pointed cone, visible from all southern stations, and once seen, too remarkable to be forgotten or confounded with any other. It is evident from the following bearings that my position was more to the north and east of that assigned to it in my map already referred to. From Ginianumu, Mount Walker (the most south-east peak) bore N. $5^{\circ} 50'$ W. (an observation repeated many times). The sextant angular distance between Mount Walker and Abercromby Peak I read as $2^{\circ} 54'$, Huxley Pinnacle $5^{\circ} 48'$ (its prismatic bearing N. $11^{\circ} 38'$ W.); Wharton Summit (which lies somewhat out of the line of the other tops and towards my station) is $9^{\circ} 25'$ (prismatic N. $15^{\circ} 15'$ W.), and Coutts-Trotter Crag, which is a sharp-pointed cone, visible and remarkable from all stations to its southern side, $10^{\circ} 23'$ (prismatic N. $16^{\circ} 45'$ W.) Coutts-Trotter Crag seems to stand at the north-west end of the crest of Mount Owen Stanley, and is probably separated from it. This fact it was impossible, from my position, to decide with certainty. I do not consider it, therefore, as part of the true crest. It is probably either Macgregor's Mount Morehead or his Mount MacIlwraith; while Sclater's Needle, whose angular distance from Mount Walker is $24^{\circ} 56'$ (prismatic bearing as recorded, N. $31^{\circ} 50'$ W.), will perhaps prove to be the other of these two. Its form is very distinctive, being sharply pyramidal, with a precipitous western slope. Mount Walker, Abercromby Peak, Huxley Pinnacle, and Wharton Summit, are peaks of the "block," which I erroneously imagined to be isolated, not from any observation it was possible to make from Ginianumu, but from a view of Mount Owen Stanley I obtained on a

particularly clear day from Holnicotte Bay, when with Sir Peter Scratchley, on board the *Governor Blackall*. Some streak of cloud, which, while it so often demarks with great distinctness, can equally blur at other times, the topography of mountain spurs seen from a distance, may have deceived me. It was on the same occasion that I detected so distinctly the great gap or pass between it and the Mount Obree Range, by which I offered to conduct the expedition to the north-east coast, which his



SILHOUETTE OF SKY-LINE OF MOUNT OWEN STANLEY.

Excellency the then Special Commissioner (the Hon. John Douglas) promised to subsidise, if the rest of the Australian colonies would have shared the expense. Through part, at least, of this gap, I believe it will be found that the Warumi river flows.

Sir William Macgregor further states, "that there were such (i.e. mountain spurs between Mount Forbes and Mount Victoria), is plain from the position he assigns to the Brown river." I beg leave to say that I have not given any position to the Brown river. That the river crossed near Madilo, called the Naoro Nguma in my map, is the *Brown* I have no means of knowing, nor should I like to venture to affirm that it is the same that enters the Warumi under Ginianumu. The northward turn of the Naoro to join the Warumi is inserted on information extracted from the natives, if I did not misunderstand them and they us, and which I considered not unlikely to be true. It must be remembered that we could see nothing of the country after entering the forest at Madilo till our reaching Uburukara. What I *do* know from observation is that we crossed the Naoro on our outward journey as a muddy river running more or less westerly at an elevation of 2000 feet. On our return journey we recrossed at the spot marked cataracts; but being unable to follow its further course, I know nothing of its whence or whither, outside the mile and a half, perhaps, of its banks we traversed. I conjectured that the Naoro might be the Brown, because that was the river north of the Goldie, generally credited with stretching up towards the main ranges. It is not at all improbable that that river (the Naoro of the map) holds on its course westerly towards the sea without turning northward, and that the river branch we saw below Uburukara and traced to join the Warumi under Ginianumu may be quite distinct, and have its sources in the Archer Range. As to the Warumi and its branches, I have indicated them as I saw them. The Warumi flowed north-westerly from us—a direction in which it became lost to view behind a great spur of Mount Owen Stanley. After studying Sir William's map, I am disposed with some confidence to believe that the Warumi is indeed a branch of the Vanapa.

Having carefully read Sir William's description of his route, I cannot help

thinking that the road that I traced by eye from one of the hills in the Sogeri region on my first arrival in New Guinea has great advantages over his. It is far shorter and far easier. The eminent feasibility of the route decided me not to think of any other locality than Sogeri for my headquarters. That described by the Administrator would still not tempt me from my own. The route taken by the party I led on behalf of the Protectorate Government was adopted at the desire of the Special Commissioner. Mr. Douglas had been assured by a miner named Gleeson, then in the Protectorate service, that a party of miners of which he was a member, had, while prospecting on the Goldie river in 1879, conducted pack-horses without great difficulty far up towards Mount Owen Stanley. Accordingly, I accepted his guidance up the Goldie Valley to the point he had formerly reached. After fourteen days of toilsome trudging, sometimes on the abrupt spurs, sometimes and oftener in the middle of the river bed, Gleeson's "furtherest for horses" was reached, and to my surprise was within shouting distance of my own furthest northward march from Sogeri to the mountain the year before. All the hill country we yet know in New Guinea is exceptionally rough, and difficult for parties to traverse; but this point can be reached from Sogeri by parties—but not by horses—with comparative ease in good weather in three days at the most. Sogeri is distant from Port Moresby three comfortable marches, while the interval between my main camp on the Goldie and my Ginianumu station can be bridged by another three. There is an excellent native path every foot of the way; none of the rivers which intercept it present any difficulty as to crossing; nowhere throughout the route does the path rise higher than 3000 feet, on an average very much lower. Only on descending from Ginianumu to the Warumi (of whose fords I cannot speak), would the tough ascent of Mount Owen Stanley commence. The Sogeri and Kaukari natives have long been on the most friendly terms with the *nao* or foreigner, and for some years now have been accustomed to porterage duties. The natives of Ebe, on the Goldie river, who looted my camp—being doubtless too sorely tempted by the wealth of barter of the most coveted kinds, left as they thought insufficiently guarded in our open camp—are not really an ill-disposed people. I would not hesitate to venture alone among them again to-morrow. The Origanumu villagers, though during that disastrous march from the village to our Goldie camp their labour was enforced at the points of our revolvers, cannot be said to have behaved other than well under the circumstances, and the day before they had been our most hospitable entertainers. The people dwelling on the Archer Range would be, I am sure, equally well affected after a short acquaintance with the white foreigners, if just and considerate. I am confident that, with a little expenditure of graciousness, there could be safely established in the village of Origanumu, under a small guard, a depôt within easy communication with Port Moresby, viâ Sogeri, on the one hand, and on the other with an exploring party working for a season on the flanks and summits of Mount Owen Stanley.

The precedent set by Sir William Macgregor in the matter of nomenclature is to be regretted. He has bestowed the name of Mount Victoria on a portion of the main range which has for nearly 40 years been known as Mount Owen Stanley, and reduplicated the names Mount Scratchley and Mount Douglas, within a few miles of each other. If the precedent be allowed that succeeding travellers may change or transpose the names bestowed by their predecessors, there will be no finality to geographical appellations, nor end to the confusion that must arise. Nor can it be fair to rob a predecessor, by removing his names from the landscape he was the first to mark out, of this his very often sole reward, simply because in his predecessor's estimation the feature to which he had applied the exalted name was less worthy to bear it than another more newly discovered. It would appear to me that

the honour conferred on a name by its commemoration on an imperishable geographical feature, lies not altogether in the prominence of that feature, for the attainment of some high, remarkable, or further-off peak may often be a less notable exploit in after days, than the reaching of, say, a nearer and lower elevation in the face of all the difficulties and dangers of a virgin traverse; the right to bestow a worthy name on the "furthest" or any feature fixed in some such arduous exploration would be a reward to compensate for many toils, and an honour for the commemorator to be proud of, and on both sides one to be jealously guarded. Why should not some future traveller presume to change Mount Gordon Bennett in Africa to Mount H. M. Stanley; or in New Guinea attempt to dethrone Mount Knutsford from its secure elevation? If the long-established name of Mount Owen Stanley must, for any more sufficient reason than appears at present, give place to another, the name of Huxley Pinnacle, that has been bestowed on the central peak of the crest (even should it prove lower instead of higher, as supposed, than the others), would, according to the rules of priority applicable in scientific nomenclature, fall to be applied to it, and surely no appellation, not even that of our Gracious Sovereign in this instance, could be more appropriate or deserving than the name of the (now illustrious) surgeon of H.M.S. *Rattlesnake*, who first sighted and named it. Where the native names of natural features can be ascertained, the Admiralty instructions are, I believe, that they should be adhered to as rigidly as possible; and that when the native name becomes known it should be substituted for the foreign designation, and the latter inserted in smaller type beneath the former, as has been done in the new survey of the Louisiade Archipelago, recently made by Commander Field, R.N.

The natives seen by Sir William Macgregor on Mount Musgrave would seem to belong to the same tribe as those I met with at Ubumkara. In this relation the following notes from my journal may be of interest:—"27th October, 1887. We met a crowd of natives (whom I had sent forward to summon) from the village (they said) of Bogara, whose chief's name is Kaimadaiva. Our new carriers—whose broad nostrils are very noticeable—are distinguishable from our Urava men by their wearing a covering round their waists of short grass petticoats, from the band of which a piece of bark cloth (*angidi*) ornamented with red and black ochres hangs down behind. In front they wear over it, if married, one or more bags (*yago*), in coloured patterns, blue (*tage-tage tako*), yellow (*baiva*), and brown. We understood them to say that these colours were extracted from the bark of trees (*ao*). These bags are woven of two coloured threads by two bone needles, worked between the first and second fingers and twisted off on to the little finger and thumb. In their hair are worn also tails of small cuscuses and wreaths of cassowary feathers, while round their foreheads were fixed coronets of dog and wallaby teeth and small shells, probably received from the coast tribes in barter. In some cases the men wore their hair in plaits, with shells hung at the end, or the crania of *minama*—probably a large species of eel. No tattooing was observed on any of them. Their villages, to judge from Ubumkara, are really very poor; the houses, raised on poles, are miserably built and kept. Most of the men wore on their arms, or had hanging in their girdles behind, coils of rattan rope, which are used by them for 'making fire.' For this purpose the operator, first selecting a dry fragment of wood, makes in it a split, in which he inserts a peg to keep it agape: into this split he places loosely a morsel of tinder plucked out of his girdle or skirt. He next cuts from his dry coil of rattan a short length, lays it on a dry leaf on the ground, and places over it the tinder plug in the cleft stick; then placing his knee or foot on the end of the stick, he pulls the rattan cord rapidly to and fro under it till the tinder ignites, when, by blowing gently through the cleft, he fans the spark into a flame. The whole operation is the

most effective and rapid of any native fire-producing contrivances that I know. Their spears are of palm-wood, devoid of ornament, and their shields have the shape and rough ornamentation seen among the Koiari."

Between Ubumkara and Ginianumu we crossed the only quartz-reef I saw on the journey. It ran in an east and west direction, and measured 18 inches across.

H. O. FORBES.

NOTE.—In my map in the 'Scot. Geog. Magazine' already referred to, "Pullen Summit" is a mistake inserted through some oversight on the draughtsman's part. I may also remark here that Mount Horsley was inserted after I had corrected the proof, and for whose position I assume no responsibility. The depicting of the spurs and summits of Mount Owen Stanley is not satisfactory. Their delineation being beyond my technical skill, I had to leave the task of representing my outlines and descriptions to the cartographer; but the picture produced is, through no fault of his, not that which I tried and failed to convey to him, and which I carry so vividly in my recollection.

Obituary.

Major-General John Charles Fremont, U.S.A.*—When, in the course of a lecture which I had the honour of delivering before the Society in March last, I had occasion to allude to the personality and services to geographical science of one of our distinguished Honorary Fellows, Major-General John Charles Frémont, United States Army, I little thought that, in a few brief months, I should, as his friend and countryman, be assigned the task of writing his brief obituary for our 'Proceedings.'

He made the long trans-continental journey with me only last summer; and, although he had passed considerably beyond the allotted age of man, he was a hale and active veteran, and bade fair to survive—as the old monk in the Escorial expressed it to the painter Wilkie—"all who were his predecessors, all who were his contemporaries, not a few of those who were younger than was he."

In his person has passed away the last of the United States pioneers, the heroes of the border, the men who have made possible the maps of to-day, have helped to abolish the "Great American Desert," have given us a domain stretching from the Atlantic to the Pacific. Such services deserve a commemorative monument, and they have a splendid one in "Frémont's Peak," standing just where the great parallel ranges of the Northern Sierra Madre break down to form the elevated plateau which is crossed by the Pacific Railroad.

John Charles Frémont came of excellent stock: that of Huguenot exiles. He was born at Savannah, Georgia, January 21st, 1813. His mother, left a widow in 1818, removed to Charleston, South Carolina, and the young man was educated at Charleston College. In 1833, he began a cruise on a naval vessel as teacher of mathematics: then he served as assistant in several railroad and military surveys in Georgia, Tennessee, and the two Carolinas. In 1838-9, he accompanied M. Nicolle in two exploring expeditions to the upper Mississippi region, having been appointed in 1838 a second lieutenant in the corps of Topographical Engineers. In 1841 he had the great good fortune to win the affections, and secure, after much

* By A. A. Hayes, Esq., F.R.G.S.

opposition, the hand of Miss Jessie Benton, daughter of the famed United States Senator of that name. This marriage, says one of his biographers most truly, "has been regarded, with much reason, as the most brilliant achievement of his life." Mrs. Frémont, who survives him, was one of the most able, intellectual, and charming women of her generation: she had a potent influence on his career, and their married life was an ideal one.

Senator Benton had a due appreciation of the possibilities of the enormous western domain acquired by the United States under the "Louisiana purchase," and the importance of a survey: and his influence secured for his son-in-law a commission to undertake this latter work, for which "he was in every respect well qualified by natural temperament, education, and experience."

His first expedition was made in 1842. With a party of twenty-two experienced French-Canadian voyageurs, and with Christopher (the celebrated "Kit") Carson as guide, he started in June from near the mouth of the Kansas river (emptying into the Missouri). In August he reached the South Pass, and then explored the western base of the Wind River mountains. The party returned in September, having had no remarkable adventures, but bringing back the results of a series of accurate observations.

In less than three months after the rendering of his first report, Frémont was again on the Missouri, intending to proceed to the South Pass and explore the Oregon emigrant route westward until he could connect his work with that of Wilkes on the Columbia, and thus complete the trans-continental line. This time he took a new route to the mountains, making a detour to the Arkansas river, and thence crossing the range to the Sweet-water. The travellers were at the South Pass, August 13th, 1843, and at Fort Hall, September 19th, whence they took the usual route down the Snake river, reaching the Dalles of the Columbia, November 4th, and completing the connected survey as projected. In the winter Frémont turned aside with a few men to make a five days' survey of Great Salt Lake and a boat voyage thereon: and he also made a trip to Fort Vancouver and back, before preparing for his homeward journey.

It was his intention to explore the Klamath Lake, thence to go south-east "to a reported lake called Mary's, at some days' journey in the great basin; and thence still on south-east to the reputed Buenaventura river . . . flowing from the Rocky Mountains to the Bay of San Francisco" (so dense was the ignorance about the region less than fifty years ago). Then he proposed going to the head waters of the Arkansas, Bent's Fort, and home.

Searching for this mythical Buenaventura river, the explorers found themselves, on January 18th, on what is now the Carson river, and the condition of the animals' feet was such that Frémont did not dare to push eastward, but made up his mind to attempt the crossing of the Sierra Nevada into the Sacramento valley. Proceeding south and then north again, in search of a practicable pass in the snow-clad range, he finally accomplished the most perilous crossing yet effected. The sufferings of the party were great, two men became temporarily insane, and thirty-three out of sixty-seven horses and mules were lost or killed for food. At last, on March 8th, 1844, Frémont and part of his men arrived at Sutter's Fort, a quiet little station dozing in entire ignorance of the fame to be brought to it ere long by the discovery of gold.

On March 24th the homeward journey was begun. The party ascended the San Joaquin valley, were guided by Christian Indians over the Tehachipi Pass, and reached Utah Lake on May 24th, completing a circuit of 3500 miles. They arrived on the Missouri in July, and Frémont was made a brevet captain for his services.

After completing his report, he hastened to St. Louis to organize still another

expedition. In May or June, 1845, he left the rendezvous near Independence, with about 100 men, and proceeded to Bent's Fort on the Arkansas. With a portion of his force he explored this river to its source, and the country in a north-west direction to the Great Salt Lake, on which he spent over a week in October. At the end of that month the explorers entered what is now the State of Nevada, and on November 5th, near the head waters of the Humboldt, the party was divided. Frémont, with a small body of men, took a southern route through the unexplored region to the westward, reaching Walker Lake on the 23rd, and Sutter's Fort again on December 10th. Early in 1846 he visited San Francisco Bay, San José, and Monterey. The Mexican governor ordered him to leave the country, and an attack on the party was threatened, but not actually made. He pushed his way north into Oregon again, but returned to California in consequence of despatches from Washington. Troublous times now ensued on the Pacific coast, and the explorer's labours became more military and political than geographical; but he had a most prominent share in the operations which put this splendid territory under the flag of the United States, and a biographer says that "his Californian career was the foundation of his fame."

In October 1848 he organised a third expedition, for the purpose of finding a southern route to California, and had a disastrous experience. In his first attempt to cross the mountains this time, eleven out of thirty-three men, and all his mules perished; but he returned to Santa Fé, made a fresh start, and reached the Sacramento in the spring of 1849.

With subsequent episodes of General Frémont's eventful life, this record has not properly to do; but there was, in the eyes of his countrymen, so much of romance and chivalry about his doings as "pathfinder," soldier, and first standard-bearer of a great political party, that they will hold them in affectionate remembrance "while water runs and grass grows."

There is something most interesting and pathetic about the fact that, only two hours before his death, his thoughts turned, with happy remembrance and longing, to the scenes of his early labours and triumphs. He told his physician, an intimate friend, that he had suffered much, but had found relief, and that in a short time he was "going home" to his wife and daughter at Los Angeles. This would seem specially graceful and appropriate. Just before the old man's eyes open on the scenes of another world, they are drawn towards that great Pacific slope which he helped to win for his country; to the mighty Sierra Nevada, the waving palms and green vineyards of the City of the Angels, the calm waters of the Western Ocean, "et dulces moriens reminiscitur Argos."

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—May 9th, 1890: Comte DE BIZEMONT in the Chair.—Among the correspondence read was a memoir by Captain Courbis on the dunes of the Sahara, which was a reply to M. Rolland's paper read on 21st March before the Society.

COSTA RICA.

A communication was received from M. H. Pittier, Director of the National Physico-geographical Institute and Observatory of San José, in Costa Rica, which contains some interesting facts about the climate of the country. The dry season commences regularly in December, and terminates in April; with the

exception of the month of February, which is often without any rain, there are always some showers during the dry season. The observatory possesses a series of observations for about twenty-three years, from which it appears that the thermometer has never descended below 50° (Fahr.). The maximum is rarely less than 88° (Fahr.); it is generally over 77°. The climate is healthy, the chief danger to Europeans not acclimatised being dysentery, which occurs in the dry season. The annual rainfall, based on fifteen years' observations, is 64 inches. The writer states that a geographical section has been added to the work of the Observatory, which will occupy itself with the exploration of the country and the preparation of a survey map. He himself has already collected a considerable amount of material with reference to the geology, orography, hydrography, and flora. As regards the latter, the most recent works on the subject indicate about 1100 species; this number is already more than doubled in the collections made up to the present.

GEOGRAPHICAL WORK IN RUSSIA.

M. Venukoff stated that on the 7th April last, at St. Petersburg, the annual exhibition of geodetical, topographical, and cartographical works executed by the Russian Staff in 1889 was held. These included many manuscript works of importance; the following maps recently published under the direction of the staff may be mentioned—(1) the large map of Russia in Europe, reduced by General Strelbitzky to the scale of 1:420,000. It has recently been completed by the addition of topographical details with regard to the north-east of the country, viz. the northern part of the Ural, the basins of the Petchora, Kama, and Vyohegda, in accordance with the surveys of Ivanov, Coutcha, and Sergheev. (2) With regard to Finland, the publication of a large map on scale 1:42,000 has been commenced. (3) Maps of the countries bordering on Asiatic Russia on the scale of 1:1,680,000. This remarkable work is the collective production of all the provincial topographical sections of the staff. It represents not only the southern part of the Russian possessions in Asia, starting from the 52nd parallel, but also Korea, Manchuria, Mongolia, Dzungaria, Eastern Turkestan, and the neighbouring parts of Tibet and China, as far as the 30th degree of N. latitude. Seven sheets out of thirty have already been published under the direction of Colonel Bolchev. This map is indispensable for travellers in Central Asia. It contains the itineraries of M. Skassy, traced for the first time, covering 4350 miles, and based upon 69 points, the geographical position of which was determined by him. (4) Map of the fourth journey of Prejevalaky in Central Asia, representing Northern Tibet on the scale of 1:2,100,000. (5) The map of M. Grombchevsky's explorations in the Pamir in 1889.

DR. NANSEN'S PROPOSED ARCTIC EXPEDITION.

M. F. Baetzman, the Commissioner of Norway at the Paris International Exhibition of 1889, made an interesting statement as to M. Nansen's contemplated Arctic expedition. After referring to the fact that the Norwegian Government had decided to ask the National Assembly to grant a subvention of 11,200*l.* towards the cost of the expedition, M. Baetzman spoke upon the general plan of operations which had been decided on by M. Nansen, and which, as we know, is based upon the general idea governing the *Jeannette* Expedition (1879-81), and the scientific conclusions drawn therefrom, M. Nansen being of opinion that, if the men of the *Jeannette* had been provided with sufficient provisions, and if they had stayed on their ice-floe, they would have continued to have been borne by the current through the interior of the polar region, and would have debouched at last into the Atlantic Ocean between Greenland and Spitzbergen. M. Nansen will commence by con-

structing a wooden vessel of about 170 tons; the ship will be solidly built, with its sides very much inclined. It will be provided with auxiliary steam machinery, and will carry coal, as well as provisions for ten or a dozen men, for five years. In February 1892 the expedition will start from Norway; by June of the same year it will have reached the Behring Straits, and will then continue its voyage towards the Archipelago of New Siberia. There the expedition will wait for the most favourable moment for pushing as far as possible to the north by the open sea, which will probably be in August or at the beginning of September, and for reaching a point where, at the approach of winter, and when the ice is forming and consolidating, the ship can be hoisted on to it and be carried towards the interior polar regions. If the ship should be broken, the expedition will take up a position on the ice with their boats and provisions. M. Nansen reckons that the expedition will last two years, although provision has been made for five.—In conclusion, M. J. Claine gave an account of a four months' journey made by him in Mexico.

— May 23rd: Comte DE BIZEMONT in the Chair.—M. G. Capus communicated some extracts from a letter from M. Dauvergne, travelling in Central Asia, in which he states that he had met with *Ovis poli* of large size, and that he had killed four of them, one 4 feet 7 inches in height, another 4 feet 9 inches, and a third 5 feet. In his travels in the Southern Pamirs, he had learned from the Kirghizes that two Europeans had penetrated as far as Alichur. These Europeans, M. Capus wrote, are MM. Ridgway and Gaston de Breteuil, who in the course of last summer visited the Pamir.—A letter was read from M. Craveri, French Vice-Consul at San José (Costa Rica), with reference to the recent earthquakes at that place. On the night of the 21st April there was a serious earthquake, lasting sixty-five seconds altogether. The writer adds that this earthquake is, like others which have taken place regularly in the month of May, the premonitory symptom of a violent shock before the rainy season, and the inhabitants were in a state of great trepidation.—The Chairman announced that the Society had just received a bequest of 2000*l.*, made by the late M. Fournier; the object of this legacy was, he said, to found an annual prize, to be awarded to the best geographical work, map, or book appearing in the year.—In conclusion, papers were read by M. Thoulet upon the scientific study of lakes, and by M. Yadrintzef upon his archaeological mission in Northern Mongolia.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

EUROPE.

- Baedeker, K.**—Italy. Handbook for Travellers. First part: Northern Italy, including Leghorn, Florence, Ravenna, the Island of Corsica, and routes through France, Switzerland, and Austria. With 19 maps and 33 plans. Eighth edition. Leipsic, Karl Baedeker; London, Dulau & Co., 1889: 12mo., pp. lxii. and 504. Price 6 marks.
- Ditto. Second part: Central Italy and Rome. With 10 maps, 31 plans, a Panorama of Rome, and a view of the Forum Romanum. Tenth edition. London, Dulau & Co., 1890: 12mo., pp. lx. and 418. Price 6 marks.
- Ditto. Third part: Southern Italy and Sicily, with Excursions to the Lipari Islands, Malta, Sardinia, Tunis, and Corfu. With 25 maps and 16 plans.

Tenth edition. London, ditto, 1890: 12mo., pp. xlviii. and 424. Price 6 marks.

— Northern Germany as far as the Bavarian and Austrian Frontiers, with Excursions to Copenhagen and the Danish Islands. Handbook for Travellers. With 35 maps and 54 plans. Tenth edition. London, ditto, 1890: 12mo., pp. xxxiv. and 453. Price 8 marks.

[These Handbooks were presented by Messrs. Dulau & Co.]

[**Balearic Islands.**]—Die Balearen. In Wort und Bild geschildert. Sechster Band. Die eigentlichen Balearen. Leipzig, F. A. Brockhaus, 1890; imperial 4to., pp. 595. [Presented by the Author.]

This is a further instalment by the Archduke Ludwig Salvator of Austria to his magnificent work on the Balearic Islands. The present volume—the 6th—treats generally of Minorca, and is handsomely illustrated with a large number of coloured plates and wood engravings, which, apart from the text, convey a good idea of the country, places, and people, &c.

Edwardes, Charles.—Sardinia and the Sardes. London, R. Bentley and Son, 1889: 8vo., pp. xii. and 379. [Presented by the Publishers.]

An account of a visit to Sardinia, with descriptions of some out-of-the-way places in the island. There is neither map nor index.

Lullin, E.—L'Utilisation des Forces Motrices du Rhône et la Régularisation du Lac Léman. Extrait du *Journal de Genève*, Mai 1890. Genève, Imp. Aubert-Schuchardt, 1890: 12mo., pp. 39.

Müllner, Johann.—Die Bevölkerungsdichte Tirols. (Separatabdruck aus dem "XV. Jahresberichte des Vereines der Geographen an der Universität Wien, 1889.") 8vo., pp. 9, map.

[**Murray's Handbooks.**]—Handbook for Lincolnshire. With map and plans. London, John Murray, 1890: post 8vo., pp. iv. [30], 213, and 18. Price 7s. 6d.

This is a further addition to Mr. Murray's Handbooks to the English Counties. The same amount of care has apparently been bestowed upon its production as with others of the series. It contains a good map of Lincolnshire and a useful index and directory.

[—] A Handbook for Travellers in Southern Italy and Sicily; comprising the description of Naples and its environs, Pompeii, Herculaneum, Vesuvius, Sorrento; the Islands of Capri and Ischia; Amalfi, Pæstum, and Capua, the Abruzzi and Calabria; Palermo, Girgenti, the Greek Temples, and Messina. Ninth edition. In two parts. Part I.—South Italy. Part II.—Sicily. With maps, plans, &c. London, John Murray, 1890: post 8vo., pp. xl. and 418. Price 12s.

[—] A Handbook for Travellers in South Germany and Austria. Part I.—Being a Guide to Württemberg, Bavaria, Austria, Bohemia, and the Danube from Ulm to the Black Sea. Part II.—Being a Guide to Tyrol, Salzburg, Styria, and the Eastern Alps, &c. Fifteenth edition. London, J. Murray, 1890: post 8vo., pp. xiii. and 626, maps and plans.

Thoroddsen, T.—De varme Kilder paa Hveravellir i Island.—Ymer, 1889: pp. 49–59, map, 8vo.

— Fra Islands indre Højland. En Rejseberetning fra Sommeren, 1889: 4to., pp. 24, map.

Toula, Franz.—Reisen und geologische Untersuchungen in Bulgarien. (Vorträge des Vereines zur Verbreitung naturwissenschaftlicher Kenntnisse in Wien. XXX. Jahrgang, Heft 16.) Wien, E. Hölzel, 1890: 12mo., pp. 144, map and illustrations. [Presented by the Author.]

Vaccarone, Luigi.—*Statistica delle Prime Ascensioni nelle Alpi Occidentali.* Terza edizione. Torino, Tip. L. Roux e C., 1890: 12mo., pp. clxxix. [Presented by W. A. B. Coolidge, Esq.]

This little volume contains statistics of the first ascents in the Western Alps. It consists of a set of tables giving, in parallel columns, the names of the peaks, heights in metres, the names of the Alpinists and guides who accompanied them, the dates of the ascents, and a column of remarks. The volume will be useful as a book of reference for Alpinists.

Wolff, Henry W.—*Rambles in the Black Forest.* London, Longmans & Co., 1890: cr. 8vo., pp. 331. Price 7s. 6d. [Presented by the Publishers.]

This volume will serve as a supplement to the ordinary guide-books dealing with this particular district of Germany. It contains descriptions of many out-of-the-way places in the Black Forest, with notes on the customs of the people, their industries, legends, and other information of interest to the tourist and visitor.

ASIA.

[**Asia Minor.**]—Archæological Institute of America. Papers of the American School of Classical Studies at Athens. 8vo. Vol. II. 1883-84. An Epigraphical Journey in Asia Minor, pp. vii., 344, and 11. Vol. III. 1883-84. The Wolfe Expedition to Asia Minor. By J. R. Sitlington Sterrett, PH.D., pp. vii., 448, and 11. Berlin [U.S.] Damrell and Upborn, 1888.

Although these two volumes are mainly of an archæological character, still there are numerous geographical details, and the maps especially which show the travellers' routes, and which have been worked out by Kiepert, are of original value, and indeed, at the present, the only satisfactory maps of the region with which they deal.

Ferry, Jules.—*Le Tonkin et la Mère-Patrie.* 2me édition. Paris, Victor-Havard, 1890: 12mo., pp. 406.

Hosie, Alexander, M.A.—*Three Years in Western China; a narrative of three journeys in Ssu-ch'uan, Kwei-chow, and Yün-nan.* With an Introduction by Archibald Little. London, George Phillip & Son, 1890: 8vo., pp. xxxiv. and 302. With map of South-west China and 8 full-page illustrations. Price 14s. [Presented by the Publishers.]

The author of this important work is not only singularly fortunate in the time of its appearance—coinciding as that does with the conclusion of an agreement between our Government and that of Peking which raises Ch'ung-k'ing to the rank of a treaty port, and throws open to Western nations the trade of the regions that he describes—but also in having accomplished what he set himself to do with such marked ability and success. So complete and interesting, in fact, is the information given by the author of the regions that he traversed, as fully to justify the high praise bestowed upon it by Mr. Archibald Little, who, in his admirable introductory chapter to the work, says: "To those who go to Szechuen to take their part in this new development, alike with those at a distance whose curiosity is awakened, and who wish to know what 'the opening of Ch'ung-k'ing' really means, Mr. Hosie's book will serve as a guide and an explanation. Few visitors to Western China have enjoyed Mr. Hosie's opportunities; and none have used their opportunities to better advantage in accumulating information for the benefit of those who come after them in the same field, as well as for the instruction and entertainment of the world at large."

The Chefoo Convention of 1876 having provided that our Government might send officers to reside at Ch'ung-k'ing to watch the condition of British trade in Ssu-ch'uan, Mr. Hosie was despatched in the latter part of 1881, to take up his consular post at that city; from which as a centre he made his various journeys,

north, south, and west, occupying a period of 252 days, and covering a distance of over 5000 miles.

The first journey was commenced on April 19th, 1882, when, leaving Ch'ung-k'ing, the author proceeded due south to Kuei-yang Fu, the capital of Kuei-chou, which was reached on May 5th. Opium-collecting, fish-hatching, wood-oil pressing, paper-making, silk culture, rice-paper shaving, and the preparation of coal-dust as fuel are described. Kuei-yang Fu lies in a plain, and is surrounded by a white wall. The shops are described as large, and the streets fairly broad and crowded. A start was made on May 7th in a south-westerly direction for Yün-nan Fu, which was reached on the 27th. It was on this journey that the author met with the white-wax insect, to which subject a separate chapter is devoted later on. He also passed through a part of the province where the Chinese have been endeavouring to exterminate the Miao-tzu, and noticed that the villages had a non-Chinese type, the walls of the houses being built of loose stones, and very thick, while the roofs were composed of broad stone slabs. After a rest of four days at Yün-nan Fu the author quitted the capital, and proceeded in a northerly direction through the province of Yün-nan to the Nan-kuang river, which he descended to its junction with the Yang-tze at Hsi-chou Fu, and proceeded down the latter river back to Ch'ung-k'ing, which was reached on June 28th, having been sixty-eight days on the route.

The second journey occupied 124 days, and leaving his headquarters on February 11th, 1883, the author proceeded in a westerly and north-westerly direction to Ch'ang-tu Fu, the capital of Ssu-ch'uan. It is described as a splendid city, and without exception the finest one that he had seen in China, Peking and Canton not bearing comparison with it. It is placed 1500 feet above the sea, and is surrounded by an excellent wall about 12 miles in circumference. The streets are fairly broad, paved with stone, clean, and in excellent repair, at least in the Chinese quarter; and altogether the city seems worthy of being the capital of the largest and richest province of the empire. Thence Mr. Hosie turned in a south-westerly and southerly direction past the Lolo country, and the city of Ning-yün Fu, across the Ya-lung river, and on to Chin-chiang-kai on the left bank of the Yang-tze, or, as it is there called, the Kin-sha-Chiang, crossing which he proceeded to Ta-li Fu, the beautiful capital of Western Yün-nan. Excellent descriptions are given of the process of making grass-cloth; of the working of the celebrated brine-wells, and the manufacture of salt; the making of brick-tea; the Lolos, and the city of Ta-li Fu. From this latter place he proceeded in a westerly direction to Yün-nan Fu, and thence in a northerly direction through the provinces of Yün-nan, Kuei-chou, and Ssu-ch'uan to the Yung-ning river, and back by the Yang-tze to Ch'ung-k'ing.

The third journey was made in 1884, and occupied sixty days. It was undertaken for the purpose of collecting information about the white-wax insect culture for the authorities at Kew Gardens. Leaving his headquarters on June 2nd, he travelled northwards on the west of the Kia-ling river to Ho-chou; thence westerly to the city of Chia-ping Fu; and thence south to Man-li-szu on the Yang-tze, and back by that river to Ch'ung-k'ing.

A portion of the author's second journey, viz. that from Ning-yuan to Ta-li Fu, was given by him in a lecture read before this Society on February 22nd, 1886, and published in the 'Proceedings' for June of that year.—[M. B.]

[Japan].—Handy Guide Book to the Japanese Islands. London, Low & Co., pp. xi. and 152, maps. Price 6s. 6d.

This is mainly a route book which will prove useful as an accompaniment to Mr. Satow's 'Handbook for Japan.'

Journal of the Straits Branch of the Royal Asiatic Society. [No. 20.] 1889. Singapore, printed at the Government Printing Office: 8vo., pp. xviii. and 212.

This Part contains the following papers:—Report on the Destruction of Coco-nut Palms by Beetles, by H. N. Ridley; British Borneo: Sketches of Brunai, Sarawak, Labuan and North Borneo, by W. H. Treacher; Notes on Names of Places in the Island of Singapore and its Vicinity, by H. T. Haughton;

Journal of a Trip to Pahang, &c., by W. Davison; A List of the Birds of the Bornean Group of Islands, by A. H. Everett, c.m.g.i. There are two maps, one of Borneo showing roughly the distribution of highlands and lowlands; the other of Palawan and adjacent islands. On each of these maps are indicated the localities at which collections of birds have been made.

Kinloch, [Colonel A. A. A.]—Large Game Shooting in Thibet, the Himalayas, and Northern India. Calcutta, Thacker, Spink, & Co.; London, W. Thacker & Co., 1885: 4to., pp. vi. and 237.

Consists of a collection of photographs, with descriptive letterpress, of most of the large game to be met with in Northern India, including Thibet, Kashmir, and the slopes of the Himalayas. Although the volume is mainly devoted to sport, some useful notes on the geography of the country visited will be found in Chapter I. The chief feature of the volume is the magnificent illustrations, which are really life-like representations of the animals they are intended to portray; these are accompanied with general descriptions of the beasts and of the districts they inhabit, together with notes on their habits, and natural history gathered from personal observation. At the end of the volume will be found some notes on tents, camp equipment, rifles, &c., together with simple directions for the preservation of natural history specimens; a map, showing all the routes of the author, is also appended.

Loftus, [Capt.] A. J.—A New Year's Paper on the Development of the Kingdom of Siam. 1890: 8vo., pp. 29, map. [Presented by the Author.]

Maximovicz, C. J.—Nautchniye resultatii puteshestvii N. M. Prjevalakago. (Scientific Results of the Central Asian Travels of N. M. Prejevalsky.) Vol. i. Flora Tangutica, Part i. with 31 plates. Vol. ii. List of the Plants of Mongolia and neighbouring part of Chinese Turkestan, Part i. with 14 plates. St. Petersburg, 1889: large 4to.

These are the first instalments of the great work upon which M. Maximovich has been engaged for several years on the botanical results of Prejevalsky's journeys in Central Asia. It is published at the cost of a special fund assigned for the purpose by the Emperor, and is, as one might expect, superbly illustrated. The introductory matter, in Russian and Latin printed in parallel columns, contains some general remarks of interest on the regions comprised in these travels, and on some peculiarities of climate, with their resultant effects on the flora. In the part relating to Mongolia the collections of Potanin and Pissetsky have been utilised. The work is of course purely botanical.—[E. D. M.]

[**Palastine.**]—Le Voyage de la Terre Sainte composé par Maitre Denis Possot et achevé par Messire Charles Philippe, 1532. Publié et annoté par Ch. Schefer, Membre de l'Institut. [Recueil de Voyages et de Documents pour servir à l'Histoire de la Géographie depuis le XIII^e jusqu'à la fin du XVI^e siècle, publié sous la direction de MM. Ch. Schefer et Henri Cordier. XI.] Paris, E. Leroux, 1890: large 8vo., pp. xv. and 350. Price 25s.

Illustrated with a series of reproductions of maps and engravings of the 16th century, including views of Chambéry, Venice, Jaffa, Ramleh, Interior of the Church of the Holy Sepulchre, Chapel of Calvary; and maps of the islands of Cyprus, Corfu, and Nicarie.

Proskowetz-Marstorff, Dr. Max Ritter v.—Eine Fahrt nach Russisch-Asien. Vortrag, gehalten in der Monatsversammlung der K. K. Geographischen Gesellschaft zu Wien am 28. Januar 1890. Wien, 1890: 8vo., pp. 28.

Recueil de Textes et de Traductions publié par les Professeurs de l'École des Langues Orientales Vivantes à l'occasion du VIII^e Congrès International des Orientalistes tenu à Stockholm en 1889. 2 vols. [Publications de l'École des Langues Orientales Vivantes, III^e Série—Vols. V. and VI.] Paris, E. Leroux, 1889: large 8vo., pp. (vol. i.) xii. and 382; (vol. ii.) 436, facsimiles. [Presented by the French Minister of Public Instruction.]

— ditto, South Dakota. Scale 1:550,000 or 7·5 geographical miles to an inch. Rand, M'Nally & Co., Chicago, 1890. (*Stanford.*)

These maps belong to an excellent series in course of publication by Rand, M'Nally & Co., of Chicago and New York. By means of symbols attached to the names of places, a large amount of information is given that cannot fail to be of service to persons travelling either on business or for pleasure. With the assistance of the index that accompanies some of these maps, the nearest mailing point to any place on the map, and the name of the express company doing business there, the position of the most convenient telegraph station, and other items of information, can easily be found. The maps are clearly drawn, particular care having evidently been taken to lay down the railway system correctly.

Washington.—Sectional Map of —. Scale 1:1,500,000 or 15·7 geographical miles to an inch. Rand, M'Nally & Co., Chicago, 1890. (*Stanford.*)

In addition to the State of Washington, this map includes the Cœur d'Alene mining district in Idaho, and the district traversed by the railway on Vancouver's Island. All railways in operation and under construction, important wagon roads and ferries, post offices, Indian and military reservations, mining districts, passes, &c., are shown. The materials used in the compilation of this map are results of official surveys and field notes supplied by Mr. C. H. Amerine, c.e., of Spokane Falls.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in May and June 1890.

No.		Inches.	
2631	} m =	10·0	{ England, south coast:—Portsmouth harbour (2 sheets), 5s. and 3s. 6d.
2681a			
1372	m =	0·3	Spain, south-east coast:—Cartagena to cape San Antonio, 2s.
1556	m =	0·67	Mediterranean, east coast of Greece:—Gulf of Volo with Oreos and Talanta channels, 3s.
1408	{ m =	2·0	Canada, Lake Huron:—Collingwood and its approaches. Collingwood harbour, 1s. 6d.
	{ m =		
1396	m =	4·0	South America, east coast:—Parahyba river, 1s.
1156	m =	4·0	South America, north coast:—Nickerie river approaches, 1s.
666	m =	6·0	Africa, east coast:—Port Mombasa, with ports Kilindini, Reitz, and Tudor, 3s.
756	m =	4·0	Bay of Bengal, Orissa coast:—Entrance of the Mahanadi river. Entrance of the Dévi river, 2s.
1898	m =	0·75	Bay of Bengal, Andaman islands:—Port Blair to Little Andaman island, including Duncan passage, 2s. 6d.
1416	m =	various	New Guinea:—Anchorages on N.W. coast—Boni harbour. Kabobolol strait. Patippa bay. Segaar bay, 1s. 6d.
2035	m =	2·0	New Zealand, North island:—Coromandel harbour.
1414	{ m =	2·6	Solomon islands:—Utuba harbour or port Purvis. Sio harbour. Waisissi or Royalist harbour, 2s.
	{ m =		
	{ m =		
2221			Black sea plans:—New plan, Theodosia (Kaffa).

(*J. D. Potter, Agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
2631	Portsmouth harbour	New plan, Portsmouth harbour, 2 sheets	2631 2631 α
1556	Gulf of Volo	New chart, Gulf of Volo, with Oreos and Talanta channels ..	1556
1554 α	Talanta and Oreos channels ..		
678	Plan of Collingwood harbour on this chart	New plan, Collingwood harbour on this chart	1408
407	Plan of Collingwood harbour on this chart		
528	Plan of Parahiba river on this chart	New plan, Parahyba river	1396
1156	Nickerie river approaches ..	New plan, Nickerie river approaches	1156
666	Island and ports of Mombaza ..	New plan, Port Mombasa, &c. ..	666
756	Entrance of Mahanadi river ..	Entrance of the Mahanadi river. Entrance of the Dévi river ..	756
	Entrance of Davey river		
2035	Coromandel harbour	New plan, Coromandel harbour ..	2035

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1598. English channel. 1123. British islands:—South coast of Ireland to Land's end. 1887. North sea:—Eider river to Blaavand point. 2842 α . Baltic sea:—Western part. 2842 β . Baltic sea:—Eastern part. 2360. Baltic sea:—Cape Falsterbø to Kalmar sound. 2362. Baltic sea:—Landsört to the gulf of Bothnia. 2364. Baltic sea:—Lübeck bay and Femern belt. 2365. Baltic sea:—Rostock to Arkona light. 2366. Baltic sea:—Arkona to Dievenow river. 2367. Baltic sea:—Dievenow river to Jershof light. 2368. Baltic sea:—Jershof light to Rixhöft light. 2369. Baltic sea:—Rixhöft to Brüster-ort. 2370. Baltic sea:—Brüster-ort to Memel. 74. Spain, north coast:—Portugalete and Bilbao. 2711. Adriatic sea:—Cape Promontore to Grossa island. 2233. Black sea:—Sevastopol to Kertch strait. 352. North America, east coast:—Bay of Fundy. 2539. Bay of Fundy:—Grand Manan island. 1551. Bay of Fundy:—St. John harbour. 791. West Indies:—St. Vincent. 1638. Gulf of Mexico:—Breton sound to Dernière island. 2853. Gulf of Mexico:—Mississippi sound and Mobile bay. 1421. Africa, east coast:—River Chinde. 1353. Malacca strait:—Diamond point to North sands. 2761. Sumatra:—Tyingkok bay to the strait of Sunda. 942 β . Eastern Archipelago:—Eastern portion. 452. Japan:—Yezo island. 1704. Australia, north coast:—Adam bay and Adelaide river entrance. 2764. Australia, east coast:—Coral sea and great Barrier reefs. 2766. New Guinea:—North-east coast of New Guinea.

(*J. D. Potter, Agent.*)

French Charts.—No. 4321. Cours de la Loire depuis Nantes jusqu'à son Embouchure. Côte Occidentale de France.—4333. Cours de la Charente. Côte Ouest de France.—4373. Côte Ouest de France de la Pta. de Corsen à St. Mathieu. Partie Sud du Chenal du Four. 1889.—4350. Rivières de Monkay et de Shuk-San. Mer de Chine. Golfe du Tonkin. 1888.—4319. Baie de Van-Fong, Hon-Kohe, Bing-Koi, Port Dayot. Mer de Chine, Annam. 1889.—4338. Mouillage de Sidi-el-Reïa. Tunisie. Golfe de Tunia. 1889.—4378. Baies Ampamonty et Ampasindava. Côte N.O. de Madagascar. 1889.—4372. Mouillages à la Côte N.O. de Madagascar. Rivière Baramahamay. Baie Andranoaomy. 1889. Service Hydrographique de la Marine. Paris.

North Atlantic Ocean.—Pilot Chart of the —, July 1890. Published by the U.S. Hydrographic Office, Washington, D.C. Captain H. F. Picking, U.S.N., Hydrographer.

— Karte des Salzgehaltes an der Oberfläche des Nordatlantischen Oceans. Auf Grundlage der Beobachtungen von Lentz (1823–26), Buchanan (1873–76–86), v. Schleinitz (1874–76), Hamberg (1883), Thoulet (1886), sowie eigener Untersuchungen während der "Plankton-Expedition" (1889), gezeichnet von Prof. Dr. Otto Krümmel. Netzentwurf nach Postel im Massstab 1:27,775,000 or 380 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 13. Gotha, Justus Perthes. (*Dulau.*)

Pacific Ocean.—Unfreiwillige Wanderungen im —. Entworfen und gezeichnet von Otto Sittig. Scale 1:40,000,000 or $9\frac{1}{4}$ to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 12. Gotha, Justus Perthes. (*Dulau.*)

Portuguese Charts.—Carta da Ilha de S. Thiago (Cabo Verde). 1890. Scale 1:100,000 or 1.3 geographical miles to an inch.—Plano hydrographico da Bahia do Tarrafal. Ilha de S. Thiago. 1890. Scale 1:5000 or 14.6 inches to a geographical mile.—Plano hydrographico do Fajão d'Agua. Ilha Brava. Archipelago de Cabo Verde. 1890. Scale 1:5000 or 14.6 inches to a geographical mile.—Reconhecimento hydrographico da Foz do Pungue. Provincia da Moçambique. 1890. Scale 1:120,000 or 1.6 geographical miles to an inch. Ministerio da Marinha e Ultramar. Comissão de Cartographia. Lisboa.

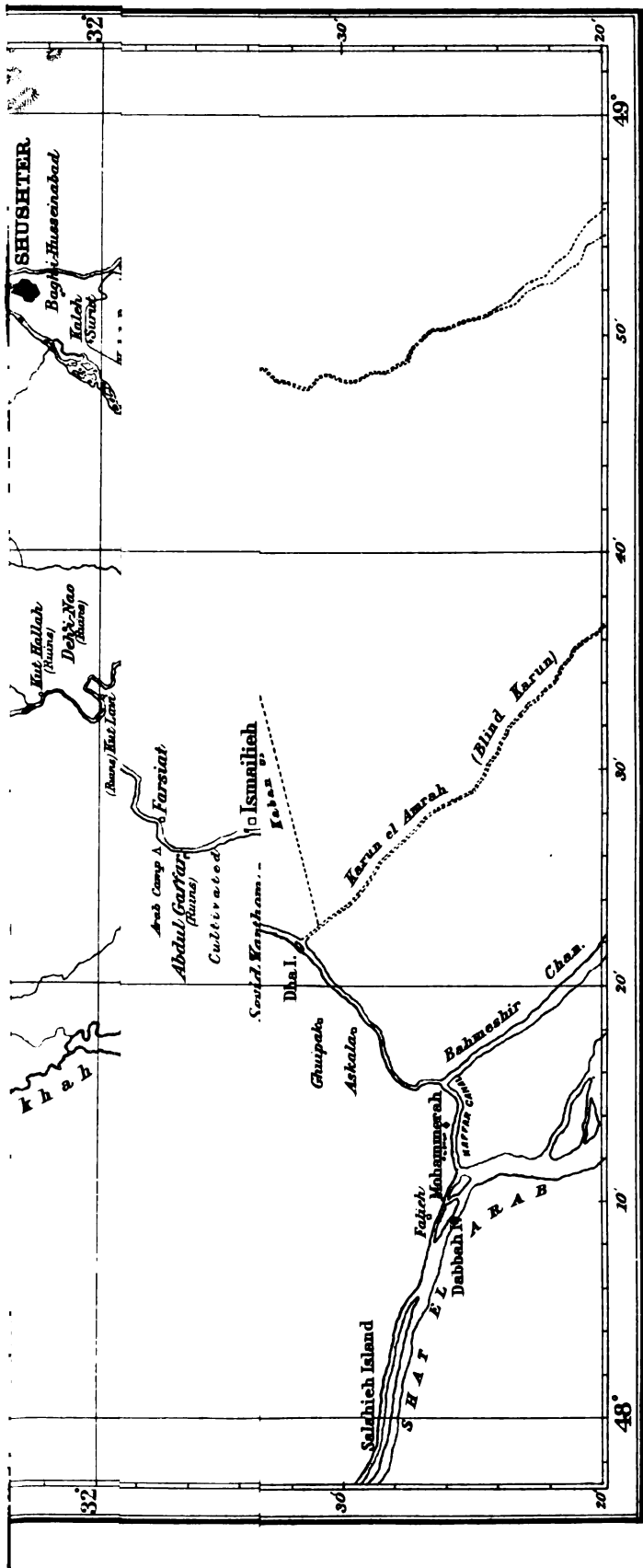
ATLASES.

Hachette et Cie.—Atlas de Géographie Moderne, édité par —. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, figures, diagrammes, etc. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Hachette et Cie., 1890. Part 17, containing Planisphère Politique, Bassin de la Méditerranée, and Asie Politique. Price 10*d.* each part. (*Dulau.*)

Stieler's Hand-Atlas.—Neue Lieferungs-Ausgabe von —. 95 Karten in Kupferdruck und Handkolorit, herausgegeben von Prof. Dr. Herm. Berghaus, Carl Vogel und Herm. Habenicht. Erscheint in 32 Lieferungen (jede mit 3 Karten, die letzte mit 2 Karten und Titel). Vierundzwanzigste (24) Lieferung. Inhalt: Nr. 6, Nord-Polar-Karte, Breiten-Massstab 1:20,000,000 von H. Berghaus. Nr. 40, Ireland in 1:1,500,000 von A. Petermann. Nr. 64, Ostindische Inseln in 1:12,500,000 von H. Berghaus. Gotha, Justus Perthes, 1890. Price 1*s.* 6*d.* each part. (*Dulau.*)

PHOTOGRAPHS.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.



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*Lieutenant H. B. Vaughan's recent Journey in Eastern Persia.**

By Major-General Sir FREDERIC GOLDSMID, C.B., K.C.S.I.

(Read at the Evening Meeting, March 10th, 1890.)

Map, p. 648.

AN interesting journey through Persia—or from Lingah, a port on its southern or sea boundary, to Semnán, a town near its northern frontier, and again from Semnán to Bájistán in the east—has recently been accomplished by Lieut. Vaughan, an officer in the 7th Bengal Infantry. His narrative has been forwarded to the Royal Geographical Society; but as it is in the itinerary form, and of considerable length, it has been, under the Society's instructions, and in the author's absence, entrusted to me to be prepared for reading. In now putting the substance of the paper before you—though I may venture an occasional remark of my own—it will be my endeavour to make very constant use of the young traveller's own words.

It will simplify the matter to consider the exploration accomplished (i. e. 1164 miles, omitting minor excursions) in three divisions:—Lingah to Yezd, a distance of 418 miles, occupying, inclusive of halts, about 2½ months, or from the 17th December to the 3rd March—Yezd to Semnán, 370 miles, occupying 24 days, or from the 30th March to the 23rd April—and Semnán to Bájistán, 376 miles, performed in one month and 12 days.

Arriving from Karáchi at Lingah, south-west of Bandar Abbas, on the 13th December, 1887, Lieut. Vaughan started on foot for the interior of Persia on the 17th of that month. The outfit he had organised consisted of one forty-pound tent (Kabul pattern), one camp table, bed and chair, a lantern, a box of clothes, and box of surveying instruments, medicines and drawing materials, a saddle, rifle, and two revolvers, and a roll of bedding strapped up in a waterproof sheet with an air pillow.

* Adapted from the original MS. narrative, which will be published in "Supplementary Papers," vol. iii.

His baggage and other essentials were loaded on six donkeys, and his followers consisted of one "Arab servant who acted as interpreter, cook, and everything else," and four musketeers sent by the Governor, to show him the road, and, as he quaintly attests from after experience, to "consume the greater part of my provisions."

The first day's march, a short one of $8\frac{1}{2}$ miles over a gravelly soil with scant vegetation, brought him to a hut amid date trees. Thence, on the second day, passing the village of Meirakum, the surroundings of which (though itself possessing 200 inhabitants, a little wheat cultivation, and large date plantations) are described as "very desolate," he pushed on to Champeh, a village of about 20 houses, "small square buildings with roofs formed of small domes, and constructed almost of sun-dried bricks." On the third march he ascended, over gently sloping ground, towards a high and barren range of hills skirted the previous day. His progress was somewhat impeded by the many and large boulders strewn across his path; but moving up a narrow ravine, down which flowed a stream with salt-encrusted banks, and climbing a steep ascent, he reached a watershed at an elevation of some 1960 feet, putting up for the night at a *Hauz*, or large brick rain-supplied cistern by the road side. From this spot, described as the summit of the hill range, Lingah Peak, its highest point, was seen to rear "its yellow mass against the blue sky." On the day following, descending into a valley between "precipitous barren peaks," and moving down the bed of a dry stream amid wild and desolate surroundings, he reached a salt-water river flowing south-west. Crossing this, and traversing broken ground between high hills, he alighted at the Caravanserai of Din, situated at an elevation of some 1400 feet, "a small and filthy stone building, crammed with fleas." The fifth march took him up a valley "intersected by walls of rock 20 to 60 feet high, and 3 or 4 feet thick running north and south, some blue, and others reddish brown, while between them often intervene gravelly hills whose sides they support." Then, ascending a rocky ravine amongst tufts of Indian grass, he halted on a low watershed elevation of about 1850 feet. Of this stage of his journey Lieut. Vaughan remarks: "east, south, and west the country behind us is simply one mass of hills as far as we can see, and their general direction east and west. The road now descends gently by a winding stony track for one mile, when it enters amongst hills and broken ground which simply baffle all description. Down along dry water courses, then down the steep sides of cliffs by narrow pathways, along ravines whose towering rocky sides overhang the road." After three miles he reached the bank of the salt river Maheyran (flowing east), the bed of which is 600 yards wide, with a breadth of slowly running water 20 inches deep, varying from 15 to 40 yards. Its left bank, 30 feet in height, is "composed of a mass of rounded boulders of all sizes in a packing of hard sand and gravel." Having ascended this, he

came upon the Caravanserai of Maheyran. Two marches further north brought him to Bastak, situated in a mountain-enclosed plain, 4 miles long from east to west, and 3 miles broad from north to south, and chief town of a district estimated to contain no fewer than 15,000 inhabitants, all of whom are Sunni Muhammadans. Meanwhile he had glanced at the village of Kukhird,* the inhabitants of which, noted as being "very polite, but awfully inquisitive," remarked that he was the first European that had visited the place: also, when descending from the hills upon the plain of Bastak, he had observed a pillar of masonry about 7 feet high perched on the side of a rock. Climbing up to this last object, and looking through an opening formed by dislodged stones, he saw the skeleton of a man with shrivelled dried-up flesh still adhering to it—since ascertained to be the remains of a highway robber, who had been bricked up, as a punishment for his crimes. On the road a large town called Jena was noticed, at a distance of five or six miles.

Lieut. Vaughan thus relates his arrival at Bastak:—"At the outskirts of the town I was met by a *tufangchi* (musket-man) of the Governor's who conducted me to Government House. As I passed through the streets the discharge of cannon reverberated through the air, amid the acclamations of the people. This was not on my account, but owing to a *khilat* (robe of honour) having been sent to the Governor of the town by the chief Governor of the province, Fath-Ali-Khan of Lar." In accordance with custom on these occasions, to receive the gift with due honour, the recipient "rides out of the town surrounded by his soldiers, and as soon as the messengers bearing the coat appear in sight, he dismounts from his horse, and advancing humbly on foot under a salute of cannon and muskets, is duly robed therein."

Of the town and its inhabitants he writes:—"Seen from the heights above it presents a most picturesque appearance, being surrounded by green fields and large plantations of date-trees. . . . There is no bazaar, the place being decidedly unsettled, and subject to occasional inroads of wandering and hostile tribes. Two months ago the brother of the present khan was murdered in the streets of the town while on his way to the mosque to pray. The murderer was another brother, who wished to become khan himself. The inhabitants are a fine and hardy race of mountaineers."

After a couple of days' halting at Bastak, our traveller resumed his march, and on the fourth day arrived at the village of Hormuz.† The road was for the most part a dreary one, and the incursions of marauding Arabs were a source of dread to the inhabitants of the one or two villages through which it passed. At one time it reached an elevation of 2450 feet; the watershed forming the boundary between Lar and Bastak was at 1700 feet. The Kuh-i-Hormuz observed on the right

* Lieutenant Vaughan's spelling is retained for little-known places.

† Marked in St. John's map.

hand was shown to be the western termination of a range of mountains running east for 12 or 14 miles. Of Hormuz itself we are told that from the ruins around it must once have been a much larger place. The hills on its north side contain sulphur and large quantities of iron. "Ibex, wild sheep, partridges, and sand-grouse abound."

Owing to the reports of conflict between the Arabs and Persians in Dáráb, and the consequent insecurity for travellers, the first three days of the new year were spent at Hormuz. On the 4th a start was made, and six days later the town of Forg was reached; but extra precautions had to be taken against marauders, such as forced marching, a constant look-out by day, and sentry posting at night; while much excitement was caused in the small camp by the passage before it of some 500 Arabs during the dark hours, as well as the discovery, in the sunlight, of camels grazing in an unusual place.

Lieutenant Vaughan bears honourable testimony to the usefulness of his escort when he says that, "although they are only villagers, they seem well up in military knowledge, and while on the march always throw out an advance guard and flankers of their own accord. The head man has a small toy telescope, which he is immensely proud of, and constantly brings into use."

The country traversed was much as before—mountains and plains, with a salt-water river, but scant vegetation. Before the descent to the village of Fadumi the watershed crossed was at an elevation of 3750 feet. On the 10th January the diary states:—

"After twenty hours' incessant rain, which I was supposed by the inhabitants to have brought with me, I left the village, and skirting the Shur river (flowing south-east) for $3\frac{1}{2}$ miles, we came upon a ford, and succeeded in crossing its swollen waters with some difficulty. The water was salt, intensely cold, and flowing rapidly. After going half a mile up its banks, we reached the point where the fresh-water river of Forg joins it, coming down through a narrow valley, up which we proceeded between barren rocky hills. The river is almost hidden by long rushes, which shelter the wild boar and other game. After travelling eight miles, we emerged on to the Forg plain, covered with cultivation and studded with hamlets, and at $10\frac{1}{2}$ miles entered the town of Forg."

A halt of nearly four weeks, occasioned by the set-in of excessively cold weather, and the necessity of replacing broken thermometers in communication with Shiraz, was made available for shooting and exploring excursions in the neighbourhood. I take advantage of the same opportunity to remark that at this particular stage of his journey Lieutenant Vaughan had come upon the track of other travellers. Among the more recent may be mentioned Mr. Preece, who visited Forg in 1884; but I had rather compare the account now received of the place with that of M. Dupré, an intelligent Frenchman, in 1808, or at the commencement of the present century. This traveller, estimating the

population as under 2000, states that there are but few shops, in which nothing is sold but fruits and cotton stuffs brought from Lar or Kerman, but that cotton cloths are manufactured there and dyed in blue. The fields, he adds, are irrigated by the waters of a mountain stream, and yield wheat, barley, rice, and cotton, the surplus of which is sent to Lar to be exchanged with iron, lead, and fire-arms.

Lieutenant Vaughan's account of Forg makes it "a walled town in a very dilapidated condition, containing about 150 people. The total population of the plain does not exceed 500." It is "governed by a Naib, a nephew of the Khan of Lar. Corn, barley, and opium are grown there."

In d'Anville's map there is an indication, in this immediate neighbourhood, of a "Château du Roi Bahman," of which M. Dupré takes note. He describes it as a partly ruined castle, flanked with towers, built by King Bahram,* and states that Abdullah Khan, the governor of Laristán at the time of his writing, having revolted against Agha Muhammad Shah, shut himself up there. But the fort having been taken, the rebellious chief escaped by flight, and had received his pardon at the hands of Agha Muhammad's successor, Fath-Ali-Shah. Now after a lapse of eighty years, Lieutenant Vaughan writes at Forg:—"There are some fine ruins in the neighbourhood, one called Kaleh Bahman, an ancient fortress perched on the top of a low detached ridge. On the side from which we approached it the ground rose gently towards the summit, and was enclosed by several lines of masonry walls flanked by round towers, all, however, in the most ruinous condition. Near the summit was a cavern, in the centre of which was an immense well, sunk through the solid rock, whence the garrison used to draw their supply of water, the well being filled from a subterranean channel conducting a stream to it from outside. The walls in many places were 15 feet thick. On the further side the ridge terminated abruptly in a precipice of 80 or 100 feet. These ruins and the remains of extensive aqueducts show what a prosperous place Forg must have been in ancient days. To the west are other ruins."

Our traveller had now accomplished a distance of 190 miles from Lingah, and had done his work on foot. It was natural that he should seek some less arduous mode of procedure. Declining an invitation from the local authority to join in a tax-collecting expedition, he bought a horse, and took a Dervish into his service as groom—the last an act of somewhat doubtful expediency, which he shortly after had reason to regret. The man, we are told, was at first "rather amusing, as he used to sing, and act the part of a Dervish asking alms and giving his blessing, but one got tired of this."

* This is probably the correct name, Bahman being identified with Artaxerxes Longimanus; whereas there were many Bahrams (Vahrahmán) of the Sasánian dynasty who lived in the centuries after our Lord.

The first of two marches from Forg to Rosak was rough and toilsome—at one time up a dangerous ascent, at another along a narrow ledge of rock, with an overhanging, perpendicular cliff on the left, and a torrent roaring beneath on the right. An encampment of nomads in the valley beyond a high watershed was the night's halting place. The second march passed over a second watershed, from which was obtained a fine view of the high snow-clad peaks of the Forg range, and across a plateau, to some hundred tents of nomad Persians. I am unable to say whether these last represent the Rosak of Mr. Preece, which he describes as "a village of 100 houses and 300 inhabitants," but they certainly do not correspond with the Rostak of M. Dupré, a "misérable village entouré de murs, dont le riz et le blé sont les seules productions." Yet the geographical position appears to be much the same in all three instances; and it is not improbable that one signifies the fixed, the other the movable habitations. The elevation attained on the road is recorded as between 5000 and 6000 feet.

Two more marches lead over a spur of the Kuh-i-sang Atash, among nomad camps, and by the head-quarters of a tribe of Persian Iliyáts to the Fort of Tul Halal, situated on an extensive sandy plain somewhat out of the beaten track. Of the Iliyáts or wandering tribes, whom he met at Gulu Kuh, under their head man Amir Kuli Khan, Lieut. Vaughan gives the following interesting particulars:—

"The people are a rough lot, and very different in their manners to the more refined men of the upper class met with in cities. One of their tents near that of the Khan, whose guest I was during my stay, was assigned to me on arrival. They possess immense herds of sheep and goats, and during the cold weather encamp on the plains in the vicinity of wells and springs. When the grass in the neighbourhood becomes exhausted, they strike camp and move to another spot. In the heat of summer they reside in the hills and think nothing of moving several hundred miles from summer to winter quarters. Each tribe has certain recognised grazing grounds, and it is regarding these that most of their disputes arise. The women go about unveiled, and are allowed far more freedom than those who dwell in cities. In this respect, however, the customs of tribes vary.

"Some of them will receive a traveller in the most friendly manner, while others (some of the worst of the marauding Arabs) will murder him on the first opportunity that may present itself. The tribes of Fars which bear the worst repute in this respect are the Bhaloos and the Arabi Iliyát. I noticed that when we came upon a camp of the latter, though in broad daylight and within sight of a town, my escort were very anxious to pass them as rapidly as possible. I believe the one reason why they are so untrustworthy is that, owing to their wandering mode of existence, it is very hard to prove anything against them; as they may be in a place one day and miles away the next. A great part

of the population of Persia is nomad. Their herds supply most of their wants; it is from the goats' hair that their black tents are woven, and their ropes twisted. Their overcoats, caps, and carpets are made from the wool of their sheep; while their saddles, gaiters, accoutrements, and often shoes, are made from their skins.

"They always seemed most devoted to their chiefs, whose power over them is almost absolute; and though respectful in salutation and other outward forms, even the raggedest and dirtiest of them would talk to a Khan with great freedom."

A disagreeable incident disturbed the traveller's equanimity of mind, and slightly changed his plans on his way to Tul-Hulal. Having allowed his baggage to precede him by some hours, when he came up with it, he learnt that his newly enlisted servant, the "Dervish," had decamped, taking with him a gun and most of the money which had been packed in the boxes. No clue to detection could be afforded by muleteer or musketeer, who knew nothing on the subject; and all that either professed to have seen was the culprit lagging behind on one of the mules. When the animal overtook them, it was minus the rider. To seek redress, however ineffectively, was a natural impulse; and for this purpose a *détour* to Nîris became necessary. What was the result of his reference to the Khan is not apparent. But my own experience does not tend to the belief that he could have obtained very full satisfaction for the loss of time and money, and other inconveniences experienced.

It had been the traveller's intention to proceed to Beshna, shown in Sir Oliver St. John's map as about half way in a direct northerly line from Lingah to Yezd. Now, however, instead of this, he turned westward, and marching for two days along the foot of a snow-capped rocky range, designated Kuh-i-Kibla, and leaving on his right an extensive swamp (that probably marked *Kavir* by St. John) he passed through Katru to Nîris. The latter place is known to many travellers of the present day—among them three officers of the Royal Engineers, St. John, Lovett, and Wells. It has been before described, and has a reputation not only from its lake and surroundings, but as the residence of Bâbis. From Nîris he recrossed the mountain ranges which lay between him and the point whence he had diverged from his direct road, and in two days was at Beshna, a village situated between low hills, among which its inhabitants graze their flocks.

Leaving Beshna on the 20th he reached Robot on the 23rd February, the ground traversed in his three marches being comparatively level, yet occasionally rising and falling in gentle undulations. To the east was a vast open plain, stretching out to the Kuh Parhiz of St. John's map (perhaps somewhat misplaced), beyond which again is the great range which runs from Yezd to Kerman. To the west the country was stony and undulating, with low hills at times observable. Halting-

places were found at Chah Alum and Chah Nain—apparently, from their names, wells dug for wayfarers in a desolate and little-frequented tract. Robot is described as a ruinous village (of some 150 people), the last stage to which led across a sandy, and, in places, swampy plain. It is marked in the map as on the road from Shiráz to Kerman, via Shahr-Babak. The recorded elevation is about 6700 feet.

There is not much to relate as regards the nine marches which remained for the small party before entering the city of Yezd. At Charbagh, a hamlet supposed to be uninhabited, they came upon a party of men sitting round a fire, who decamped, and left behind them a sheep ready for cooking. At Khavre they found a village of some 70 houses situated in a valley at an elevation of 7510 feet. To reach Merao, a wretched-looking hamlet constantly plundered by robbers, they ascended over a watershed between low hills 8000 feet high. On the fourth march, which brought them to a waterless halting place at Kuh Dukaru, they passed two hills of curious appearance on their right—*Kuh-i-Aag bálá* (upper) and *Kuh-i-Aag páian* (lower)—both evidently extinct volcanoes. The muleteer declared that they were caused by a giant shaking the dust out of his shoes; adding, that if he were not believed, an inspection of the hills would confirm the truth of his assertion, and show that they were formed of nothing but soft earth which gave under the visitor's foot. The fifth stage over a desert plain was a long one, 31½ miles to Kalweh, a small fort with but one inhabitant. The animals had gone more than 50 miles without watering, and suffered greatly from thirst; so that here a day's halt was held requisite. During the last march the great range south of Yezd was crossed; the watershed elevation being estimated at 6360 feet. On the 1st March progress was made as far as a garden called Husainabad. Should this be identified with the spot so named in St. John's map, it would seem to have been placed too far to the westward; and the seventh march to Muhammadabad, passing Sari Yezd at a short distance on the right, tends to confirm this impression. These two places were visited by me in the winter of 1865 and 1870, when leaving the city of Yezd for Kerman, so that we are no longer in an unexplored region. Yezd itself was the short eighth march of Lieut. Vaughan from Robot. As that officer remarks, this town is already well known, but although on that account his description of it is but brief, a passage or two may be found appropriate:—

“It is a fine city containing a population of between sixty and seventy thousand souls, and is the capital of the district of the same name. There are several fire-temples in the place, though mostly concealed from view. A curious feature here is the great number of wind towers; these are high square erections, rather top-heavy, and resembling an old fashioned kitchen clock with the face knocked out, through which the wind pours down into the lower rooms of the houses, and keeps them

cool during the summer months, when the heat is so great that many of the people live altogether in subterranean apartments. Others who can afford to leave their business retire to their summer houses on the Shir Kuh, and there pass the summer. The bazars, which are roofed in, are very extensive and well stocked. There is a very fine old mosque called the 'Juma Masjid' in the city, whose lofty minarets are visible for many a mile across the dreary expanse by which the place is surrounded. Water is brought by numerous underground passages along which it flows from the Shir Kuh, at a depth of many feet below the surface. As regards trade, the place does a considerable amount; exporting, besides other products, opium, cotton, and wool. The imports consist of almost every kind of goods consumed in Persia, amongst which are large quantities of sugar and tea. A great portion of this trade is in the hands of the Parsís. The port of Yezd is of course Bandar Abbas, Lingah serving in this respect but little, owing to the badness of the roads and their insecurity when passing through the nomad haunts of Lar."

Lient. Vaughan's reckoning raises the figure for the total population of Yezd by 25,000 above my own and that of the Statesman's Year Book. These last may have been based upon inaccurate information, and partly affected by immigration and natural increase; but when he quotes the latest census for Gabrs or Parsís at above 6700, I cannot but regard it as an over-estimate. The number of Jews, given as 900, is much in accordance with the information gathered on my first visit to the city twenty-four years ago. As for the Hindu merchants, of whom I counted seventeen in 1865, and five in 1871, it is not unlikely, since nothing is now reported of them, that they have disappeared altogether.

I propose, on some future occasion, to say a few words on the geographical results of the present exploration, in connection with the results of older explorers—mainly those obtained from the surveys of the late Sir Charles Macgregor. I shall therefore confine myself, at the present, to recalling one of the many routes of that able, zealous, and indefatigable officer, the record of which may well be reconsidered in reviewing any newly explored approach to Yezd from the south. It is one which he followed in the spring of 1875 when proceeding to that city from Dehbíd, on the Ispahan-Shiraz post road, and which brought him to his destination through Ubarkuh and Taft, and over the Aliábád Pass of 8000 feet high. The more recent traveller must have made his entry by the same gate and through the same gardens, villages, and cultivation; though he may not have been inflicted with the same ceremonious *istikbál* which was accorded to, and has been graphically described by, Macgregor.

The next section of the journey under consideration includes a partial experience of the *Kavir*—a word which St. John interprets a "salt swamp," Fraser, a "salt desert whether wet or dry," and the dictionary,

"saluginous ground where nothing grows." If either of these interpretations be correct, the term *Dasht-i-Kavir*, in reference to a considerable portion of Khurasan, should be rendered the "Desert of Salt," and not, as in many maps, the "Great Desert," a rendering which implies the use of the common Arabic word *kabír*, localised into *kavir*, "great." Macgregor came upon what he calls "a bit of real *kavir*" on his way from Yazd to Tabbas through Koor. He describes it as dark soil, covered with a thick efflorescence, glittering painfully to the eye, without a blade of grass or leaf of any kind, or living thing; adding that this vast ground of white, apparent everywhere, not smooth but honeycombed with small holes, contains occasional dark patches of moist earth, which in time dry up and become salt. Marco Polo's route from Kuhbanan to Tabbas and Damaghán—according to Itinerary No. I., and other suggested identifications in Sir Henry Yule's valuable edition of the Venetian traveller's record,—may well be supposed to take in something of *kavir*. It was not improbably part of the "desert of surpassing aridity, which lasts for some eight days," where "are neither fruits nor trees to be seen, and what water there is is bitter and bad,"* for such description is not discordant with modern results.

But according to St. John, the great *kavir*—formed by the drainage of the Shuráb and Kárasú rivers from the west, and a considerable affluent from Turahiz on the east—has only been once seen by a European. This was Dr. Bühsé, a Russian, who crossed it about latitude 34° when travelling from Damaghán to Yezd, and who described it as about nine versts, or six miles wide. Macgregor could not have been very far from it, when at the above-mentioned oasis of Khúr, which he makes 210 miles south of Semnan and 175 north of Yezd, but which he expressly states is situated south of "the *kavir*."

Lieutenant Vaughan's fourth stage from Yazd initiated him into the mysteries of this peculiar formation in its more ordinary aspect. "On our left," he says, "a *kavir* is visible, stretching away for many miles to the west. After crossing a narrow neck of it, we halt in the desert." The second march following, he halts in a ravine, "which drains the low and sandy hills" on his right "into the *kavir*." On his seventh march he is in a desolate sandy waste "almost touching the *kavir*." Nine days later, after "crossing a watershed whose elevation is 4700 feet," he descends "gently down a watercourse, running north-east into the basin of the *Dasht-i-Kavir*." We are now about to behold the phenomenon in its more special character. But before reading to you his own description of the scene before him, I will briefly retrace his progress up to this point.

Leaving Yazd on the 30th March, he travelled over a sandy plain, partly bounded by rocky hills, passed through the Parsi village of Kalanta, containing some fifty or sixty houses, and arrived on the 1st

* Yule's 'Marco Polo,' vol. i. p. 131.

April at the Cháh-i-Kuh Heriz, a place of Parsi pilgrimage. Here he found a shrine erected in memory of a Parsi maiden who, to avoid her Muhammadan pursuers, prayed that she might disappear into the ground—an aspiration which is said to have been instantly realised! The legend has its counterpart in Sind, and its *venue* has been pointed out to me when riding over the frontier of that province into the neighbouring Mekran.

On the 3rd April he was at the village of Tút, noted as picturesque, with a few houses, cultivation, and an old caravanserai. On the 5th he reached the foot of the Siáh-kuh, "a mountain of considerable elevation, though not snow-capped, and evidently of volcanic origin;" and the next day he halted at Cháh Gumbaz, the well at which place was reported to be haunted by evil spirits—several people coming to draw water there having fallen dead at its edge! The 7th April was rendered memorable to the whole party by a storm of great violence. They had ascended a high range of hills, when "a small black cloud was visible to the west," and by the time they had reached the loftiest point on the road, "the sky in that direction was completely shrouded by a dense black mass of clouds advancing with great rapidity" towards them. Then followed "brilliant flashes of lightning, accompanied by a continuous roll of thunder ever growing louder," after which "came a cold wind raising clouds of dust, next a few heavy drops of rain," and the storm burst upon them with terrific fury. What with the wind and rain and hail, their progress was effectually checked; the animals refused to face the tempest, and, "huddled together in a helpless mass," remained still, while the members of the little company dismounted, and, covering up the saddles, sought shelter among them." After about twenty minutes the weather abated, and, drenched to the skin, the travellers hurried over the muddy ground as fast as their animals could take them. Descending from the hills along the bed of a stream, luckily not in flood, they emerged on open ground, and travelling across it for a few miles, arrived in the caravanserai outside the large town of Anarak. Here they lit fires, and, drying their clothes, entered upon an investigation of damage incurred.

Anarak is a town, or small city, of some 4000 souls, chiefly miners who work in neighbouring lead and copper mines. It is compactly built, and surrounded by two walls. In the immediate vicinity is the Kuh Darumgill, the highest peak of a lofty hill range on the north. The inhabitants were not well disposed to the stranger visitors. Vaughan states that they turned out in large numbers and mobbed both him and his servants, compelling them to leave the city which they had entered, and seek refuge in the caravanserai. Fortunately, there was a brighter side to the picture; for some Persian travellers, in the latter building, came out in a body to their assistance, and so put an end to an affair which at one time threatened to have a serious result. On the 9th April, crossing

a pass of about 5000 feet in height, they descended to a plain, and halted at Shúr-áb, a hamlet said to mark the extreme limit of Turkman inroads. These are now, it may fairly be hoped, put an end to in North-Eastern Persia, by the contiguity of Russia and the Trans-Caspian railway.

Their next march took them to Ashin, a small village of about fifteen houses. To the eastward they passed a high range of precipitous and barren hills called the Kuh Mahalla. North of their halting-place some small hills were observed, beyond which, at 12 miles distance, was a village called Baba Khalet, inhabited by charcoal burners. North, again, of this place, Lieut. Vaughan was informed that a forest existed, four miles in depth from north to south, and stretching out many miles in a north-easterly direction. Beyond this was the *Kavir*, which they neared on the 12th and 13th April, by two marches aggregating 36½ miles, over an undulating country draining into a salt swamp. Gauhir, their halting-place, was a cluster of springs of brackish water at the foot of the Kuh-i-Dom, at an elevation of 4400 feet. On the 14th April, arrived at the very *Kavir* in its full reality—or at the actual stage from which we reverted to Yezd—Lieut. Vaughan will tell his graphic story:—

“As we quitted the defile, a sudden turn in the road presented to our astonished gaze what at first sight looked like a vast frozen sea, stretching away to the right as far as the eye could reach in one vast glistening expanse. A more careful examination proved it to be nothing more than salt formed into one immense sheet of dazzling brilliancy, while here and there upon its surface, pools of water, showing up in the most intense blue, were visible. Away to the north of it stood a distant range of low red hills.

“A peculiar haze, perhaps caused by evaporation, hangs over the whole scene, which, though softening the features of the distant hills, does not obliterate their details. This, which I now see before me, is the Great Salt Swamp, to the presence of which the Dasht-i-Kavir owes its name. This swamp, lying at a low level in the centre of the great desert, receives into its bed the drainage from an immense tract of territory. All the rivers flowing into it are more or less salt, and carry down to it annually a great volume of water. The fierce heat of the desert during the summer months causes a rapid evaporation, the result being that the salt constantly increases in proportion to the water, until at last the ground becomes caked with it. The Persians say that many years ago a sea rolled its waves over the whole of the depression where I am now travelling, and that it was navigated by ships which used to sail from Semnan to Kashan. My guide told me the following legend:— ‘One day, many years ago, long before the time of the Prophet, a holy man arrived at Kashan, took a boat, and ordered the man to sail him across to some point or other. The boatman, being of a suspicious turn

of mind, insisted on payment of the fare before landing. This condition was accepted, but the amount offered was held insufficient, and a *pour boire* demanded in addition. After a dispute the point was yielded, and the old man said nothing more until he reached the shore, when, taking up a handful of earth from the ground, he threw it into the sea, uttering these words, 'Avaricious boatmen shall here ply their trade no more.' The sea instantly disappeared, and in its place came the desert as it now stands; while the fish became turned into stones, the boatman who tried to swindle was struck with blindness, and the holy man went on his way rejoicing.

"I suggested to my guide that this was rather a severe punishment for such a small fault, and that an earthquake, or a severe storm which would have sent all the boatmen to the bottom of the sea, might have been sufficient to meet the requirements of the case. He said he didn't know about that; anyhow, this was the story as he had heard it recounted by his tribe who had lived on the borders of the desert for ages.*

"After breakfasting in front of this wonderful marsh, which was several miles off, I climbed to the top of the nearest hill to see if I could mark its limit; but no, there it was, stretching away without any termination until it and the sky appeared to meet.

"Resuming the march we reached Chashma Bulazun, a small spring of fresh water, and halted there for the night (elevation 4200 feet). Here we saw the tracks of a large panther; so, lighting several fires, we brought the baggage animals inside them and lay down ourselves close by.

"The next few marches were in the neighbourhood of the swamp, towards the centre of which the wind blew unceasingly day and night. On the second evening, at Chah Shur (elevation 3700 feet), it blew a perfect gale, so much so that all our fires were blown away, and it became almost impossible to cook anything. Then, to add to the general discomfort, the rain began to descend in torrents, and we had to shift from the stream-bed, in which we had camped for shelter, on to higher ground. I lay during the night with a waterproof sheet over me, and my boxes and saddle piled up on the windy side. Needless to say that I always slept in my clothes and boots."

On the 16th April he passed over a small neck of *kavir* at an

* The tradition that a salt sea once covered the vast tract of the Khurasan Desert was brought specially to my notice when halting at the village of Yúnsi on the east side of the *Kavir*, in 1872. At this spot, I was informed, the Prophet Jonah was, according to local legend, ejected from the whale's mouth. It need scarcely be said that Muhammadans accept, together with much of the Old Testament history, the story of Jonah—after whom, indeed (Arabic *Yúnas*) Yúnsi is named. Savary thus translates one of many passages in the Kurán regarding this Prophet:—"The fish which had swallowed him threw him upon the sand overwhelmed with sufferings." The incident of the gourd is also narrated in the Kurán and preserved in local tradition.

elevation of about 2700 feet. Otherwise, up to the 20th, he but skirted or overlooked the salt swamp, according as his route fell or rose. On the date last mentioned he reports, "a march across the *kavir*, which consists here of a swollen, puffed-up, glazed crust, with a powdery soil beneath, of a Naples yellow colour." I quote his description further :— "As we progress, the animals' feet break through its surface with a crackling sound ; all vegetation ceases. At the fourth mile we reach a salt stream, called by the natives the Shatt, flowing from west to east at a mile-and-a-half an hour. This river probably drains the low *kavir* north of the Siáh Kuh into the Great *Kavir*, and receives also the drainage from the hills north of Semnan. In flood it must be about 150 yards in breadth, with an average depth of six feet, though at present the section of the actual stream flowing is not more than eight square feet. A few white birds are visible here and there, which resembled the Indian paddy bird ; also a few ravens. After crossing the stream with great difficulty, owing to the swampy nature of its banks, we resume our march over the *kavir*. The elevation is between 1400 and 2400 feet."

I would pause one moment to point out the geographical importance of these altitudes in the Great Salt Desert ; as the circumstance that the town of Tabbas was determined by Khanikoff at 1500 feet above the sea-level, has been cited to show that the *kavir* cannot be far above, however likely to be below, that level. If the term be understood in its general acceptation, then Lieutenant Vaughan's diary shows that it may be certified at an elevation much greater than that of Tabbas.

Our traveller continues :—"Skirting a low spur of the Kuh-i-Gugird, we proceed up a desolate valley, formed of soft and slippery uneven *kavir*, studded with large rounded holes, rendering our progress slow and laborious. We then cross once more the salt river, the banks of which are here covered with a deposit of salt about six inches thick extending for many yards on either bank. The surrounding scenery is appallingly desolate. On the right rise the barren, waterless hills of the Kuh-i-Gugird,* or sulphur range. These hills are formed of a succession of sandy hillocks, rising tier above tier ; in places they consist of soft rock with fine parallel strata running in a horizontal direction and resembling a section of a well-pressed hay stack. Here and there narrow perpendicular strata of gypsum intervene. The ravines in these hills have often perpendicular sides, rising to a height of 200 or 300 feet, while their width does not exceed 20 or 30 feet. At other places the ravines turn into large tunnels, which, twisting about under ground for a hundred yards or more, emerge again on another ravine higher up. Bushes grow here and there, but there is not a trace of fresh water anywhere. Naphtha is said to be found in them, and the inhabitants of Semnán occasionally mine them for copper and for

* Also Kukurd, as *ants*.

sulphur. While thus engaged, the drinking water used is obtained by them from the salt streams, and condensed with a still. In this valley we halt for the night."

On the 21st April they crossed a low hill, on which stands a ruined pillar, called the "Míl Ispaháni." Its *raison d'être* is thus explained:—A wealthy camel-owner of Ispahan was here overtaken by heavy rains, and could neither advance nor retire, because the *kavir* on both sides of him had become a dangerous track. Compelled to await the hardening of the ground to enable him to resume his journey, he was detained for so long a period that no fewer than twenty-five of his camels died from starvation or in vain attempts to cross the swamp. The pillar was intended to serve as a warning to future travellers. Bones of camels, remains of fires, and other signs of tarrying wayfarers, certainly lent credence to the tale, though allowance should undoubtedly be made for local colouring. At Biabának, on the 22nd April, the inhabitants of the village came crowding round the newly-arrived visitors, and expressed astonishment at the boldness which had caused them to hazard a passage of the desert from Anarak. The next day, riding over a sandy plain, dotted with villages and brightened by patches of occasional cultivation, they entered the town of Semnán, on the high road from Tehran to Mash-had. Lieutenant Vaughan estimates that it has 16,000 inhabitants. My own estimate was under 13,000. Our informants in 1872, when I passed the place on return from Sistan, made the number to be that of 2500 families.

The journey from Yezd to Semnán, of which an outline has just been presented, occupied twenty-four days. During these, Lieutenant Vaughan provisioned only twice, the first time at Kalanta, the second at Anarak. He carried eight *massaks*, or water skins, filled and refilled as circumstances required or opportunity offered. His caravan consisted of two horses, seven mules, and two donkeys; with which were two muleteers, a personal servant, a groom, and a guide—not a large following for an expedition through the Great Salt Desert of Khurasan.

It was not until the 28th of May, more than a month after arrival at Semnán, that Lieut. Vaughan again set forth on his main journey. But in the interval he was not idly reposing. The town he had reached was not, it is true, a Capua: still, compared to the roughing and privations of the Khurasan Desert, it must have had its attractions. Not many days passed, however, before he was again in the saddle—making an excursion into the desert to the Kúh-i-Gugird, the mass of hills which he had left behind him unexplored on the upward march. At the Chashma-i-Cháh Meshmus, or "spring of the well Mishmis," on the edge of the *kavir*, he had observed, on a vast sandy plain to the westward, the Siáh Kuh, a solitary hill with a flattened summit suggestive of bygone volcanic action. Between this and the northern Kúh-i-Gugird—to which it is erroneously joined in existing maps, intervened an extensive salt-marsh.

Three days before arrival at Semnán he had (as already shown) skirted the Kuh-i-Gugird, and the appearance of the mountains included under that designation had caused him to entertain the notion of surveying the surrounding country to the south and south-east from their summit. His project was not realised, though a vigorous attempt was made to put it into execution. After getting within 15 miles of the range, the further progress of his camels was checked by swampy ground; whereupon, he continued his route on foot, carrying with him water and food. Unfortunately, in accomplishing two-thirds of the ascent of the hills, he was seized with sickness and compelled to retrace his steps. The following extract from his diary shows that his little expedition was not wholly unproductive. "I found at the north foot of the range a thicket consisting of bushes of every description varying from 3 to 14 feet in height and extending westward for miles; probably eastward also, though I was unable to verify the supposition. On the upper parts of the hills grew occasional tufts of grass, on which the wild sheep and other game, whose footmarks were plentiful, fed. In one of the ravines I saw two very curious birds' nests exactly opposite each other, and built out from the cliffs: they were about 40 feet above my head, and formed of sticks woven like a hamper; their shape was cylindrical and their estimated dimensions were two feet six inches by one foot. The only birds visible were some large ones soaring at a great height overhead."

Leaving Semnán, as we have said, on the 28th May, and moving in a direction generally east or south-east, he followed a hilly and, with small exception, desolate route skirting the Khurasan desert at an elevation varying from 5250 to 3080 feet, descending to the lower figure at his eighth day's stage, Turut. This he describes as a very ancient town with a population of 800 or 1000 souls. It once possessed a citadel, of which the ruins still remain. Wheat and other crops are cultivated here; but it is only separated by 6 or 8 miles from the dreary *kavir* whose brown expanse is visible stretching away like an ocean bounding the horizon southwards over an arc of nearly 180°.

Ten marches further, at the small walled town of Doruna, with its 300 to 400 well-disposed inhabitants, he has descended from a maximum elevation of 4700 to 3900 feet. Up to this point there is little to be recorded of his march. At one time he observed evidence of Turkoman inroads in the ruins of a ransacked and deserted town; at another he saw myriads of live locusts swarming over every atom of vegetation, while a well in the neighbourhood was filled with their putrid bodies. On one occasion he was overtaken by darkness when separated from his followers, and had to wander in perplexity until the sign of lighted fires drew his attention to the hill on which his servants had bivouacked. The most exciting incident was, perhaps, a row between his men and the camel-driver, during which the latter had several of his teeth knocked out. In a geographical point of view, his account of the salt river Kal

Mura, known higher up as the "Abresham," is interesting. It is thus described:—"The river comes from the north-east through a narrow valley. Its banks are thickly covered with green bushes, tufts of grass and all sorts of shrubs for at least fifty yards' distance on either side. To the south it runs away into the desert towards its unknown destination, its course being marked for a long way by green bushes. Some 40 or 50 miles off it is said to terminate in a vast lake. People living on the Kuh-i-Taurum told me that, in winter, when the sun sets to the south-west, the waters of the lake are seen glistening in the sunlight for miles. Camel-drivers who have lost their camels are said to have followed the river-course in search of them, and have found it to terminate in a salt lake whose further shore was invisible to the eye. This lake is shown on some German maps."

As regards the "Kal Mura" or "Abresham" just referred to, it is worthy of remark that Captain Claude Clerk, when describing his march from Herat to Semnán, in the Notes contributed to this Society's Journal in 1861, shows that he crossed the said river at a point far south of the bridge on the high Tehran-Mash-had road, its passage beneath which has been usually observed by travellers. St. John considers it a possible feeder of the "Great Kavir" crossed by Dr. Böhse. The salt lake of the German maps may well be a minor *kavir* retaining, from its conformation, an unusual depth of water.

The distance from Doruna to destination was lengthened by the necessity of making a *détour* to the south, to "avoid the impassable *kavir* of Bájistán," which intervened between the encampment he had reached on the 1st July and that city. This brought him to Nagenau, a flourishing town situated on an open plain, with good grazing ground, and possessing about 600 inhabitants, mostly cultivators—the chief crops being wheat and tobacco. A recently built caravanserai there, however well constructed, afforded little comfort to the traveller, owing to its many large and black scorpions. The fourth march from Nagenau was into the town of Bájistán.

According to Lieut. Vaughan, the people here remembered well the visit, in April 1872, of the Sistan Mission, which seems to have much impressed them; causing especial gratification by its distribution of presents, each of which was minutely described for his edification. Major Euan Smith's published report on Bájistán—referring to that particular occasion—gave the town a population of some 4000 souls, with a ruined fort, two good caravanserais, four *hammáms*, fifty mosques, and seventy shops. Vaughan's estimate of "about 1000 houses" may not essentially differ from this statement; but, while admitting the ruined fort, he makes mention of one dilapidated caravanserai only in his enumeration of buildings. "The Governor," he writes, "is a Naib, subject to the Khan of Tabbas, whose son he is." It is further recorded: "My tent having been torn to pieces in a storm, and the caravanserai

being unfit to live in, having no roof, I put up in a subterranean excavation just outside the city. The Governor, when he came to call, seemed much amused at my condition, the outcome, as I explained, of the length of my journey, which had caused most of my kit to go to pieces. There were large quantities of fruit and vegetables obtainable, most welcome to us after eating nothing but dried and salted food for days. A considerable manufacture of cloth and silk goods is carried on at this place, and there is a moderate amount of wheat and barley grown. Fish of from 1 lb. to $\frac{1}{2}$ lb. abound in the *kanats*, or underground streams by which water is brought to the city; many of them are blind, and the inhabitants, for some reason or other, never eat them. Elevation 4300 feet."

While at Bájistán, Lieut. Vaughan made a little expedition to the eastward, over a range of high hills and through a pass 4800 feet in height, to Jumain, the chief town of a cluster of about 15 villages, constituting the township of Gunabad. "The population of the plain," he writes, "is very large, the greater portion being nomad, who, however, never remove beyond the neighbouring hills."

I will now quote the traveller's *résumé* of his labours, which, if more immediately relating to the last section, has a very general application to the whole exploration:—"The journey, though interesting, was rather a trying one, owing to the heat experienced, the scarcity of water, which necessitated long marches, and the absence of fresh provisions.

"My own opinion regarding the Kavir is that it extends uninterruptedly from $52^{\circ} 45'$ to 57° E. longitude without any break whatever and that about $54^{\circ} 15'$ its bed is slightly elevated, forming a drier region, across which the road from Yezd to Damaghan runs. It contains, I believe, two great depressions, one immediately south and at the foot of the Gugird Hills, the other at the point formed by the junction of the Kal Mura and Kal Lada rivers, both of which depressions pretty certainly contain vast sheets of water in the rainy season. As regards the southern border of the Kavir, I cannot speak with any certainty.

"My observations for altitudes are only approximate, though corrected for temperature. The latitudes were taken with a six-inch sextant from meridian altitudes of the sun and altitudes of the North Pole star; time being taken by a half chronometer, which kept going fairly accurately throughout.

"The insect and animal life of the desert consisted of the wild ass, snakes, lizards, scorpions, spiders, and beetles. Birds—the vulture, raven, and, if I remember rightly, a few doves. All the snakes I saw were brown, exactly resembling in colour and appearance a piece of dead stick. Some of them used to climb bushes, and hitching their tails round a bough would stick their bodies out in imitation of a withered branch, and thus remain motionless for hours. My servant said that

they were waiting for a bird to come and perch on them, when they would immediately strike it. None of the snakes I saw exceeded 3 feet in length; they were usually from 18 inches to 2 feet long. Scorpions of all sizes and of various colours abounded, especially in dry and sandy places. There was also a curious spider, called the *dúmlak*. He had long hairy legs, formed of shell like those of a crab, while his body was soft and attained the size of a walnut. They had no tails, but were provided with two pairs of curved crab-like claws, which carried a row of teeth like a saw on their inner surface. They spin no web, but run about on the surface of the ground with great velocity, seizing any beetles or other insects which fall in their way. The natives say that they are very poisonous, and that all insects living in the desert are so, even though the same species may be found harmless elsewhere."

In conclusion, it is only fair to Lieut. Vaughan to remark that, irrespectively of much general and useful information afforded by this journey, he has determined the true position of more than one place roughly marked in bygone maps, and has discovered the existence of towns, villages, or halting stations, hitherto unknown to European geographers—notably Bastak, his seventh march from Lingah, with its population of 5000, and surrounding district of 15,000 souls.

After the paper,

Mr. W. T. BLANFORD said the most interesting portion of Lieut. Vaughan's paper was that relating to the Kavir, which consisted of broken tracts of salt desert. The origin of those tracts was very simple. The drainage of the interior of Persia had no outlet. No rivers ran to the sea. There was a very small rainfall, and what there was drained towards the interior of the country, carrying with it a small amount of salt. When the moisture was evaporated, the salt was left behind. On old maps these districts were shown as one continuous area, called the Great Desert of Persia. The fact was, there were a number of depressions at different heights above the sea, each of which was more or less impregnated with salt; and the swamps ran for a long distance through the shallows of which the interior of Persia was formed. Of course, very much depended on the accuracy of Lieut. Vaughan's observations, and it was therefore to be hoped that they were accurate.

The PRESIDENT said they had reason to be grateful to Lieut. Vaughan for having undertaken a journey in so very dreary a country simply for the purpose of increasing human knowledge. They had the testimony of Mr. Blanford as well as of Sir Frederic Goldsmid, that he had accomplished his object. It was not given to every one to discover a town hitherto unknown to map-makers, containing 5000 inhabitants. It was a pleasure to know that this contribution to our information had been made by a young Indian officer. In olden times such officers did a great deal of useful work in the way of making known the countries conterminous to India, but then there was an element of romance which made them willing to endure the pains of travel. That stimulus did not now exist, and of late years Indian officers had not furnished so many accounts of travels as might have been expected. He was confident that the meeting would give its best thanks to Lieut. Vaughan as well as to Sir Frederic Goldsmid, who had been his interpreter.

*Notes on Yoruba and the Colony and Protectorate of Lagos,
West Africa.*

By Sir ALFRED MOLONEY, K.C.M.G., Governor of Lagos.

GEOGRAPHERS have continued the name Slave Coast, originally given by the Portuguese, to that portion of West Africa situated between the Volta and Oil rivers. It was only at the end of the eighteenth century that we obtained any definite knowledge of the grand Niger river which bounds the north and east of this portion of the continent, and only in 1830 were we satisfied that it had no connection with the Nile, Senegal, Gambia, or Congo, but was an independent river that emptied itself into the Bight of Benin on the western side of Africa.

This territorial wedge is linguistically divided between the Ewe (Dahomey) and Yoruba or Yarriba-speaking peoples. On the area occupied by the latter I purpose to dwell in this paper.

The population of Yoruba has been estimated as 3,000,000; its area may be viewed as from 25,000 to 30,000 square miles, or the size of Belgium and Holland together, of which 1069 square miles compose the Colony and Protectorate of Lagos.

To this area have been applied generally the names Nago and Yoruba or Yarriba.

According to the information given to the Landers, in 1830-1, the northern boundary of Yarriba (the capital of which was Katanga) was the river Moussa (Mussa) which cuts the right bank of the Niger opposite Rabba.

We read of the people occupying those parts in the middle of the seventeenth century as the powerful Oyos or I-yos ruling to the sea over Benin and Ewe (Dahomey). About 1830 we find the Felatahs or Fulanis from Sokoto crossing the Niger *into* Yarriba, which they attacked, when they established Alorie (Ilorin), and, to strengthen their position, made it a centre of freedom for runaway slaves. The attitude of Ilorin towards Yoruba is to-day the same.

This area is studded with large populous centres, which owe their origin to community of tongue, tribal interests, and the necessity of self-protection. Of these I may mention, with their respective populations, the following:—Lagos, 86,559, Abeokuta, 100,000, Jebu-ode, 60,000, Oru, 10,000, Ibadan, 150,000, Oyo, 80,000, Ogbomoso, 6000, Ejigbo, 40,000, Ilobu, 60,000, Ikirun, 60,000, Otun, 15,000, Ilesha, 40,000, Ede, 50,000, Oshogbo, 60,000, Iwo, 60,000, Ipetumodu, 40,000, Ode Ondo, 60,000, Igbaga, 15,000, Ilorin, 100,000, Isehin, 20,000. As a consequence of this concentration, the open country is sparsely populated, and its agricultural development far from what it should be.

Beginning on its western side, the intersecting rivers of the country are the Whemi (Okpara), the Ajera (with its tributary the Giddy), the

Addo (called, for the part above the town of Addo, the Yewa), the Itele, the Ogun, with its main tributaries the Ayan and Opiki, the Odo-ona, the Omi, the Oshun, and the Oni, the Ofara or Ubu river, the Oluwa, and the Benin. The Whemi, which is said to originate in the direction of Mehi or Barba, may be viewed as the old geographical boundary between Yoruba and Ewe-speaking peoples; by it Dugba, the landing-place of Abomey, from whence it is distant about 23 miles, can be approached by steamers in the wet season. The area over which the Ewe language is spoken is called Ewemi; hence most probably the name of this river.

The Ajera river is important as representing, by the longitude of its mouth, the line of delimitation agreed upon between the French and English territories; it also forms the western boundary of the Pokra district.

The Addo or Yewa is a valuable commercial highway through the territories of Okeodan, Ilaro, Egbado, into the heart of Ketu; it is navigable for steamers of light draught to Addo, some 30 miles from the sea; it could be made navigable to Okeodan and Ajiliti. It is fed from the west near Addo by the Owo.

The Ogun, having its source in the highlands beyond Oyo, flows with considerable current by that capital, which is some 150 miles from the coast-line around Abeokuta, and discharges itself into the Kradu water, near Ikoradu, by two mouths, the Ikoradu and Agboyi estuaries. A few miles to the north of Abeokuta it is joined by the Ogon or Ayan from the Sabe country to the north-west. Some 10 miles up the Ayan it is joined by Opeki (or Ofiki). On its right bank, between Abeokuta and the Kradu water, it is fed by the Owiwi, by the Apon, and by the Ilo, via Ota, opposite Isheri. In the dry season the passage of the Ogun is obstructed by banks; in the wet season it is said to be navigable for light draught steamers, even as far as Aro, the landing-place of Abeokuta, which is some 90 miles from Lagos.

The Odo-ona, the Omi, the Oshun, and the Oni are rivers of Jebu of which little more than their names is so far known.

The opening up of the three first-named would promote much the development of Jebu and the country beyond, whilst the Oni, Ofara, and Oluwa would do likewise for Ondo, Ife, and Ikale.

These rivers do not discharge themselves into the sea, but into the channels or lagoons which form an inland waterway accompanying the coast-line. These channels, which form a feature of the Guinea coast, present an interesting study in Physical Geography, and also afford a rich field for the study of their brackish and fresh-water fauna. From their openings into the sea, to a distance of some 30 miles, they are affected by the tide; beyond, the water is generally deep and fresh; on both sides the land is clothed with rich vegetation, and offers a genial home for tropical growth. The forests which fringe the water-

ways are carpeted here and there with the parasitical *Thonningia* and are rich in orchids, of which I have been fortunate in securing living specimens for the Royal Gardens, Kew, of many rare and beautiful species, some sweetly scented, some probably new, of the genera *Angræcum*, *Lissochilus*, *Polystachya*, *Bolbophyllum*, *Megaclinium*, *Sarcanthus*, and others.

It may be interesting to remark here that I came across in the Niger delta the mistletoe-like cactus, *Rhipsalis cassytha*, found also in Madagascar and generally in tropical Africa. The genus *Rhipsalis* is said to be the only genus of Cactaceæ found outside of the New World.

Amid the rich vegetation of the lagoon banks are many species of palm-trees, including groves, miles in extent, of *Raphia vinifera*, the pounded pericarp of which is used in the still waters of narrow creeks to stupefy or poison fish. Other common trees are mangroves, the accompaniments of brackish water, and a willow-like shrub called "salt-bush," from which in the vicinity of Benin, as elsewhere, a native salt is manufactured.

The inland border of these long lines of channels and lagoons must, I think, have originally been the sea-coast, and the strips of land that now, sandwich-like, intervene between the sea and the mainland, have to all appearance been formed by the continuous action of the surf caused by the current that crosses the Atlantic from the Gulf Stream, in driving back the debris which is carried down, especially in the floods, by the many intersecting streams and rivers.

Such lagoons run along parallel to the sea for hundreds of miles, and connect, with two slight and removable interruptions, the Volta and the Oil rivers; the narrow area they embrace represents the malarial belt, so fatal to Europeans; the further inland therefrom one gets, the more healthy, but perhaps the more hot the country becomes.

On the occasion of a recent visit which I paid to the eastern district of the colony, I ascertained personally that with the removal of a few grass islets—an easy matter—a passage by inland waters to the Benin river, a distance of some 160 miles, was not only practicable but easy for steam-launches and probably for larger vessels in course of time. When such ways of communication are generally opened up and definitely established, the open surf-tossed roadsteads and dangerous bars for which West Africa is notorious may to a great extent be avoided.

The Colony of Lagos, which is the seaboard of Yoruba, was acquired by a treaty between the late King Docemo of Lagos and other chiefs, and Commander Bedingfield of H.M.S. *Prometheus* and Consul M'Crosky, on behalf of Her Majesty, on the 6th August, 1861, and by another treaty dated 7th July, 1863, between Lieutenant Glover, on behalf of Her Majesty, and Chief Akrah and other chiefs of Badagry. These treaties conveyed to the Queen the whole territories belonging to these chiefs. Later additions were made at the wish of the native authorities and

peoples concerned, as follow: the kingdom of Katanu in 1879, of Appa in 1883, and of Jakri, Ogbo, and Mahin in 1885.

The native name for Lagos is Eko, changed, it is said, from *Oko*, a farm, for which this island was first used by the Yorubas who had settled on the island of Iddo: or it may have been called so after the town in Yoruba of the same name *Eco*, through which the Landers passed *en route* to Boussang. The name Lagos is Portuguese, possibly from *lago*, a lake, as it looks like an island situate in a lake, but more probably from the seaport Lagos, in Portugal.

In 1871 the population of the Colony and Protectorate was 60,221, made up of 27,863 males and 32,358 females. In 1881 it reached 75,270, composed of 37,665 males and 37,605 females: for 1887 it has been estimated at 86,559. It must be borne in mind that this increase is not entirely attributable to the excess of births over deaths, as the population is augmented to no inconsiderable extent by the escaped slaves who succeed from time to time in reaching the colony and in thus securing their natural liberty.

The Niger has been and continues to be the high road from the north and east of Mohammedanism, and its active pioneers towards the western coast of Africa have been the Fulanis or Fulatahs, and the Kamaris who have in the past overrun much of the country, and have succeeded in contracting the area of Yoruba-land. Among Lagos Mohammedans, for whom I entertain a great respect, there is found the usual sympathy for their co-religionists, which extends with a reverential affection to Ilorin which they view as their local Mecca, and with which they have constant communication, either via Abeokuta, Isehin, Oyo, and Ogbomoso, or by Atijere, Ode-Ondo, Ilesa, and Ila.

Ilorin is situated on the Assa, one of the feeders of the Niger; there it has a width of some 40 yards, but navigation is obstructed by boulders. The difficulties are minimised, they say, in the rains when the water is high.

Mohammedanism was introduced into Lagos about 1816, in the reign of Oshiloku, who was the eighth king; there were then many sheikhs of the Ulema. About 1836, when civil war broke out, the Mohammedans fled under one Iaris Daha to the town of Ibi, where they remained until they were invited back to Lagos by King Akitoye in 1840. Since then they have increased rapidly, and are now a most orderly, intellectual, and respectable class of citizens, composed of all the tribes of Yoruba; prominent men among them are of the Houssa and Bornu peoples.

The present Mohammedan population of Lagos may be estimated at 15,000. In Sir Richard Burton's 'Wanderings in West Africa,' written in 1863, he put the Moslem population at from 700 to 800.

The Christian mission bodies have been and are the popular educators. I cannot speak too highly of their labours and self-sacrifice; they

deserve all sympathy, encouragement, and respect. The bright spots or *oases* (of small area so far) of civilisation and culture to be noticed dotting Yoruba are of their doing. Educational labours are chiefly conducted through native agency. Followers of Islam, although in many instances their children are to be found in Christian educational institutions, have their own Mohammedan schools, their labours being exclusively confined to the teaching of Arabic from its grammar and advancing to the Koran, and Mohammedan history.

Generally, more attention is now being directed in the country to the promotion of industrial education, which, although in the past it formed a prominent feature in the missionary curriculum, fell into neglect from want of funds and not receiving the support and encouragement it deserved. I view industrial education, especially in an agricultural form, as of primary importance to the country.

Going westward we find that according to local tradition the first Popo (Ewe) immigrants, headed by their King Agbangra, of Hungi, a town that existed to the westward of Whydah, but since destroyed by Dahomians, got to Appa, the king of which gave to them, as a place of settlement, a farm of one of his slaves, named Bada, on a strip of land between the lagoon and the sea and in front of the present Badagry—celebrated as the starting-point of Clapperton and the Landers. On this site they settled, calling it *Bada's gri* or farm, hence the name Badagry. They were later followed up *viâ* Kotonu, which is on the same land strip, by Dahomians, and, deserting in consequence the original Badagry, crossed the lagoon and established the present town.

The capital of the district is Badagry, with a population of 2500 to 3000; it is approached by lagoon, and distant from Lagos 45 miles.

The aborigines of Katenu, Appa, and Badagry were Yoruba-speaking people, who emigrated from their country within the bend of the lower Niger after it had been overrun from the north by the Fulahs and Kambaris or Houssas; they have been supplanted by, or almost altogether absorbed among, the tribes of Ewe-speaking people, known and commonly referred to in English as Popos and Whemians, but known among themselves and the Yorubas as Egun, who have steadily for years migrated, and still migrate, in numbers eastward to escape the atrocities, mainly represented by human sacrifices and slavery, of their fellow-countrymen ordinarily known as Dahomians.

The population of the district was returned in 1886 as:—Badagry portion, 12,068; Frah* or Katenu kingdom, 8355; Appa kingdom, 3255.

The industries of the district are the manufacture of palm oil from the husks of the ripe fruit of the *Elais guineensis*, the preparation for the market of the kernel of the same fruit, the cultivation of Indian corn, of leguminous plants of different sorts and sizes, of the sweet potato, of

* Katenuans are called Frahs, or fishermen.

cassava which affords the preparation known as *gari*, an important staple of food in these parts, of yams, and sugar-cane to a small extent. Fish is caught in large quantities, especially by the Katenuans, and sun-dried or smoked for sale; in either form it represents a considerable coast and inland industry. I may remark that fresh fish is not appreciated by the Yoruba; he prefers it in the form which I have just described.

The lagoon, as one approaches Badagry from Lagos, presents for some 20 miles a monotonous scene, fringed on both banks, as is usual in such latitudes when the water is salt or brackish, with mangrove, *Avicennia africana* and *Rhizophora mucronata*, which yields largely the firewood in common use.

On the sea-strips of land, the line of mangroves gives way, as one nears the sea-shore, to the dwarf trees of the *Chrysobalanus Icacó* or cocoa-plum, seen in their perfection in July, when they are covered with a blue plum-like fruit of the size of a small peach, reminding me of the Black Hambro grape; they are again succeeded by ground creepers indifferent to salt-spray, among which runs handsomely a large-leafed leguminous plant with a most beautiful purple-red flower of considerable size for a pea; also the *Ecastophyllum Brownei*.

From the opening into the Igbessa waters westward nothing but the graceful oil-palm presents itself for miles, and the busy improvised villages of the manufacturers who resort there for the season. Here one is much struck with the alluvial deposits topped with rich black vegetable mould, in which anything tropical might be grown.

I must not omit to mention the *Borassus æthiopicum*, or fan-palm as it is generally called—the “ronier” or “run” of the Gambia. This tree grows abundantly behind Badagry, and it has indeed surprised me to find that it has not been utilised there as piles for wharves, as it is commonly at the Gambia.

Thirdly, there is the *Raphia vinifera*, or bamboo palm, which here abounds. The leaf for thatch and the poles, or rather mid-rib of the leaf, used for varied purposes, present extensive and important industries. Such poles made up into bundles ready for sale are floated down to Lagos in rafts on the tides. The presence and extent of this growth is at once remarkable in the towns and villages of the districts from the fact that nearly all the houses and fences are constructed from the *Raphia vinifera*.

Open spaces occasionally present themselves, being the sites of deserted farms from which the trees have been recklessly removed in the past by burning to save labour; they are now only remarkable for their isolation, and the scrub that has taken the place of the former rich vegetation. From such sites a double crop of corn could be reaped each year, or groves of plantains and bananas would there thrive luxuriantly.

Pistia stratiotes is commonly found obstructing the waterways.

Floating islets, torn away pieces of some river bank, covered by a rank grass from four to five feet high, are at times met, especially in the floods, and prove a source of some trouble (to say nothing of the myriads of mosquitoes that seem to inhabit them) if allowed to get entangled with the chain of a steamer at anchor, which has been known to afford to snakes (some poisonous, all surrounded by doubt whether they are or not, and frequently met with in such islets) ready means of getting on board. This rank grass is used by the natives as fodder for pigs, and the islets are frequently staked in shallows as a feeding ground for fish, and later surrounded by a bamboo grating from which, after the islet has been cut to pieces, the fish are removed by circular hand nets.

The papyrus grows luxuriantly along the banks of the western main lagoon, marked here and there by manatee traps for the *Manatus senegalensis*, or by a bamboo pole with a white rag of Manchester cotton on the top, to denote the opening of the creek leading to some village or town. In the Popo language the Manatee is called *Yingbinyingbin*, and in Yoruba *Ese*. The animals are harpooned in the traps just referred to in the dry season when the waters of the lagoon are low, and during just half of the year. The flesh is much appreciated by the natives, resembling a combination of veal and pork. Strips of the hide, with the parts used as handles studded with brass-headed nails, seem to be viewed as fashionable, and I should say certainly effective, whips by the natives.

Pineapple and *Sansiviera guineensis* and *longiflora* grow extensively in wild luxuriance in Appa and Pokra; indeed the latter grows everywhere on the Yoruba seaboard; they are put to little use, though they are products from which might be derived important and valuable industries.

In districts where the oil palm becomes scarce, and fresh water is found, the banks are often lined with species of *Ficacæ*, the haunt of the fruit-bat, *Epomophorus gambianus*, as also of a true bat, the *Vesperugo tenuispennis*; these abound, and are common articles of food.

This leads me to speak of the lake dwellings of certain tribes who surround or live on the sheet of water known as the Denham waters, lying behind the Dahomean sea-board, and the rivers that flow into it. The male portion of these amphibious people are fishermen, or fishermen and farmers combined. These tribes are the Kátenus, Esos, and Whemians (all speaking the Ewe or Dahomey language), who live in large native villages and towns built entirely out and over the water. I paid several visits to these waters, and had the opportunity of observing for myself the modes of life of the people. They once formed part of the old kingdom of Dahomey, which was in the past split up by intertribal wars. The weak were not driven to the wall in this case, but literally into the water, where safety was sought from their more powerful fellow-countrymen—viz. from the ancestors of the present occupants of the Dahomean kingdom—the protection being ensured from

a knowledge of the fact that it has been for some time conveniently contrary to the Dahomean fetish to cross water, at least in canoes.

Their towns or villages have each a floating population, varying, I may estimate, from two or three hundred souls to as many thousands. The people are fine and healthy, and, as a rule, free from disease. Their houses are built upon piles or stout straight branches of hard wood, of some 3 to 6 inches diameter, which are secured as supports by being worked under manual labour from canoes into the bottom some 3 or 4 feet. The upper ends are then secured by cross-pieces of like nature, on which is worked a bamboo flooring, two-thirds or a half of which is covered in by a house, the uprights of which are fixed first, and secured below the platform to the supporting piles. The roof frame is next made on the platform, then covered with grass or bamboo leaves and raised to its position, when it is secured by the tie. The remaining portion of flooring is used as a verandah, or rest loft, and is sometimes covered in or not, according to the wish of the owner. In the construction no nails are used. The houses are in shape rectangular, sometimes conical, having in the latter case the appearance of floating beehives of large proportions.

These people are not only fishermen, but are pastoral, especially the Whemians; and their relative wealth, and consequent social status, may be guessed by the general appearance of their houses, and by the stand of cattle to be seen in the pens adjoining their houses, built on piles over the water, like the dwellings. The absence or shallowness of the water at some sites in the dry season admits of the cattle being allowed to wander on *terra firma*; but fodder has to be brought by canoe to the less fortunate creatures that have to eke out an existence in such pens as are always surrounded by water, until such time as they are tethered and transported by canoe to the butcher.

The length of the piles depends on the depth of water, and on the probable rise in the rainy season. I have seen houses built over water some two or three fathoms deep. Should there happen to be a higher rise than allowed for, which at times happens, when even the platform is covered, a temporary flooring is made in the roof, with a hole in its thatch as a door, over which the people have to reside until the water has subsided.

Habit, associated with still-existing dread, leads them to prefer these aquatic residences, although they cultivate farms and make oil on the adjoining lands. The domestic animals among them are pigs, goats, sheep, cattle, dogs, &c. The men fish, farm, and trade, while the women attend to the live stock and attend markets, paddling their own way; they also fish. The fishing-gear is similar to what I have already described.

Intertribal fighting, whether for offence or defence, has been conducted from canoes capable of holding two or three persons, their

weapons being guns, harpoons, spears, and clubs. So uncertain are they of safety, and so apprehensive of danger, that they keep, when travelling, secured against the sides of the canoes, guns and a quantity of ammunition. Their beds are similar to those usually adopted on land, viz. a reed or fibre mat, on the bare floor.

Polygamy, which is general in Yoruba, exists, but wives and children live in separate houses from husbands. On invitation a particular wife will join her husband, and on such occasion, generally at night, paddle her own canoe to him, and convey his evening meal.

To the east of these people the colony of Lagos now extends from a line passing through the meridian of the Ajera river eastward to the river Benin; it is divided into four districts:—Western (Badagry), Central (Lagos), Northern (Ebute Meta), and Eastern (Palma and Lekki).

The distance from Lagos roadstead to the anchorage at Lekki, the capital of the eastern district, is 42 miles; the length by lagoon is 72 miles, which can be followed into the Benin river, into which it flows about $7\frac{1}{2}$ miles from its mouth. Five feet in the wet and four feet in the dry season, represent the shallowest water by the lagoon passage to Benin; this is found on a narrow ridge of sand on Lekki flats, which can be easily dredged to admit of steamers of seven and eight feet draught plying from Lagos to Benin. Here, I may say, are to be found hippopotami.

The northern district of the colony and the kingdom of Jebu are continuous; both are situated on the mainland; and the latter extends eastward along the northern bank of the Ossa as far as the branch of the Ofara or Ubu river, that debouches about four miles to the eastward of the island of Makun. On the same side and next come the Mahins, Ubus, Ijohs or Ioes, the water-pirates of old, and the Jakry people.

The eastern district is also a network of lagoons; and the rivers that intersect the mainland and have contributed to build up the strips and islands which form the coast belt between the lagoon waterway and the sea, are—the Ogun, that rises to the north of Abeokuta; the Omi, Oshun, and Oni in Jebu; the Ofara or Ubu, from Ondo; and the unexplored waterways behind Abota in the direction of Igbobini.

The littoral to the eastward of Lagos, as far as Ode, may be spoken of linguistically as Jebu. The Lagos people, or their descendants, or the old Kosoko party that was driven from Lagos in 1852, have also settled along this strip. The Mahins have maintained for centuries their hold on so much of the littoral as lies between Ode and their capital, Mahin; the remainder, as far as the Benin, is peopled and commanded, as regards the exercise of influence, by Jakri people, with a small intermixture of Sobos, not Ogbos, as they are at times represented.

The distance by sea from the anchorage, Lagos bar, to Benin bar

is 100 miles; whilst, by the inland waters, viâ Aboto and Arogbo, to the mouth of what is known at Benin as the Lagos or Itebu creek, the distance is estimated at 160 miles. In course of time, flat-bottomed steam lighters and barges may be worked through, up to 4 feet draught. Bars could thus be avoided altogether, and one port of entry and exit used, viz. Forcados, as will be explained later. The width of the navigable part of the Benin bar is half a mile. At ordinary tides the depth of water on the bar is, low-water, 10 feet, high-water, 14 feet; at spring tide there is an additional foot.

Lagos bar is distant from Forcados river bar about 120 miles. Water at ordinary tides on Forcados bar is 16 feet low-water, and 22 feet high-water. The width of the channel over the bar is one mile.

From the Benin river to the Escardos river, by sea, it is 10 miles. From the Escardos river to the Forcados, by sea, 13 miles. From the Forcados to the Ramos river, by sea, 14 miles. The depth of water on the Escardos bar is, low-water, 9 feet; high-water 15 feet. The depth of water on the bar of the Ramos river is, low-water 8 feet; high-water, 14 feet; the navigable channel is half a mile across.

The distance from the Forcados to the Escardos river by creek, round by Goshawk Point, is estimated at 25 miles; and from the Escardos river through Daly creek to its union with the Benin about 22 miles; while the distance by Ellagico river and Agaru creek, the route for large steamers, is about 55 miles. The Benin river is connected with the Escardos by two known waterways. The lower is known as Daly creek.

The Mahins seem to have remained up to to-day where they have been described as located centuries ago—on that portion of the strip of "false coast" lying east of Ode, and onward to and inclusive of Omahe or Mahin. On the same strip next comes the territory of Iwere (Owere, Owyhere, Ouarre, Awerre, Warre), which extended to the Benin river and included the islands or deltas intermediate between Benin and Forcados rivers. This territory is also recognised as the Ichekre, Shakry, or Jakry, and its capital was Warre.

From a hurried comparison of some short vocabularies I have drawn up, I am led to conclude that the Jakry or Warre language is a dialect of the Yoruba; a conclusion opposed to that of Mr. R. N. Cust in his work on the modern languages of Africa, who gives as synonymous Izekiri, Ishekeri, Dsekiri, Benin, Bini, and Iwine; it is also opposed to what the Jakry men say, viz. that they and the Benins are one, and that Warre was peopled from Benin.

In Yoruba we find one, *eni*; two, *aji*; three *eta*. In Jakry dialect the difference is merely the prefix *m*, viz. *meni*, *meji*, *meta*. Again: the word ask is *bere* in Yoruba, *biro* in Jakra; soap, *ose* in Yoruba, *oche* in Jakry; door, *ilekun* Yoruba, *ekun* Jakry.

Jakry men have a great veneration for Warré. The corpses of "big men" are taken there for burial after death; while in the case of "small men" only the hair and toe and finger nails are taken. The same custom applies to Jakry women. The bodies of slaves are consigned to the bush or river.

Tradition makes the Benins a component part of the Yoruba nation. They speak, however, a distinct language, as I venture to think from a comparison of Yoruba and Benin vocabularies which I formed, to the extent of three or four dozen words. Take the numerals in Yoruba, one *eni*, two *eta*, five *arun*, ten *ewa*: in Benin we have *puhu*, *geva*, *ihisin*, and *ijigbe*. Yam in Yoruba is *isu*, in Benin *eyan*; man, *okunrin* Yoruba, *opayah* Benin; town, *ilu* Yoruba, *ebaro* Benin; welcome, *kuabo* Yoruba, *bokian* in Benin.

The Benins are reported to be skilful workers in iron, copper, cotton, and grass manufactures. Among themselves and in the interior countries they are known as Eddos; along the coast-line, as Awonrin or Awhawrin. Oshobo, Shobo, Ihasherri, Ijohmu, Eshawran, and Oshuocoosey, are given as the principal towns where Benin chiefs live who attend all general councils of the king. The Benins have been described to me as of the same family as the Tappas, who, they say, are thirteen days' journey distant from them.

The following have been named to me as countries or provinces, with separate responsible governments, of the kingdom of Benin, within which the Eddo language, or some dialect thereof, is spoken—Uruwah, Ekumah, Igbedey, Egoro, Oogiami, Ekonogbosharay, Eko-amu, Ehru, Ukun, Uromu, Nraikin, Akekereke (fourteen days' journey inland from Benin) Eborokimi, and Ojala. For each, the king of Benin chooses the king or chief. The burial of any such chief cannot be undertaken unless the king of Benin is informed first.

A native salt industry of old standing continues. The salt is made extensively by Jakry men from the leaves of a willow-like tree not unlike the mangrove, which are burnt, the ashes then soaked and washed, and then evaporated; the residue represents native salt, which is even now preferred for many uses to introduced salt.

In addition to the Benins, Jakrymen, and Ijohs, we hear much in those parts of the Issobos or Sobos, who are described as people tributary (they have been so for generations) to, and above, Benin, on the same side; industrious, agricultural, and oil manufacturers. While there seem to be in their language many different words, yet in their numerals and other words, there is a great affinity between Benin and Sobo; whether due to gradual absorption, or not, of the language of a people so long under Benin sway, remains to be proved. We find, for example, in Benin, door *ehu*, in Sobo *ese*; man, *opayah* B., *osare* S., woman, *okuo* B., same S.; town, *eboro* B., *osiotete* S. Then, in the numerals, we have one, *puho* B., *ovo* S.; two, *geva* B., *igivray* S.; three, *geha* B., *esa* S.; ten, *igigbe* B., *igbe* S.

The commercial houses on the Benin have each its own mud-bank, called a "beach," protected by a surrounding swamp, and, as regards river frontage, by a line of coco-posts driven closely together to counteract washing away. These beaches are thus formed:—A house is to be established; application is made to the particular chief interested, who readily grants a site in the mangrove swamp, which he will probably clear with his slaves, under the guise of helping the trader, really to promote his own interests. The site is then fenced with coco-posts and filled up with black mud, and a coating of sand put on the top. It is then ready to receive a dwelling-house.

Although we find in Yoruba large tracts of land without any sign of a habitation, it would seem to be the indigenous view of land tenure that there is no land absolutely unoccupied in the sense of being without an owner.

The occupancy, clearing, and cultivation of unoccupied land is considered to vest the ownership in the occupier within the limits which he has originally cleared, as against any subsequent occupier. But possession is dependent first upon asking and receiving permission from the person or persons considered and acknowledged as having seigniorial rights, which is usually the king, some chief or chiefs, or head man.

Permission, as regards the asking, is merely a matter of form, as any such landlord has no interest to the contrary, and besides, he naturally desires to have as many persons as possible living within his acknowledged area. Squatting without permission is contrary to native custom and feeling. Seigniorial rights are often of so little value that they are not claimed, amounting in most cases only to occasional presents of fruit or vegetables. As between the natives themselves, there is no subject which gives rise to disputes of so much acrimony and pertinacity as disagreements relating to land.

The industries in the eastward direction are the manufacture of palm oil, the cultivation of indian corn, of leguminous plants of different sorts, of yams, and of *cassava*, which affords the preparation known as *gari*, an important staple of food.

The fishing industry proceeds only to a very limited extent on the lagoons, if I except sites opposite to towns and villages peopled by Lagosians. I may add, sea fishermen are not known in the colony; this fact is attributable to the existence of the inland waters, which seems to supply native wants in fish. The many rivers that intersect the country are also said to abound in fresh-water fish.

The fishing craft is represented altogether by the canoe, "the dug-out," of varying sizes, regulated by the number of persons carried, viz. from five to one. They are generally hollowed out, by the adze and burning of the trunk, of the silk cotton tree (*Bombax*), or of a species of fig-tree. Canoes most frequently used are those for three persons;

they are propelled by paddles, the shapes of which vary tribally, the occupant (or occupants) resting on his knees, on his haunches, or standing erect, or perched on seats—cross sticks, secured by tie-tie on the gunwale of the canoe.

They are sometimes built up at the sides when required for commercial transport purposes, for ferry-boats, or as war-canoes. The ordinary sized fishing canoe is propelled by three men, one of whom, occupying the stern, propels and steers, his main duty being the latter; and in their management of the craft they are surprisingly clever.

Transport is mainly effected by means of the rivers and lagoons, that is the inland waterways, so far as water can be made use of, and on the heads of natives by land, as was experienced in the Ashantee war of 1873-4. For water transport, canoes abound. The carrying power of canoes is judged by the number of persons or casks of oil each will carry. Their sizes accordingly vary from what can contain from two to eighty persons, or from two to sixteen puncheons of oil.

Bar-boats of seven to eight tons have been used at Lagos; only for commercial purposes, as the means for the transfer of cargoes from ship to shore, and of produce from shore to ship. They have been only used by the mercantile houses, but since the African steamship companies have supplied to Lagos and the rivers their own branch steamers, the number of bar-boats has considerably decreased, and their use is a thing of the past.

On the lagoons and rivers fishing is conducted day and night. On moonlight nights fishermen make use of a broken bottle and a piece of iron which they tinkle to attract their prey. Fishing gear consists of fish-traps of various forms and sizes, generally made of the split midrib of the leaf of the *Raphia vinifera*, and of drag-nets, hand-nets, and lines commonly manufactured from the fibre of the pineapple (*Ananassa sativa*), *ojaikoko* (*Sansiviera guineensis*), *Agbonius ilusa*, or *Honckenya ficifolia*. This is the work of the fisherman, whose sinking-lead, or anchor for his canoe, is usually a piece of brick or stone.

For the capture of fish the natives also resort to the use of vegetable poisons, such as *Tephrosia Vögeli* and *Morelia senegalensis*. There are many others in use, known so far only by their vernacular names.

Edible oysters are found in beds, on the rocks running out into the sea, which are uncovered at low tide, and on trees (mangrove). The trade in oysters is large, but confined to the coast.

The trees on which oysters are usually to be found in the tropics are of the mangrove family, the nature of which, with their aerial roots, admits of their growth in the flow of the oyster spat, which is thus at times in part intercepted, adheres, and develops into what is commonly spoken of as the tree-oyster. Mangrove oysters are not as much sought after as bed or rock oysters, although they are collected for the sake of their shells, for the purpose of conversion into lime.

Bed-oysters are more extensively sought after. A solitary canoe at anchor over oyster-beds may be seen at times with no occupant. He has dived with his basket, and grabs in the mud (so long as his breath will allow him to remain under) for his prey, until by such repeated efforts he succeeds in filling his canoe. Women are usually the buyers and subsequent retailers of such commodities. Rarely, except for European tastes, oysters are sold open, but in bulk with the shell on. Such as are not disposed of fresh are cured similarly as are shrimps and fish.

The oyster season, although the mollusc may be taken at any time, may be considered to extend, as far as the Gold Coast colony goes, over six months or so of each year, during the rainy season. Oyster collectors make yearly presents to the fetish-priests, to invoke and propitiate the god of fish.

There is a certain danger associated with this industry, for it has been known that persons concerned in the same have fallen victims to sharks and crocodiles; in the lagoon waters the latter abound. The collection of the raw material can be followed out by any man or woman. Odd to say, among the Yorubas, he who follows the oyster industry is considered as of the lowest grade of society. In the past, such a man would be denied marriage in a family of position above his social estimate. Women go in for the collection of mangrove-oysters. There is commonly found in the western lagoons and those of the Whemi river a large edible prawn commonly used as an article of food—*Palæmon vollenhoveni*.

The Yoruba people, although they have many songs, are comparatively unacquainted with musical instruments, if we except the drum. In the country are to be generally found itinerant drummers and singers. Their vocal effusions, confined as a rule to the compass of a few notes, and noisy and monotonous as they are sometimes pronounced, are usually accompanied by the drum, or by a set of drums, by the clapping of hands, or by the beating of time on some stick or on their tongueless native bell called *agogo*. The principal amusement of the youth of Yoruba is to dance to the beat of a drum, which serves as an accompaniment to song on the occasion of festivals, great ceremonies, at births, marriages, and deaths.

The public singers are called *akonrin*, *akewi*, and *onirara*. They are classed as beggars, as are drummers and other musicians in West Africa. Their occupations are hereditary. Singers work in couples, sometimes more; they rely on their vocal powers, in the channel of abuse or flattery, for their maintenance.

A Yoruba goes so far as to consider that his language is sufficiently musical to be easily imitated instrumentally, and accordingly to allow a player through his instrument to convey his thoughts without having recourse to words.

Such a practice is often referred to as the drum language, viz. the
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imitation of the human voice of the drum ; and to understand it one has to know the accents of pronunciation in the vernacular, and to be capable of recognising the different and corresponding notes of the drum.

Whilst to the north of Dahomey lies Mehi or Makhie, where a dialect of Ewe is spoken, Yoruba is bounded on the north by Borghu, the capital of which is Bussah or Bussang, on the Niger, where the ruler of the country resides. As will be acknowledged from the comparative examples hereafter given, the language of Borgu has an affinity to that of Bornu, which is a dialect of Fulah. At the time of the Landers, the two most powerful kings in that part were—for Northern Africa, the king of Bornu, and for Western the king of Borghu.

Sultan Bello, in his geographical account of the country, says that Burghoo (Borgu) was peopled from the Soudan by slaves (the Landers thought conquered inhabitants) of the Fulahs.

	<i>Bornu.</i>	<i>Borghu (Barba).</i>
One	Tiya	Guba.
Two	Yiru	Iru.
Three	Ita	Ita.
Four	Ne	Neh.
Five	Nobu	Nobu.
Body	Wesu	Wasi.
Child	Bi	Biyanku-bu.
Dog	Bun	Bunhun.
Elephant	Sunu	Sünnüm.
You weep	Nena-sumu	Na-su-mu.
Rain	Gura	Gura.

The Barba people trade in cattle and poultry with Lagos, through Isehin and Abeokuta.

Except what we find scattered in the few works of travel, comparatively little is known of the geology of Yoruba beyond the generally known fact that its seaboard or malarial belt is alluvial.

The island of Lagos and the strips of land that lie sandwich-like along the coast in the lagoons, have been also considered to be originally of coral formation, and subsequently covered with deposits of sand and continental debris of various depths. On the island of Lagos deposits of sand to a depth of 18 feet are to be found.

Most part of this alluvial area is below the level of the intersecting and surrounding lagoons in the rainy season ; in the dry weather, when the water is comparatively low, it has a slight elevation above the water-level. At Epe, Ikoradu, Ilegbo, and Porto Novo, all situated on the mainland, are noticeable tracts of rising ground of varying elevation up to about 150 feet. This alluvial condition will account for the remarkable absence of stone in the country until the laterite or ironstone region is reached on the mainland, where I found it widely spread,

having found it cropping up, reddish-brown in colour, over extensive areas to the north of Badagry, in Ebute Meta, and onwards towards Abeokuta, and in Jebu to the eastward.

For the lack of information hitherto furnished regarding the interior we can somewhat account when we remember that in the old slave days the hunting down of captives was left to the natives themselves, and that the human barter or sale was confined to the seaboard.} The palm-oil industry succeeded this nefarious traffic, and the *Elais guineensis* which yields this commodity is found confined to a belt of about 100 miles from the coast-line; beyond, the country had little interest or attraction. Again, the rivers have, as a rule, been closed to Europeans, and the sections their banks offer for geological study have not been available.

The geological map of West Africa, published by Dr. Oscar Lenz in 1882, illustrates merely the coast land of Yoruba between 2° and 3° E. long. This illustration represents (1) the alluvial or coast region, and next the laterite or ironstone; beyond, no information appears. The question naturally presents itself, whence came the laterite, whether from gneiss, of which the elevated regions to the north-west of Yoruba, known as the Kong Mountains, are said to be formed, or from the volcanic rocks (basalt?) of the Cameroons Mountains about 300 miles distant eastward?

Speaking of Kong, Burton said it was the source whence gold was supplied to Mandingo to the north and Ashanti to the south. Mungo Park before him brought to notice the gold-yielding country north of Kong; but spurs of this highland are doubtless the ranges that intersect Gaman, Ashanti, the Wassaws, Akmis, and Aquapim of the Gold Coast Colony, Quahon, Crobai, Aguamoo, Dahomey, Northern Yoruba, and Mehi.

Laterite presents itself in Addo, Okeodan, Igbessa, Ilaro, Ketu, Egba, Jebu, and Yoruba generally. Mention is made of the cropping up here and there, but not frequently, of red sandstone, which has been compared to what is so noticeable at Accra, Cape Coast, Elmina, Cape Three Points, and Cape Palmas.

In and about Abeokuta, the Rev. T. J. Bowen, of the American Baptist Mission, found chiefly coarse granite, masses of which rise up to a height of 200 feet and more. As he went further inland he found it of finer grain and capable of a high polish. The village of Eruwa stands on a naked mass of granite several hundred feet high. The arms Ayan and Ofiki of the Ogun river are obstructed by boulders of what has been described as gneiss.

Abeokuta, the capital of Egba, means, in Yoruba, "underneath a rock," and is the name that was given to the granite hill under the boulders of which took shelter refugees of the old Egba kingdom after its breaking up, about the beginning of the present century, by Yorubas (Oyos) and Jebus. The largest boulder is worshipped under the name of *Olunia*.

Quartz crystals were found in Yoruba by Mr. Bowen, who thus wrote of the region near and north of Abeokuta:—"The coarse granite at Abeokuta presents fine crystals of felspar. Trap-rock is found in the valley south of the Oke-Efo mountains (situated between the arms of the Ogun river), and a little protogene. In the granite of these mountains I discovered small quantities of schorl, a rare occurrence in Yoruba." Mr. Bowen also saw gold in quartz rocks, of which he satisfied himself with acid and blow-pipe. The vernacular in Yoruba for gold is *wara*—query whether it is not a loan word from the interior: we find it is similarly called in Barba and Timbaktu.

However, of the natural mineral wealth of the country iron alone is smelted and worked in Yoruba. The Ketus and Dahomians excel in working iron, brass, and in wood-carving; such industries are also pursued generally throughout Yoruba.

In 1881 Professor E. Cohen examined specimens supplied by Professor Fraas from the highest part of the Cameroons Mountains, which he pronounced as plagioclase basalt with olivine, rich in iron. Later, in 1882, Professor C. W. Gumbel examined geological specimens from the auriferous region of the Gold Coast 300 to 400 miles west of Lagos, and found them to consist of crystalline schists, with quartzite and itaberite common. The matrix of the gold was, according to him, in the schistose rocks, and principally in the itaberite (found to a considerable extent behind the French and Portuguese possessions further south). None of the quartz-bearing specimens seemed to have come from reefs.

Along the edge of the mainland in the Ebute Meta district, as at Porto Novo, to its westward, decomposed laterite conveniently presents itself, and is used by the natives for the manufacture of bricks (now an extensive industry), water-pots, tobacco-pipes, and other interesting and useful articles of pottery.

In Ketu the soil has been found sufficiently tenacious (decomposed laterite?) to admit of the storage of rain-water in dug-out tanks needing no artificial supports. In Okeodan is to be seen a white clay, chiefly used for personal disfigurement on the occasion of the celebration of fetish rites. I found the same on the top of the Aguaepean range of hills behind Accra. Waterworn stones are found exposed and at elevated regions in northern Yoruba, sometimes buried in laterite. I noticed the same fact in the champaign country near Accra, where tank and well excavations were proceeding.

Since writing this paper it has been suggested to me by Mr. Rudkin that the origin of the laterite is probably due to the alteration of basaltic or other basic eruptive rocks rich in ferruginous silicates, the situation of which is not known yet to us: thus, that it has hardly come from the volcanic rocks of the Cameroons, but rather from similar rocks in or nearer to Yoruba; if not that, it may owe its origin to the iron-bearing

minerals in the schistose series, especially to the itaberite, which is rich in oxide of iron.

Beads, called *okum*, in the form of perforated cylinders of red agate jasper passing into cornelian, have reached me from the Niger, where it is stated this stone is obtainable, and much used in imitation of coral, to which it is preferred.

Nor is Yoruba excluded from the widespread belief that stone implements are thunderbolts. Some rude celts shaped as axes and chisels I have collected: they are called *arā okó*. The second great Orisá, or object of worship intermediate between man and God (*olorun*) is *Sángó*, the thunder god, a name sometimes applied to the stone implements which are believed to be the bolts of *Sángó*, who is also named *Dzakuta*, the stone-thrower. The greatest reverence is extended to these stones, which are used as family fetishes when they are found by ordinary persons.

On the nature of the stone of these implements it is difficult to get any information without destroying the specimens for microscopic observation, and even then with the prospect of a doubtful result. The character of the rock, fine grained as a rule, is disguised in the polish given in shaping the implement, and from use. Through the courtesy of Mr. F. W. Rudler, of the Museum of Practical Geology, I am enabled to say that one of my specimens is a quartzite, and two others schistose rocks (one of very low density, and the other containing much quartz), brought down by the floods and rivers from schistose hills of the interior.

Stone arrow or spear heads I have not come across; on the other hand, I have arrows varying from merely pointed sticks to iron-tipped reeds.

In the valley of the Upper Volta, Akropong, Aburi, in Ashanti, in the gold-fields behind Axim, have also been found remains of the stone age of West Africa. Burton describes his specimens from Axim as fine close felsite or greenstone trap (dolerite) found, according to him, everywhere along West Africa. Dr. John Evans has remarked upon the strong general resemblance between West African stone implements and those found in Greece and Asia Minor. In their practice, when engaged sacrificially, of daubing these stones with blood, palm-oil, &c., the West Africans resemble the Indians.

The most complete information in a comprehensive form regarding the Flora of the country is to be found in the work entitled 'Flora Nigritiana,' by Dr. J. D. Hooker and Mr. G. Bentham, giving the results of the botanical researches of Dr. Theodore Vogel, who was botanist to the expedition sent by Her Majesty to the Niger in 1841, the sequence of the discovery of the course of that river by the Landers.

"The total number of species enumerated from the collection made in West Tropical Africa by the officers of the Niger Expedition, and by

Don and others, amounts to 974, of which Dicotyledons 803, and Monocotyledons 171." Of the former the principal orders were Leguminosæ, of which there were 113 species, Rubiaceæ 97, Compositæ 40, Acanthaceæ 37, Euphorbiaceæ 37, Convolvulaceæ 27, Urticaceæ including Artocarpeæ 27, Malvaceæ 23, and Melastomaceæ 23. Seventy-nine species under Gramineæ, 39 under Cyperaceæ, and 16 under Commelyneæ make up chiefly the Monocotyledons.

Since the publication of this work much has been done by various collectors in adding to our knowledge, particularly of the economic botany of Yoruba. A botanic centre, which gives much promise, was established in 1887 by the Government of Lagos, on the mainland, for the education of the natives in the direction of recognising the botanical wealth of their own country, and to serve as a distributing centre of economic plants of commercial value, for to its indigenous and exotic agricultural development Tropical Africa must look for a long time to come. The Royal Niger Company has also followed the example set by Lagos.

Of the economic plants of the country, I would briefly mention the *Elais guineensis*, which yields the palm oil of commerce; next *Gossypium barbadense* and *herbaceum*, said to give the new cotton exported through Lagos; *Cocos nucifera* (coco-nut tree), to the extensive growth of which much attention is now being turned; *Cola acuminata*, cultivated to a limited extent; the fruit is an important article for home consumption and for export to the settlements of negroes in Brazil; *Baphia nitida*, bar and camwood; *Biza orellana*, famous for its arnatto dye; *Arachis hypogæa*, the ground-nut, cultivated to a small extent for home consumption; *Butyrospermum Parkii*, extensively found in northern and north-western Yoruba; several species of rubber vines (*Landolphia*) and *Sansivieras*, yielding valuable fibres, as do several Tiliaceous plants.

There are many indigo-yielding plants commonly found in Yoruba, of which I may specially mention those chiefly used in the extensive blue-dying industry that prevails, viz. *Indigofera anil*, *Indigofera tinctoria* (used so much in India), and *Lonchocarpus cyaneescens*, the *Elu* of Yoruba; both are to some extent cultivated.

In a monograph written in 1876 by W. P. Hiern, in the 'Transactions' of the Linnean Society, on the genus *Coffea*, he refers to no less than 15 African species, and he generally remarks that "all the species most valuable for economic or commercial purposes are confined to Africa or are of African origin." It has indeed always surprised me that so little attention has been given in its native country to this indigenous product. In Yoruba, about Abeokuta, the missionaries use commonly the wild coffee, *C. rupestris*; along the Niger we find *C. jasminoides*.

GEOGRAPHICAL NOTES.

Our next Session.—The new Session of the Society will open on Tuesday, November 11th. An evening meeting will be held at that date, followed by meetings on the 24th November and the 8th December. The papers expected to be read on these, or subsequent, dates are:—“The Tanganyika Plateau,” by H. H. Johnston, H.M. Consul at Mozambique; “Journey up the Niger and to the head-waters of the Benué,” by Major C. M. Macdonald; and “Climates,” by A. Buchan, Secretary to the Scottish Meteorological Society.

The Grave of Mr. Keith Johnston in East Africa.—By a communication from the Foreign Office we learn that Dr. Schmidt, the Acting Imperial German Commissioner, in the course of a tour of inspection in that part of the German territory, had visited the burial place of Mr. Keith Johnston, the leader of our East African expedition of 1879, near Berobero, 120 miles inland from Dar-es-Salaam. We owe our grateful thanks to Dr. Schmidt for having cleansed and repaired the site of the grave, and causing it to be surrounded by a wooden railing, and for erecting on the grave itself a wooden cross bearing the name of the deceased. Colonel Euan Smith, our Consul-General, has expressed the gratitude of all Englishmen to Dr. Schmidt for the honour and respect he has paid to the last resting-place of one of the English pioneers of civilisation in East Africa: meantime it is hoped that the family and friends of the much-lamented traveller will see that a suitable stone or tablet is sent out to be placed on his grave, Dr. Schmidt having promised beforehand that their wishes shall be carried out.

Dr. O. Baumann in Usambara.—The following particulars of the continuation of Dr. Baumann's surveys in Usambara are taken from the current number of Petermann's ‘Mitteilungen.’ Information as to his earlier surveys was recorded in our July number. From the village of Kwa Kitzungui, situated on the eastern edge of the Paré range, the traveller proceeded northwards along this mountain chain. The country presents nearly everywhere the character of a steppe, except where the mountain streams have formed small oases, such as those of Gondja and Kinsuani. Seven days' travelling brought him to the northern end of the South Paré Mountains, where he surveyed the small peak of Paré Kisungu. Then he marched to the southern end of the Ugueno range, more correctly designated the North Paré range, and penetrated through the mountains from south to north in six days, crossing the routes of Dr. Meyer and v. d. Decken. The country here is mostly open, well cultivated and watered. Bananas, sugar-cane, and sweet potatoes are grown principally. There is an absence of villages. The inhabitants, the Wa-paré, live in isolated huts scattered over the country. They wear their hair generally in rude clay-bedaubed frisures, like the Masai;

they carry spears with immense blades, and their clothing of skins is very modest. Their great timidity, which stands in contrast with their warlike appearance, caused them to take to their heels wherever the traveller appeared in the southern part of the country. In the heart of the mountains the people were far more accessible. The streams of this district are rich in iron ore, the manipulation and smelting of which in a primitive way the natives understand. The most northerly corner of the mountains is inhabited by the Wagueno, a small tribe whose territory the traveller crossed in one day. Dr. Baumann then returned to Moshi. He intended afterwards to make a survey of the South Paré Mountains.

Progress of M. Grum-Grijmailo's Expedition into Central Asia.—The expedition which started in April 1889, under the leadership of M. Grum-Grijmailo and his brother,* to explore the eastern Tian Shan, is reported to have arrived at Hami on the 16th January last. Near the head-waters of the Khorgos in the eastern Tian Shan the travellers discovered a very high peak called Doess-Meghene-ora (meaning "most lofty of mountains"), the altitude of which they estimated at about 21,500 feet. After ascending the Bogdo-ula they visited the Turfan oasis, whence they made an excursion across the Desert of Gobi to Lake Lob-nor. It is not stated whether they have, as was originally contemplated, explored the Altyn-tag range.

Some Scientific Results of Sir W. Macgregor's recent Expedition to the Owen Stanley Range.—The following notes on some of the scientific results of Sir W. Macgregor's recent expedition to the Owen Stanley Range are extracted from various reports by specialists, to whom the collections brought home by the expedition were submitted, which are published as appendices in a Parliamentary Paper (C-5897) recently issued by the Colonial Office. The botanical specimens were submitted to Sir F. von Mueller, who deals in his report chiefly with those plants gathered at altitudes between 8000 and 13,000 feet. Of the eighty plants recorded as emanating from the most elevated regions nearly forty seem to be endemic. Of these, two, viz. *Ischnea elachoglossa* and *Decatoca Spencersi*, represent new genera, the one allied to the exclusively Italian *Nananthea*, the other to the Australian and chiefly Alpine *Trochocarpa*; nineteen are of Himalayan type. There is in the highland vegetation of New Guinea an extensive display of Heaths and Vacciniacæ, which forms of vegetation are in Australia so scantily developed, and then mostly on alpine heights, and there is also a marked preponderance of far Southern upland types, either Australian, New Zealand, or Sub-antarctic, a fact demonstrated by the occurrence of numerous absolutely identical species (18 are mentioned by name). Four Borneo plants have now been traced to the Papuan highlands, viz.

* Vide 'Proceedings R.G.S.,' 1889, p. 505.

Drimys piperita, *Drapetes ericoides*, *Rhododendron Louisi*, and *Phyllocladus hypophyllus*. Even a few of such British plants as are not almost universally cosmopolitan, have now been found to be indigenous in New Guinea, e. g. *Taraxacum officinale*, *Scirpus cespitosus*, *Aira cespitosa*, *Lycopodium clavatum* and others. Sub-antarctic features are represented by *Gaultiera mundula*, *Uncinia Hookeri*, *Schœnus curvatus*, &c. Arboreal vegetation on the Owen Stanley Range was found to cease at 11,500 feet, but this is not due to a change of geological formation. It is possible that on some other Papuan peaks the tree-limit may be somewhat higher, as is the case with zones of vegetation in the Himalayas at and near the tropics, where for instance the *Scirpus cespitosus* (one of the plants just mentioned) grows at 17,000 feet. *Cyathea Macgregorii* seems to reach one of the most elevated positions attained by tree-ferns anywhere, viz. 12,000 to 13,000 feet. The following are mentioned as plants possessing possible economic value:—the “cypress” (*Libocedrus papuana*), which constitutes the principal forests on the summit of Mount Douglas and Winter’s Height, the peculiar “bamboo” with which the dry region begins at 8500 feet, several hardy rhododendrons, the dwarf raspberry plant, and the korthalsia palm. The species of highland grasses in Papua are not numerous. The plants from the Louisiades, and some of the lower tracts of New Guinea, belong mostly to Sunda Island forms; one stately pandanus (*P. Macgregorii*) is new. Von Mueller reserves for future consideration the question whether the occurrence in the highlands of New Guinea and Borneo of so many plants from high southern latitudes in evidently coeval forms of common origin, and the fact that the highest regions, and these almost only, should, as in New Zealand, reiterate plant-life otherwise typical of Tasmania, of continental Australia, of islands in the Southern Ocean, and of Patagonia, may not indicate a continuity of portions of the Papuan islands in earlier epochs with a once vastly extending southern land now mostly submerged.—As to the birds, Mr. C. W. de Vis reports that the 161 specimens represent 82 species, of which 13 appear to be hitherto unrecorded, and one at least lays claim to generic rank. The latter is a very distinct kind of Bower bird, obtained at an altitude of 11,000 feet on Mount Knutsford, and rivalling the Regent bird in beauty. It has been designated *Cnemophilus* (mountain-slope lover), and the species is to be named after Sir W. Macgregor. A second new Bower bird, constituting a third species of the genus *Amblyornis* and distinguished by a very ornate crest, a new honey-eater of the genus *Melirrhophetes* and a new species of flycatcher, *Todopsis*, are noted. No new birds of paradise were discovered. One of the most important ornithological results is that the decided change of climate observed at the altitude attained, over 13,000 feet, is not attended by a corresponding change in the types of bird life, and that even here there is no infusion of forms characterising temperate or cold latitudes.—The collection of reptiles consisted of

two species of lizards, the snake-like *Lialis*, common to Australia also, and the sleeping lizard (*Cyclodus*), ten species of snakes, mostly innocuous, four of which are Australian, and one frog, a new species of the genus *Michrohyla*.—The Lepidoptera collected represent unfortunately only the fauna of the lower altitudes and the species, with two or three exceptions, were already known to science. The collection is interesting as displaying the similarity of the New Guinea fauna to that of North-east Australia, there being no less than 23 of the 53 species obtained common to both regions, while of the 31 genera represented 25 are found in both countries.—Two land shells from the highest summit (13,000 feet) of the Owen Stanley Range constitute the first traces of molluscan life collected in the New Guinea mountains, and are pronounced to be hitherto unknown species of the genus *Rhytida*.—The examination of the geological specimens by Mr. W. H. Rands, the Assistant Government Geologist, shows that the whole region drained by the Vanapa river consists almost entirely of schists, which become more highly metamorphosed as the loftier heights of the Musgrave Range and Mount Victoria are reached. On the latter the schists are very micaceous, highly crystalline, and closely approaching to gneiss; on passing down the river the country consists of clay schists and slates, while near the mouth there are specimens of a but slightly altered sandstone. The schists, and also the alluvial deposits of the Vanapa river, contain traces of gold. This is important in connection with the discoveries of Mr. A. Goldie and the Rev. W. Lawes, in 1877-8, of the first alluvial gold in New Guinea, and the still earlier discovery of gold in the rock specimens obtained by the Hon. W. Macleay during his voyage in the *Chevert*, and by D'Albertis on the Fly river.

Captain Page's Expedition up the Pilcomayo.—We have received news of serious misfortunes having befallen this expedition, and of the death of its commander, Captain John Page, of the Argentine Navy, whose paper on "The Gran Chaco and its Rivers," read before the Society in January 1889, will be fresh in the memory of frequenters of our Evening Meetings. Captain Page had had previous experience of the two rivers, the Pilcomayo and the Vermejo, which traverse the plains of the Chaco, and had set himself the task of solving the problem of their serving as waterways between the centres of population on the Plata and Bolivia. He had boats constructed for the purpose in England, and left with high hopes of succeeding in his mission, though previous attempts had failed, owing to the sudden and disastrous floods to which the rivers are subject, and the treacherous character of the Indians and half-breeds who live along their banks. The news is taken from the *La Nacion* newspaper of Buenos Ayres, August 19th. It is to the effect that after ascending for some distance, and overcoming the great obstacles which the river presents, they ran out of provisions, and had to support themselves by their guns and fishing, whilst suffering from

the attacks of the Indians. The military guard with which they were provided at starting returned, worn out with hunger and fatigue: the rest of the party pressed forward, and reached the swamp known as "Patino" in S. lat. 22°, from which Captain Toriffa, the second in command, was sent down to the mouth of the river to procure fresh supplies. Before he could return with the required means of saving the party from starvation, news arrived of the death of the gallant leader. Among the remaining members of his party, whose fate is not yet known, are the son of the captain, Mr. Nelson Page, who was with him in London, Mr. Kerr, an English naturalist, and Mr. Kenyon, who also went out with Captain Page from England.

The Orœfa Jokul, Iceland.—An attempt, which was near proving successful, to reach the summit of this lofty ice-clad peak in South-eastern Iceland was made last summer by Mr. Frederick W. W. Howell, of Sutton Coldfield. He started with three men (Páll Jonsson, Thorlakur Thorlakson, and Jon Sigurdsson) from Svinafell on the 12th August, and reached on the following day a point 6100 feet above sea-level, within 141 feet of the summit. At that point they were beaten back, after a long struggle, by a south-easterly gale and snowstorm. The snow-line was found to be at 2000 feet elevation. Mr. Howell believes, contrary to the opinion of previous travellers, that the difficulties of the ascent are not insuperable, at any rate from Sandfell, his starting-point. At the highest point reached the névé had curled back from the arête, leaving an awkward descent and exposing an ice-bound wall, but a little lower down a snow-bridge led across, and, in suitable weather, Mr. Howell saw no reason why the ascent could not be continued. The only previous attempt to reach the summit that we can find is that of Messrs. Holland and Shepherd in 1861.

New Russian Ethnographical Journal.—A new quarterly Ethnographical publication is announced to appear this autumn, in St. Petersburg, under the title of *Jivaya Starina*. It will be edited by the President for the time being of the Ethnographical Section of the Imperial Geographical Society, assisted by an efficient staff of contributors, and will contain—I. Researches, observations and reflections; II. Minor articles, notes linguistic and popular on Russians and foreign nations; III. Critical and biographical notes; IV. Miscellaneous. Among the new features of this periodical will be contributions by writers of the peasant class, and by women, who have shown in Russia a great aptitude for ethnography, and especially for everything relating to tradition, custom, and ancient observances.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION
OF THE BRITISH ASSOCIATION.

LEEDS MEETING, 1890.

THE Geographical Section met in the Albert Hall, and the meetings were throughout well attended.

The Committee of the Section was constituted as follows:—

PRESIDENT.—Lieut.-Colonel Sir R. Lambert Playfair, K.C.M.G., F.R.G.S.

VICE-PRESIDENTS.—Sir Frederic J. Goldsmid, K.C.S.I., C.B.; Sir Erasmus Ommanney, C.B., F.R.S., F.R.A.S.; E. G. Ravenstein.

SECRETARIES.—A. Barker, M.A.; John Coles, F.R.A.S.; J. Scott Keltie (*Recorder*); H. J. Mackinder, M.A.; A. Silva White, F.R.S.E.

COMMITTEE.—Theodore Bent; Dr. W. G. Blackie; Rt. Hon. Sir George F. Bowen, G.C.M.G., D.C.L., LL.D.; Professor Flower, C.B., F.R.S., LL.D.; Sir James Kitson, Bart.; Dr. H. J. Johnston-Lavis; Dr. Hugh Robert Mill; Dr. J. S. Phené, LL.D.; Sir Rawson W. Rawson, K.C.M.G., C.B.; Eli Sowerbutts; Rev. Canon H. B. Tristram, F.R.S.; Cope Whitehouse.

Thursday, September 4th.

The PRESIDENT opened the business of the Section with the following address:—

The Mediterranean, Physical and Historical.—When the unexpected honour was proposed to me of presiding over your deliberations, I felt some embarrassment as to the subject of my address. Geography as a science, and the necessity of encouraging a more systematic study of it, had been treated in an exhaustive manner during previous meetings. The progress of geography during the year has been fully detailed in the Annual Address of the President of the Royal Geographical Society; so that it would be a vain and presumptuous endeavour for me to compress these subjects into the limits of an opening address. Closely connected with them are the magnificent experiments for opening out Africa which are being made by our merchant princes, amongst whom the name of Sir William Mackinnon stands pre-eminent, and by the missionary societies of various churches, all acting cordially in unison, and sinking, in the dark continent, the differences and heart-burnings which divide Christianity at home; I have thought it better, however, not to discuss matters so closely connected with political questions which have not yet passed into the realm of history.

In my perplexity I applied for the advice of one of the most experienced geographers of our Society, whose reply brought comfort to my mind. He reminded me that it was generally the custom for Presidents of Sections to select subjects with which they were best acquainted, and added: "What more instructive and captivating subject could be wished than **THE MEDITERRANEAN, PHYSICAL AND HISTORICAL?**"

For nearly a quarter of a century I have held an official position in Algeria, and it has been my constant delight to make myself acquainted with the islands and shores of the Mediterranean, in the hope of being able to facilitate the travels of my countrymen in that beautiful part of the world.

I cannot pretend to throw much new light on the subject, and I have written so often about it already that what I have to say may strike you as a twice-told tale; nevertheless, if you will permit me to descend from the elevated platform

occupied by more learned predecessors, I should like to speak to you in a familiar manner of this "great sea," as it is called in sacred Scripture; the *Mare Internum* of the ancients; "our sea," *Mare nostrum*, of Pomponius Mela.

Its shores include about three million square miles of the richest country on the earth's surface, enjoying a climate where the extremes of temperature are unknown, and with every variety of scenery, but chiefly consisting of mountains and elevated plateaux. It is a well-defined region of many parts, all intimately connected with each other by their geographical character, their geological formation, their flora, fauna, and the physiognomy of the people who inhabit them. To this general statement there are two exceptions, namely—Palestine, which belongs rather to the tropical countries lying to the east of it, and so may be dismissed from our subject, and the Sahara, which stretches to the south of the Atlantic region—or region of the Atlas—but approaches the sea at the Syrtis, and again to the eastward of the Cyrenaica, and in which Egypt is merely a long oasis on either side of the Nile.

The Mediterranean region is the emblem of fertility and the cradle of civilisation, while the Sahara—Egypt, of course, excepted—is the traditional panther's skin of sand, dotted here and there with oases, but always representing sterility and barbarism. The sea is in no sense, save a political one, the limit between them; it is a mere gulf, which, now bridged by steam, rather unites than separates the two shores. Civilisation never could have existed if this inland sea had not formed the junction between the three surrounding continents, rendering the coasts of each easily accessible whilst modifying the climate of its shores.

The Atlas range is a mere continuation of the South of Europe. It is a long strip of mountain land, about 200 miles broad, covered with splendid forests, fertile valleys, and in some places arid steppes, stretching eastward from the ocean to which it has given its name. The highest point is in Morocco, forming a pendant to the Sierra Nevada of Spain; thence it runs, gradually decreasing in height, through Algeria and Tunisia, it becomes interrupted in Tripoli, and it ends in the beautiful green hills of the Cyrenaica, which must not be confounded with the oases of the Sahara, but is an island detached from the eastern spurs of the Atlas, in the ocean of the desert.

In the eastern part the flora and fauna do not essentially differ from those of Italy; in the west they resemble those of Spain; one of the noblest of the Atlantic conifers, the *Abies pinsapo*, is found also in the Iberian peninsula and nowhere else in the world, and the valuable alfa grass or esparto (*Stipa tenacissima*), from which a great part of our paper is now made, forms one of the principal articles of export from Spain, Portugal, Morocco, Algeria, Tunisia, and Tripoli. On both sides of the sea the former plant is found on the highest and most inaccessible mountains, amongst snows which last during the greater part of the year, and the latter from the sea-level to an altitude of 5000 feet, but in places where the heat and drought would kill any other plant, and in undulating land where water cannot lodge.

Of the 3000 plants found in Algeria by far the greater number are natives of Southern Europe, and less than 100 are peculiar to the Sahara. The macchie or maquis of Algeria in no way differs from that of Corsica, Sardinia, and other places; it consists of lentisk, arbutus, myrtle, cistus, tree-heath, and other Mediterranean shrubs. If we take the commonest plant found on the southern shores of the Mediterranean, the dwarf palm (*Chamærops humilis*), we see at once how intimately connected is the whole Mediterranean region, with the exception of the localities I have before indicated. This palm still grows spontaneously in the south of Spain and in some parts of Provence, in Corsica, Sardinia, and the Tuscan Archipelago, in Calabria and the Ionian Islands, on the continent of Greece, and in several of the islands in the Levant, and it has only disappeared from other countries

as the land has been brought under regular cultivation. On the other hand, it occurs neither in Palestine, Egypt, nor in the Sahara.

The presence of European birds may not prove much, but there are mammalia, fish, reptiles, and insects common to both sides of the Mediterranean. Some of the larger animals, such as the lion, jackal, panther, &c., have disappeared before the march of civilisation in the one continent, but have lingered, owing to Mohammedan barbarism, in the other. There is abundant evidence of the former existence of these and of the other large mammals, which now characterise tropical Africa, in France, Germany, and Greece; it is probable that they only migrated to their present habitat after the upheaval of the great sea which in Eocene times stretched from the Atlantic to the Indian Ocean, making Southern Africa an island continent like Australia. The original fauna of Africa, of which the lemur is the distinctive type, is still preserved in Madagascar, which then formed part of it.

The fish fauna is naturally the most conclusive evidence as to the true line of separation between Europe and Africa. We find the trout in the Atlantic region and in all the snow-fed rivers falling into the Mediterranean; in Spain, Italy, Dalmatia; it occurs in Mount Olympus, in rivers of Asia Minor, and even in the Lebanon, but nowhere in Palestine south of that range, in Egypt, or in the Sahara. This fresh-water salmonoid is not exactly the same in all these localities, but is subject to considerable variation, sometimes amounting to specific distinction. Nevertheless it is a European type found in the Atlas, and it is not till we advance into the Sahara, at Tuggurt, that we come to a purely African form in the Chromidæ, which have a wide geographical distribution, being found everywhere between that place, the Nile and Mozambique.

The presence of newts, tailed batrachians, in every country round the Mediterranean, except again in Palestine, Egypt, and the Sahara, is another example of the continuity of the Mediterranean fauna, even though the species are not the same throughout.

The Sahara is an immense zone of desert which commences on the shores of the Atlantic Ocean, between the Canaries and Cape de Verde, and traverses the whole of North Africa, Arabia, and Persia, as far as Central Asia. The Mediterranean portion of it may be said roughly to extend between the 15th and 30th degrees of North latitude.

This was popularly supposed to have been a vast inland sea in very recent times, but the theory was supported by geological facts wrongly interpreted. It has been abundantly proved by the researches of travellers and geologists that such a sea was neither the cause nor the origin of the Libyan Desert.

Rainless and sterile regions of this nature are not peculiar to North Africa, but occur in two belts which go round the world in either hemisphere, at about similar distances north and south of the equator. These correspond in locality to the great inland drainage areas from which no water can be discharged into the ocean, and which occupy about one-fifth of the total land surface of the globe.

The African Sahara is by no means a uniform plain, but forms several distinct basins containing a considerable extent of what may almost be called mountain land. The Hoggar mountains in the centre of the Sahara are 7000 feet high, and are covered during three months with snow. The general average may be taken at 1500. The physical character of the region is very varied; in some places, such as at Tiout, Moghrar, Touat, and other oases in or bordering on Morocco, there are well-watered valleys, with fine scenery and almost European vegetation, where the fruits of the North flourish side by side with the palm tree. In others there are rivers like the Oued Guir, an affluent of the Niger, which the French soldiers, who saw it in 1870, compared to the Loire. Again, as in the bed of the Oued Rir,

there is a subterranean river, which gives a sufficient supply of water to make a chain of rich and well-peopled oases equal in fertility to some of the finest portions of Algeria. The greater part of the Sahara, however, is hard and undulating, cut up by dry watercourses, such as the Igharghar which descends to the Chott Melghigh, and almost entirely without animal or vegetable life.

About one-sixth of its extent consists of dunes of moving sand, a vast accumulation of detritus washed down from more northern and southern regions—perhaps during the glacial epoch—but with no indication of marine formation. These are difficult and even dangerous to traverse, but they are not entirely destitute of vegetation. Water is found at rare but well-known intervals, and there is an abundance of salsolaceous plants which serve as food for the camel. This sand is largely produced by wind action on the underlying rocks, and is not sterile in itself, it is only the want of water which makes it so. Wherever water does exist, or artesian wells are sunk, oases of great fertility never fail to follow.

Some parts of the Sahara are below the level of the sea, and here are formed what are called *chotts* or *sebkhas*, open depressions without any outlets, inundated by torrents from the southern slopes of the Atlas in winter and covered with a saline efflorescence in summer. This salt by no means proves the former existence of an inland sea; it is produced by the concentration of the natural salts, which exist in every variety of soil, washed down by winter rains, with which the unevaporated residue of water becomes saturated.

Sometimes the drainage, instead of flooding open spaces and forming chotts, finds its way through the permeable sand till it meets impermeable strata below it, thus forming vast subterranean reservoirs where the artesian sound daily works as great miracles as did Moses' rod of yore at Meribah. I have seen a column of water thrown up into the air equal to 1300 cubic metres per diem; a quantity sufficient to redeem 1800 acres of land from sterility, and to irrigate 60,000 palm trees. This seems to be the true solution of the problem of an inland sea; a sea of verdure and fertility caused by the multiplication of artesian wells, which never fail to bring riches and prosperity in their train.

The climate of the Sahara is quite different from that of what I have called the Mediterranean region, where periodical rains divide the year into two seasons. Here, in many places, years elapse without a single shower; there is no refreshing dew at night, and the winds are robbed of their moisture by the immense continental extents over which they blow. There can be no doubt that it is to these meteorological, and not to geological, causes that the Sahara owes its existence.

Reclus divides the Mediterranean into two basins, which, in memory of their history, he calls the Phœnician and the Carthaginian, or the Greek and Roman seas, more generally known to us as the Eastern and the Western Basins, separated by the island of Sicily.

If we examine the submarine map of the Mediterranean, we see that it must at one time have consisted of two enclosed or two inland basins, like the Dead Sea. The western one is separated from the Atlantic by the Straits of Gibraltar, a shallow ridge, the deepest part of which is at its eastern extremity, averaging about 300 fathoms; while on the west, bounded by a line from Cape Spartel to Trafalgar, it varies from 50 to 200 fathoms. Fifty miles to the west of the Straits the bottom suddenly sinks down to the depths of the Atlantic, while to the east it descends to the general level of the Mediterranean, from one to two thousand fathoms.

The Western is separated from the Eastern Basin by the isthmus which extends between Cape Bon in Tunisia and Sicily, known as the "Adventure Bank," on which there is not more than from 30 to 250 fathoms. The depth between Italy and

Sicily is insignificant, and Malta is a continuation of the latter, being only separated from it by a shallow patch of from 50 to 100 fathoms; while to the east and west of this bank the depth of the sea is very great. These shallows cut off the two basins from all but superficial communication.

The configuration of the bottom shows that the whole of this strait was at one time continuous land, affording free communication for land animals between Africa and Europe. The Palæontological evidence of this is quite conclusive. In the caves and fissures of Malta, among river detritus, are found three species of fossil elephants, a hippopotamus, a gigantic dormouse, and other animals which could never have lived in so small an island. In Sicily, remains of the existing elephant have been found, as well as the *Elephas antiquus*, and two species of hippopotamus, while nearly all these, and many other animals of African type, have been found in the pliocene deposits and caverns of the Atlantic region.

The rapidity with which such a transformation might have occurred can be judged by the well-known instance of Graham's Shoal, between Sicily and the island of Pantellaria; this, owing to volcanic agency, actually rose above the water in 1832, and for a few weeks had an area of 3240 feet in circumference and a height of 107 feet.

The submersion of this isthmus no doubt occurred when the waters of the Atlantic were introduced through the Straits of Gibraltar. The rainfall over the entire area of the Mediterranean is certainly not more than 30 inches, while the evaporation is at least twice as great; therefore, were the Straits to be once more closed, and were there no other agency for making good this deficiency, the level of the Mediterranean would sink again till its basin became restricted to an area no larger than might be necessary to equalise the amount of evaporation and precipitation. Thus not only would the strait between Sicily and Africa be again laid dry, but the Adriatic and Ægean Seas also, and a great part of the Western Basin.

The entire area of the Mediterranean and Black Seas has been estimated at upwards of a million square miles, and the volume of the rivers which are discharged into them at 226 cubic miles. All this and much more is evaporated annually. There are two constant currents passing through the Straits of Gibraltar, superimposed on each other; the upper and most copious one flows in from the Atlantic at a rate of nearly three miles an hour, or 140,000 cubic mètres per second, and supplies the difference between the rainfall and evaporation, while the under-current of warmer water, which has undergone concentration by evaporation, is continually flowing out at about half the above rate of movement, getting rid of the excess of salinity; even, thus, however, leaving the Mediterranean salter than any other part of the ocean except the Red Sea.

A similar phenomenon occurs at the eastern end, where the fresher water of the Black Sea flows as a surface current through the Dardanelles, and the salter water of the Mediterranean pours in below it.

The general temperature of the Mediterranean from a depth of 50 fathoms down to the bottom is almost constantly 56°, whatever may be its surface elevation. This is a great contrast to that of the Atlantic, which at a similar depth is at least 3° colder, and which at 1000 fathoms sinks to 40°.

This fact was of the greatest utility to Dr. Carpenter in connection with his investigations regarding currents through the Straits, enabling him to distinguish with precision between Atlantic and Mediterranean water.

For all practical purposes the Mediterranean may be accepted as being, what it is popularly supposed to be, a tideless sea, but it is not so in reality. In many places there is a distinct rise and fall, though this is more frequently due to winds and

currents than to lunar attraction. At Venice there is a rise of from one to two feet in spring tides, according to the prevalence of winds up or down the Adriatic, but in that sea itself the tides are so weak that they can hardly be recognised, except during the prevalence of the Bora, our old friend *Boreas*, which generally raises a surcharge along the coast of Italy. In many straits and narrow arms of the sea there is a periodical flux and reflux, but the only place where tidal influence, properly so called, is unmistakably observed is in the Lesser Syrtis, or Gulf of Gabes; there the tide runs at the rate of two or three knots an hour, and the rise and fall varies from three to eight feet. It is most marked and regular at Djerba, the Homeric island of the Lotophagi; one must be careful in landing there in a boat, so as not to be left high and dry a mile or two from the shore. Perhaps the companions of Ulysses were caught by the receding tide, and it was not only a banquet of dates, the "honey-sweet fruit of the lotus," or the potent wine which is made from it, which made them "forgetful of their homeward way."

The Gulf of Gabes naturally calls to mind the proposals which were made a few years ago for inundating the Sahara, and so restoring to the Atlantic region the insular condition which it is alleged to have had in prehistoric times. I will not allude to the English project for introducing the waters of the Atlantic from the west coast of Africa; that does not belong to my subject. The French scheme advocated by Commandant Roudaire, and supported by M. de Lesseps, was quite as visionary and impracticable.

To the south of Algeria and Tunis there exists a great depression stretching westward from the Gulf of Gabes to a distance of about 235 miles, in which are several *chotts* or salt lakes, sometimes only marshes, and in many places covered with a saline crust strong enough to bear the passage of camels. Commandant Roudaire proposed to cut through the isthmuses which separated the various *chotts*, and so prepare their basins to receive the waters of the Mediterranean. This done, he intended to introduce the sea by a canal, which should have a depth of one mètre below low-water level.

This scheme was based on the assumption that the basin of the *chotts* had been an inland sea within historic times; that, little by little, owing to the difference between the quantity of water which entered and the amount of evaporation and absorption, this interior sea had disappeared, leaving the *chotts* as an evidence of the former condition of things; that, in fact, this was none other than the celebrated Lake Triton, the position of which has always been a puzzle to geographers.

This theory, however, is untenable; the Isthmus of Gabes is not a mere sand-bank; there is a band of rock between the sea and the basin of the *chotts*, through which the former never could have penetrated in modern times. It is much more probable that Lake Triton was the large bight between the Island of Djerba and the mainland, on the shores of which are the ruins of the ancient city of Meninx, which, to judge by the abundance of Greek marble found there, must have carried on an important commerce with the Levant.

The scheme has now been entirely abandoned; nothing but the mania for cutting through isthmuses all over the world which followed the brilliant success achieved at Suez can explain its having been started at all. Of course, no mere mechanical operation is impossible in these days, but the mind refuses to realise the possibility of vessels circulating in a region which produces nothing, or that so small a sheet of water in the immensity of the Sahara could have any appreciable effect in modifying the climate of its shores.

The eastern basin is much more indented and cut up into separate seas than the western one; it was therefore better adapted for the commencement of commerce

and navigation; its high mountains were landmarks for the unpractised sailor, and its numerous islands and harbours afforded shelter for his frail barque, and so facilitated communication between one point and another.

The advance of civilisation naturally took place along the axis of this sea, Phœnicia, Greece, and Italy being successively the great nurseries of human knowledge and progress. Phœnicia had the glory of opening out the path of ancient commerce, for its position in the Levant gave it a natural command of the Mediterranean, and its people sought the profits of trade from every nation which had a seaboard on the three continents washed by this sea. Phœnicia was already a nation before the Jews entered the Promised Land, and when they did so they carried on inland traffic as middlemen to the Phœnicians. Many of their commercial centres on the shores of the Mediterranean were founded before Greece and Rome acquired importance in history. Homer refers to them as daring traders nearly a thousand years before the Christian era.

For many centuries the commerce of the world was limited to the Mediterranean, and when it extended in the direction of the East it was the merchants of the Adriatic, of Genoa, and of Pisa who brought the merchandise of India, at an enormous cost, to the Mediterranean by land, and who monopolised the carrying trade by sea. It was thus that the elephant trade of India, the caravan traffic through Babylon and Palmyra, as well as the Arab *kafilahs*, became united with the occidental commerce of the Mediterranean.

As civilisation and commerce extended westwards, mariners began to overcome their dread of the vast solitudes of the ocean beyond the Pillars of Hercules, and the discovery of America by Columbus, and the circumnavigation of Africa by the Portuguese, changed entirely the current of trade as well as increased its magnitude, and so relegated the Mediterranean, which had hitherto been the central sea of human intercourse, to a position of secondary importance.

Time will not permit me to enter into further details regarding the physical geography of this region, and its history is a subject so vast that a few episodes of it are all that I can possibly attempt. It is intimately connected with that of every other country in the world, and here were successively evolved all the great dramas of the past and some of the most important events of less distant ages.

As I have already said, long before the rise of Greece and Rome its shores and islands were the seat of an advanced civilisation. Phœnicia had sent out her pacific colonies to the remotest parts, and not insignificant vestiges of their handicraft still exist to excite our wonder and admiration. We have the megalithic temples of Malta sacred to the worship of Baal, the generative god, and Ashtoreth, the conceptive goddess, of the universe. The three thousand nurhagi of Sardinia, round towers of admirable masonry, intended probably for defence in case of sudden attack, and the so-called giant graves, were as great a mystery to classical authors as they are to us at the present day. Menorca has its talayots, tumuli somewhat analogous to, but of ruder construction than, the nurhagi, more than two hundred groups of which exist in various parts of the island; with these are associated subordinate constructions intended for worship; altars composed of two immense monoliths, erected in the form of a T; sacred enclosures and megalithic habitations. One type of talayot is especially remarkable, of better masonry than the others and exactly resembling inverted boats. One is tempted to believe that the Phœnicians had in view the grass habitations or *mapalia* of the Numidians described by Sallust, and had endeavoured to reproduce them in stone: "Oblonga, incurvis lateribus tecta, quasi navium carinæ sunt."

For a long time the Phœnicians had no rivals in navigation, but subsequently

the Greeks—especially the Phocians—established colonies in the Western Mediterranean, in Spain, Corsica, Sardinia, Malta, and the South of France, through the means of which they propagated not only their commerce, but their arts, literature, and ideas. They introduced many valuable 'plants, such as the olive, thereby modifying profoundly the agriculture of the countries in which they settled. They have even left traces of their blood, and it is no doubt to this that the women of Provence owe the classical beauty of their features.

But they were eclipsed by their successors; the empire of Alexander opened out a road to India, in which indeed the Phœnicians had preceded him, and introduced the produce of the East into the Mediterranean, while the Tyrian colony of Carthage became the capital of another vast empire, which, from its situation, midway between the Levant and the Atlantic Ocean, enabled it to command the Mediterranean traffic.

The Carthaginians at one time ruled over territory extending along the coast from Cyrene to Numidia, besides having a considerable influence over the interior of the continent, so that the name of Africa, given to their own dominions, was gradually applied to a whole quarter of the globe. The ruling passion with the Carthaginians was love of gain, not patriotism, and their wars were largely fought with mercenaries. It was the excellence of her civil constitution which, according to Aristotle, kept in cohesion for centuries her straggling possessions. A country feebly patriotic, which entrusts her defence to foreigners, has the seeds of inevitable decay, which ripened in her struggle with Rome, despite the warlike genius of Hamilcar and the devotion of the magnanimous Hannibal. The gloomy and cruel religion of Carthage, with its human sacrifices to Moloch and its worship of Baal under the name of Melcarth, led to a criminal code of Draconic severity, and alienated it from surrounding nations. When the struggle with Rome began, Carthage had no friends. The first Punic War was a contest for the possession of Sicily, whose prosperity is even now attested by the splendour of its Hellenic monuments. When Sicily was lost by the Carthaginians, so also was the dominion of the sea, which hitherto had been uncontested. The second Punic War resulted in the utter prostration of Carthage and the loss of all her possessions out of Africa, and in 201 B.C., when this war was ended, 552 years after the foundation of the city, Rome was mistress of the world.

The destruction of Carthage after the third Punic War was a heavy blow to Mediterranean commerce. It was easy for Cato to utter his stern 'Delenda est Carthago'; destruction is easy, but construction is vastly more difficult. Although Augustus in his might built a new Carthage near the site of the old city, he could never attract again the trade of the Mediterranean, which had been diverted into other channels. Roman supremacy was unfavourable to the growth of commerce, because, though she allowed unrestricted trade throughout her vast empire, and greatly improved internal communications in the subjugated countries, Rome itself absorbed the greater part of the wealth and did not produce any commodities in return for its immense consumption, therefore Mediterranean commerce did not thrive under the Roman rule. The conquest of Carthage, Greece, Egypt, and the East poured in riches to Rome, and dispensed for a time with the needs of productive industry, but formed no enduring basis of prosperity.

It is only in relation to the Mediterranean that I can refer to Roman history, but I must allude to the interesting episode in the life of Diocletian, who, after an anxious reign of twenty-one years in the eastern division of the empire, abdicated at Nicomedia and retired to his native province of Illyria. He spent the rest of his life in rural pleasures and horticulture at Salona, near which he built that splendid palace within the walls of which subsequently arose the modern city of

Spalato. Nothing more interesting exists on the shores of the Mediterranean than this extraordinary edifice, perhaps the largest that ever arose at the bidding of a single man; not only vast and beautiful, but marking one of the most important epochs in the history of architecture. Though now obstructed with a mass of narrow, tortuous streets, its salient features are distinctly visible. The great temple, probably the mausoleum of the founder, has become the cathedral, and after the Pantheon at Rome there is no finer specimen of a heathen temple turned into a Christian church. Strange it is that the tomb of him whose reign was marked by such unrelenting persecution of the Christians should have been accepted as the model of those baptisteries so commonly constructed in the following centuries.

Of Diocletian's Salona, one of the chief cities of the Roman world, but little now remains save traces of the long irregular wall; recent excavations have brought to light much that is interesting, but all of the Christian epoch, such as a large basilica which had been used as a necropolis, and a baptistery, one of those copied from the temple of Spalato, on the mosaic pavement of which can still be read the text, "*Sicut cervus desiderat fontem aquarum ita anima mea ad te Deus.*"

The final partition of the Roman empire took place in 395; forty years later the barbarians of the North began to invade Italy and the south of Europe, and in 429 Genseric, at the head of his Vandal hordes, crossed over into Africa from Andalusia, a province which still bears their name, devastating the country as far as the Cyrenaica. He subsequently annexed the Balearic Islands, Corsica, and Sardinia, he ravaged the coasts of Italy and Sicily, and even of Greece and Illyria, but the most memorable of his exploits was the unresisted sack of Rome, whence he returned to Africa laden with treasure, and bearing the Empress Eudoxia a captive in his train.

The degenerate emperors of the West were powerless to avenge this insult, but Byzantium, though at this time sinking to decay, did make a futile attempt to attack the Vandal monarch in his African stronghold. It was not, however, till 533, in the reign of Justinian, when the successors of Genseric had fallen into luxurious habits and had lost the rough valour of their ancestors, that Belisarius was able to break their power and take their last king a prisoner to Constantinople. The Vandal domination in Africa was destroyed, but that of the Byzantines was never thoroughly consolidated; it rested not on its own strength, but on the weakness of its enemies, and it was quite unable to cope with the next great wave of invasion which swept over the land, perhaps the most extraordinary event in the world's history, save only the introduction of Christianity.

In 647, twenty-seven years after the Hedjira of Mohammed, Abdulla ibn Saad started from Egypt for the conquest of Africa with an army of 40,000 men.

The expedition had two determining causes—the hope of plunder and the desire to promulgate the religion of El Islam. The sands and scorching heat of the desert, which had nearly proved fatal to the army of Cato, were no bar to the hardy Arabians and their enduring camels. The march to Tripoli was a fatiguing one, but it was successfully accomplished; the invaders did not exhaust their force in a vain effort to reduce its fortifications, but swept on over the Syrtic desert and north to the province of Africa, where, near the splendid city of Sufetula, a great battle was fought between them and the army of the Exarch Gregorius, in which the Christians were signally defeated, their leader killed, and his daughter allotted to Ibn-ez-Zobair, who had slain her father.

Not only did the victorious Moslems overrun North Africa, but soon they had powerful fleets at sea which dominated the entire Mediterranean, and the emperors of the East had enough to do to protect their own capital.

Egypt, Syria, Spain, Provence and the islands of the Mediterranean successively fell to their arms, and until they were checked at the Pyrenees by Charles Martel it seemed at one time as if the whole of Southern Europe would have been compelled to submit to the disciples of the new religion. Violent, implacable, and irresistible at the moment of conquest, the Arabs were not unjust or hard masters in countries which submitted to their conditions. Every endeavour was, of course, made to proselytise, but Christians were allowed to preserve their religion on payment of a tax, and even Popes were in the habit of entering into friendly relations with the invaders. The Church of St. Cyprian and St. Augustine, with its 500 sees, was indeed expunged, but five centuries after the passage of the Mohammedan army from Egypt to the Atlantic a remnant of it still existed. It was not till the 12th century that the religion and language of Rome became utterly extinguished.

The Arabs introduced a high state of civilisation into the countries where they settled; their architecture is the wonder and admiration of the world at the present day; their irrigational works in Spain have never been improved upon; they fostered literature and the arts of peace, and introduced a system of agriculture far superior to what existed before their arrival.

Commerce, discouraged by the Romans, was highly honoured by the Arabs, and during their rule the Mediterranean recovered the trade which it possessed in the time of the Phoenicians and Carthaginians; it penetrated into the Indian Archipelago and China; it travelled westward to the Niger, and to the east as far as Madagascar, and the great trade route of the Mediterranean was once more developed.

The power and prosperity of the Arabs culminated in the ninth century, when Sicily fell to their arms; it was not, however, very long before their empire began to be undermined by dissensions; the temporal and spiritual authority of the Omniade Khalifa, which extended from Sind to Spain, and from the Oxus to Yemen, was overthrown by the Abbasides in the year 132 of the Hedjira, A.D. 750. Seven years later Spain detached itself from the Abbasside empire; a new Caliphate was established at Cordova, and hereditary monarchies began to spring up in other Mohammedan countries.

The Carlovingian empire gave an impulse to the maritime power of the South of Europe, and in the Adriatic the fleets of Venice and Ragusa monopolised the traffic of the Levant. The merchants of the latter noble little republic penetrated even to our own shores, and Shakespeare has made the Argosy or Ragusie a household word in our language.

During the eleventh century the Christian Powers were no longer content to resist the Mohammedans; they began to turn their arms against them. If the latter ravaged some of the fairest parts of Europe, the Christians began to take brilliant revenge. The Mohammedans were driven out of Corsica, Sardinia, Sicily, and the Balearic Islands, but it was not till 1492 that they had finally to abandon Europe, after the conquest of Granada by Ferdinand and Isabella.

About the middle of the eleventh century an event took place which profoundly modified the conditions of the Mohammedan world. The Caliph Mostansir let loose a horde of nomad Arabs, who, starting from Egypt, spread over the whole of North Africa, carrying destruction and blood wherever they passed, thus laying the foundation for the subsequent state of anarchy which rendered possible the interference of the Turks.

English commercial intercourse with the Mediterranean was not unknown even from the time of the Crusades, but it does not appear to have been carried on by means of our own vessels till the beginning of the sixteenth century. In 1522 it was so great that Henry VIII. appointed a Cretan merchant, Censio de Balthazari,

to be "Master, governor, protector, and consul of all and singular the merchants and others his lieges and subjects within the port, island, and country of Crete or Candia." This is the very first English consul known to history, but the first of English birth was my own predecessor in office, Master John Tipton, who, after having acted at Algiers during several years in an unofficial character, probably elected by the merchants themselves to protect their interests, was duly appointed consul by Sir William Harebone, ambassador at Constantinople in 1585, and received just such an exequatur from the Porte as has been issued to every consul since by the Government of the country in which he resides.

Piracy has always been the scourge of the Mediterranean, but we are too apt to associate its horrors entirely with the Moors and Turks. The evil had existed from the earliest ages; even before the Roman conquest of Dalmatia the Illyrians were the general enemies of the Adriatic; Africa under the Vandal reign was a nest of the fiercest pirates; the Venetian chronicles are full of complaints of the ravages of the Corsairs of Ancona, and there is no other name but piracy for such acts of the Genoese as the unprovoked pillage of Tripoli by Andrea Doria in 1535. To form a just idea of the corsairs of the past it is well to remember that commerce and piracy were often synonymous terms, even among the English, up to the reign of Elizabeth. Listen to the description given by the pious Cavendish of his commercial circumnavigation of the globe: "It hath pleased Almighty God to suffer me to circumpass the whole globe of the world. . . . I navigated along the coast of Chili, Peru, and New Spain, where I made great spoils. All the villages and towns that ever I landed at I burned and spoiled, and had I not been discovered upon the coast I had taken a great quantity of treasure," and so he concludes, "The Lord be praised for all his mercies!"

Sir William Monson, when called upon by James I. to propose a scheme for an attack on Algiers, recommended that all the maritime powers of Europe should contribute towards the expense, and participate in the gains by the sale of Moors and Turks as slaves.

After the discovery of America and the expulsion of the Moors from Spain, piracy developed to an extraordinary extent. The audacity of the Barbary corsairs seems incredible at the present day; they landed on the shores and islands of the Mediterranean, and even extended their ravages to Great Britain, carrying off all the inhabitants whom they could seize into the most wretched slavery. The most formidable of these piratical States was Algiers, a military oligarchy, consisting of a body of janissaries, recruited by adventurers from the Levant, the outcasts of the Mohammedan world, criminals and renegades from every nation in Europe. They elected their own ruler or Dey, who exercised despotic sway, tempered by frequent assassination; they oppressed without mercy the natives of the country, accumulated vast riches, had immense numbers of Christian slaves, and kept all Europe in a state bordering on subjection by the terror which they inspired. Nothing is sadder or more inexplicable than the shameful manner in which this state of things was accepted by civilised nations. Many futile attempts were made during successive centuries to humble their arrogance, but it only increased by every manifestation of the powerlessness of Europe to restrain it. It was reserved for our own countryman, Lord Exmouth, by his brilliant victory in 1816, for ever to put an end to piracy and Christian slavery in the Mediterranean. His work, however, was left incomplete, for though he destroyed the navy of the Algerines, and so rendered them powerless for evil on the seas, they were far from being humbled; they continued to slight their treaties, and to subject even the agents of powerful nations to contumely and injustice. The French took the only means possible to destroy this nest of ruffians, by the almost unresisted occupation of Algiers and the deportation of its Turkish aristocracy.

They found the whole country in the possession of a hostile people, some of whom had never been subdued since the fall of the Roman empire, and the world owes France no small debt of gratitude for having transformed what was a savage and almost uncultivated country into one of the richest as well as the most beautiful in the basin of the Mediterranean.

What has been accomplished in Algeria is being effected in Tunisia. The treaty of the Kas-es-Saeed, which established a French Protectorate there, and the military occupation of the Regency, were about as high-handed and unjustifiable acts as are recorded in history; but there can be no possible doubt regarding the important work of civilisation and improvement that has resulted from them. European courts of justice have been established all over the country; the exports and imports have increased from 23 to 51 millions of francs, the revenue from 6 to 19 millions, without the imposition of a single new tax, and nearly half a million per annum is being spent on education.

Sooner or later the same thing must happen in the rest of North Africa, though at present international jealousies retard this desirable consummation. It seems hard to condemn such fair countries to continued barbarism, in the interest of tyrants who misgovern and oppress their people. The day cannot be far off when the whole southern shores of the Mediterranean will enjoy the same prosperity and civilisation as the northern coast, and when the deserts, which are the result of misgovernment and neglect, will assume the fertility arising from security and industry, and will again blossom as the rose.

It cannot be said that any part of the Mediterranean basin is still unknown, if we except the empire of Morocco. But even that country has been traversed in almost every direction during the past twenty years, and its geography and natural history have been illustrated by men of the greatest eminence; such as Gerhard Rohlfs, Monsieur Tissot, Sir Joseph Hooker, the Vicomte de Foucauld, Joseph Thomson, and numerous other travellers. The least known portion, at least on the Mediterranean coast, is the Riff country, the inhospitality of whose inhabitants has given the word "ruffian" to the English language. Even that has been penetrated by De Foucauld disguised as a Jew, and the record of his exploration is one of the most brilliant contributions to the geography of the country which has hitherto been made.

Although, therefore, but little remains to be done in the way of actual exploration, there are many by-ways of travel comparatively little known to that class of the community with which I have so much sympathy, the ordinary British tourist. These flock every year in hundreds to Algeria and Tunis, but few of them visit the splendid Roman remains in the interior of those countries. The Cyrenaica is not so easily accessible, and I doubt whether any Englishmen have travelled in it since the exploration of Smith and Porcher in 1861.

Cyrene almost rivalled Carthage in commercial importance. The Hellenic ruins still existing bear witness to the splendour of its five great cities. It was the birthplace of many distinguished people, and amongst its hills and fountains were located some of the most interesting scenes in mythology, such as the Gardens of the Hesperides and the "Silent, dull, forgetful waters of Lethe." This peninsula is only separated by a narrow strait from Greece, whence it was originally colonised. There, and indeed all over the eastern basin of the Mediterranean, are many little trodden routes; but the subject is too extensive; I am reluctantly compelled to restrict my remarks to the western half.

The south of Italy is more frequently traversed and less travelled in than any part of that country. Of the thousands who yearly embark or disembark at Brindisi, few ever visit the Land of Manfred. Otranto is only known to them

from the fanciful descriptions in Horace Walpole's romance. The general public in this country is quite ignorant of what is going on at Taranto, and of the great arsenal and dockyard which Italy is constructing in the Mare Piccolo, an inland sea containing more than 1000 acres of anchorage for the largest ironclads afloat, yet with an entrance so narrow that it is spanned by a revolving bridge. Even the Adriatic, though traversed daily by steamers of the Austrian Lloyd's Company, is not a highway of travel; yet where is it possible to find so many places of interest within the short space of a week's voyage, between Corfu and Trieste, as along the Dalmatian and Istrian shores, and among the islands that fringe the former, where it is difficult to realise that one is at sea at all, and not on some great inland lake?

There is the Bocche di Cattaro, a vast rent made by the Adriatic among the mountains, where the sea flows round their spurs in a series of canals, bays, and lakes of surpassing beauty. The city of Cattaro itself, the gateway of Montenegro, with its picturesque Venetian fortress, nestling at the foot of the black mountain, Ragusa, the Roman successor of the Hellenic Epidaurus, Queen of the Southern Adriatic, battling with the waves on her rock-bound peninsula, the one spot in all that sea which never submitted either to Venice or the Turk, and for centuries resisting the barbarians on every side, absolutely unique as a mediæval fortified town, and worthy to have given her name to the argosies she sent forth; Spalato, the grandest of Roman monuments; Lissa, colonised by Dionysius of Syracuse, and memorable to us as having been a British naval station from 1812 to 1814, while the French held Dalmatia; Zara, the capital, famous for its siege by the Crusaders, interesting from an ecclesiological point of view, and venerated as the last resting-place of St. Simeon, the prophet of the *Nunc Dimittis*; Parenza, with its great Basilica; Pola, with its noble harbour, whence Belisarius sailed forth, now the chief naval port of the Austrian empire, with its Roman amphitheatre and graceful triumphal arches; besides many other places of almost equal interest. Still further west are Corsica, Sardinia, and the Balearic Islands, all easily accessible from the coasts of France, Italy, and Spain. Their ports are constantly visited by mail steamers and private yachts, yet they are but little explored in the interior.

I am tempted to linger a little over one of the places I have just mentioned, and to devote more time to a physical and historical description of Corsica than I can spare for the Mediterranean generally. It is replete with all that makes travel delightful—unequalled scenery, a brilliant climate, historical associations, and the study of a race of men who still retain their national peculiarities. The facilities for travelling are as great as can be fairly expected; roads such as none but the French seem able to make, winding along steep coasts and over high mountains, plunging into the depths of shady valleys and amongst dark forests in search of what is so dear to a French engineer's heart, a uniform gradient, and metalled with granite so hard that in the driest weather they are free from dust. I may add that I never failed to find sufficiently good accommodation and a kindly reception in the smallest and most remote villages.

Corsica has been compared in shape to a closed hand with the index finger extended, the latter being the promontory, called Cap Corse. The island is traversed in its whole length by a chain of high mountains, the general direction of which is north and south, dividing it into two parts of nearly equal extent. Placed, as it is, in the centre of the Western Mediterranean, between the Alps and the Atlas, and with so great inequalities of surface, it presents an epitome of the whole region from the warm sea-level to the Alpine character of the interior, where the mountains rise to a height of nearly 9000 feet, and are clothed in snow during the greater part of the year.

All the western coast, and more than two-thirds of the whole island, are of granitic formation. The central range throws out spurs towards the sea, forming on the western side numerous bays of considerable size and depth. Nothing can exceed the grandeur of the scenery on the coast which culminates in the celebrated Calanches de Piana, a succession of stupendous granite rocks worn and hollowed out in the most fantastic manner, fearful in their forms, but soft and lovely in their colouring. There are many similar rocks throughout the island, such as the Calanches d'Evisa, the Fourches d'Asinao, and the Gorge of Inzeca, where a river flows between great cliffs and amongst boulders of green serpentine, a sight never to be forgotten.

The eastern side of the island consists of primary rocks, more or less easily disintegrated, the detritus being washed down by rains, so as to form the low plains bordering that coast. As the rivers force their way through them with difficulty, marshes and lagoons are created. These are hotbeds of malarious fever in summer, dangerous even for the natives, who migrate to the hills at that season.

The forests, the great glory of the island, consist chiefly of oak, beech, birch, and the *Pinus laricio*, indigenous to Corsica, and the monarch of European conifers, which rises as straight as an arrow, sometimes to a height of 120 or 150 feet.

The Castagniccia, or the country of the chestnut, is an extensive and very beautiful district, especially when the trees are in full leaf. The fruit is more useful to the people who inhabit the district than even the date to the Arab. He has to cultivate his palm trees laboriously, irrigate them in summer, and pick the fruit with the greatest care. The chestnut demands no such attention; it grows spontaneously, requires no cultivation, and the fruit falls of itself when sufficiently ripe. It is the staple food of the people, who eat it in every form, even giving it to their cattle instead of grain, while the sale of the surplus furnishes them with the other necessaries of life.

After the forests the most pleasing feature in the island, and covering more than half its surface, is the macchie, or brushwood, before mentioned, spreading its delicious perfume through the air and lighting up the landscape with a blaze of colour. There is also a constant succession of wild flowers, liliaceous plants, orchids, cyclamen, and many others. In one pine wood I saw the ground carpeted with violets and primroses, while ferns, from the common bracken to the noble *Osmunda regalis*, are found everywhere.

The principal towns are Ajaccio on the south-west, a well-known winter station, the capital of the island, full of memories and memorials of Napoleon; Bastia on the north-east, the commercial capital; Calvi on the north-west, a picturesque stronghold rising high above the sea, and dominating the surrounding country. The last is one of the few places that were always faithful to the Genoese cause, and it still bears over the entrance gate the inscription, "*Civitas Calvi semper fidelis.*"

Corte, in the interior of the island, the ancient feudal capital, was the chief seat of Paoli's government, as well as the headquarters of the short-lived English administration under Sir Gilbert Elliot. It is situated at the confluence of two rivers, the Restonica and the Tavignano, which descend to the plains through a series of magnificent gorges. High above the town, perched on the summit of a rock, is the picturesque citadel built in the beginning of the fifteenth century.

In the extreme south is Bonifacio, another ancient fortress, not only strange and beautiful in itself, but commanding fine views from its ramparts of Sardinia and the numerous islands on both sides of the Straits.

Cargese, 28 miles north of Ajaccio, is exceptionally interesting. In 1676 an emigration of about 1000 Greeks from Maina, in the Morea, wearied with Turkish

oppression, took place to Genoa, whence they were sent to Corsica. A second emigration of 400 started to join them in the following year, but they were overtaken by the Turkish fleet and massacred. The prosperity of the small colony was not of long duration, because, when the insurrection in Corsica against the Genoese broke out, the Greeks, out of gratitude to their protectors, refused to join in it. In consequence their villages were destroyed, their lands confiscated, and their flocks driven away. They fled for refuge to Ajaccio, and there remained till the advent of the French. It was one of the first acts of Comte Marbeuf, on assuming the government of the island, to reinstate them in a new domain, and he it was who built the present town of Cargese. The inhabitants, though in full communion with the Church of Rome, still retain their Greek Liturgy, and to some extent their language, and live on the most cordial terms with their Latin neighbours. . . .

I have endeavoured to sketch, necessarily in a very imperfect manner, the physical character and history of the Mediterranean, to show how the commerce of the world originated in a small maritime state at its eastern extremity; how it gradually advanced westward till it burst through the Straits of Gibraltar, and extended over seas and continents until then undreamt of, an event which deprived the Mediterranean of that commercial prosperity and greatness which for centuries had been limited to its narrow basin.

Once more this historic sea has become the highway of nations; the persistent energy and genius of two men have revolutionised navigation, opened out new and boundless fields for commerce, and it is hardly too much to say that if the Mediterranean is to be restored to its old position of importance, if the struggle for Africa is to result in its regeneration, as happened in the new world, if the dark places still remaining in the further East are to be civilised, it will be in a great measure due to Waghorn and Ferdinand de Lesseps, who developed the overland route and created the Suez Canal.

But the Mediterranean can only hope to retain its regenerated position in time of peace. Nothing is more certainly shown by past history than that war and conquest have changed the route of commerce in spite of favoured geographical positions. Babylon was conquered by Assyrians, Persians, Macedonians, and Romans; and though for a time her position on the Euphrates caused her to rise like a Phoenix from her ashes, successive conquests, combined with the luxury and effeminacy of her rulers, caused her to perish. Tyre, conquered by Nebuchadnezzar and Alexander, fell as completely as Babylon had done, and her trade passed to Alexandria. Ruined sites of commercial cities rarely again become emporia of commerce; Alexandria is an exception dependent on very exceptional circumstances.

The old route to the East was principally used by sailing vessels, and was abandoned for the shorter and more economical one by the Suez Canal, which now enables a round voyage to be made in sixty days, which formerly required from six to eight months. This, however, can only remain open in time of peace. It is quite possible that in the event of war the old route by the Cape may be again used, to the detriment of traffic by the Mediterranean. Modern invention has greatly economised the use of coal, and steamers, by the use of duplex and triplex engines, can run with a comparatively small consumption of fuel, thus leaving a large space for cargo. England, the great carrying power of the world, may find it more advantageous to trust to her own strength and the security of the open seas than to run the gauntlet of the numerous strategical positions in the Mediterranean, such as Port Mahon, Bizerta, and Taranto, each of which is capable of affording impregnable shelter to a hostile fleet, and though the ultimate key to the Indian

Ocean is in our own hands, our passage to it may be beset with a thousand dangers. There is no act of my career on which I look back with so much satisfaction as on the share I had in the occupation of Perim, one of the most important links in that chain of coaling stations which extends through the Mediterranean to the further East, and which is so necessary for the maintenance of our naval supremacy. It is a mere islet, it is true, a barren rock, but one surrounding a noble harbour, and so eminently in its right place that we cannot contemplate with equanimity the possibility of it being in any other hands than our own.

It is by no means certain whether exaggerated armaments are best suited for preserving peace or hastening a destructive war; the golden age of disarmament and international arbitration may not be near at hand, but it is even now talked of as a possibility.

Should the poet's prophecy or the patriot's dream be realised, and a universal peace indeed bless the world, then this sea of so many victories may long remain the harvest field of a commerce nobler than conquest.

The following papers were read :—

The Vertical Relief of the Globe. By Dr. H. R. MILL.

On the Teaching of Geography in Russian Schools. By Dr. H. R. MILL.

A Railway through Southern Persia By Major-General Sir F. J. GOLDSMID, C.B., K.C.S.I.

New Trade Route into Persia. By H. B. LYNCH.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—June 6th : 1890.—Comte DE BIZEMONT in the Chair.—Communications were read from Captain A. Bernard and M. G. Rolland, on the formation of the dunes of the Sahara, a subject which had recently been much discussed at the Society's meetings.

VALLEYS OF THE ALAI AND PAMIR.

M. G. Capus presented two manuscript maps, prepared by him, showing the accumulation and depth of snow in the months of March and April 1887, in the valleys of the Alai and of the Pamir, and made some interesting remarks on the results of his observations in that direction. The valleys of the Pamir properly so-called contain much less snow than those of the Alai district; there are many spots in the valley of the Alai where the snow-bed at the bottom of the valley is over 16 feet in depth, whereas, in the valley of the Ak-su the snow really reaches a depth of from 7 to 10 feet. This is accounted for by the different climatological conditions of these two parts of the same orographical system. The Alai receives more aqueous vapour in winter in consequence of its proximity to the Aralo-Caspian depression, and because of the prevailing winds. Again the distribution of the snow is, comparatively speaking, more irregular on the Pamir than on the Alai. On the former the temperature descends lower and the snow acquires a consistency finer than fine crystalline powder and is easily carried by the wind in drifts, while on the Alai at a lower altitude the inequalities of the soil and other conditions allow the snow to accumulate in strata of greater or less depth. The principal snow deposits are formed at the eastern extremity of the long valleys or in the lateral valleys of the latter, where the calms are more frequent and the aerial currents are more broken up.

in ricochet. This is the case, for example, with the long valleys of the Alai, of the Upper Ak-su, of the Uzundjilgua leading to the Uz-bel, the transversal valleys of which, like those of the Taldyk, of the Kizil-art, of the Ak-baital, of the Neza-tash, &c., contain the greatest quantity of snow, which accumulates in the high passes and at points where a long valley abruptly changes its direction. These air currents from the south-west at this season of the year blow with constancy and remarkable violence. The snow-covering in the interior basins, such as those of the great Kara-kul and of the Rang-kul, is of very little depth; the irregular winds sweep the fine snow over the bare soil, which, absorbing a quantity of heat on sunny days does not allow the snow to accumulate. The Teitt Kirghizes, wintering on the Pamir, pasture their flocks in these regions. The northern slopes of all the mountains are relatively more snow-covered than the southern.

M. Hamy communicated an extract from a letter he had received from Dr. Catat, who is carrying out an important mission of exploration in the little-known parts of Madagascar. The letter in question was written from Fianarantsoa, in the Betsileo country, whither he had returned after a short excursion to the south. He had ascended the mountain Infandana, where he came upon a cavern full of human skeletons in a very good state of preservation, the study of which will throw valuable light upon the interesting tribe of the Betsileos. Another tribe to which Dr. Catat has given attention is that of the Antaimoro, where he found numerous traces of an Arab element, once important but now extinct. The origin of the Bares people is still very doubtful. The information collected by Dr. Catat seems to indicate that they are a mixture of an Asiatic race with an aboriginal African tribe, to which have been added Jewish, Arabian, and other elements. Dr. Catat and his companion, M. Maistre, will continue their work in the interior until the close of the year.

DYBOWSKI'S EXPLORATION OF SOUTHERN ALGERIA.

In conclusion M. Dybowaki read a paper upon the mission in South Algeria, with which he was entrusted by the Ministers of Public Instruction and Agriculture. The object of this expedition was to study the natural history of the extreme southern part of the French possessions. El Golea was the principal district visited. This oasis is ten days' march from Uargla, and there is only one well on the way, the water of which was undrinkable, the well being so little used. The region has almost ceased to be an oasis, and it is inhabited by about 50 wretched negro families, slaves of Chaamba. In the extreme south slavery still exists, notwithstanding the efforts of the military authorities. M. Dybowski states that a colony might be established at El Golea with prospects of success. The soil is fertile and water is abundant. The flora is relatively rich, some of the trees attain a height of from 25 to 30 feet, principally the tamarisks. In the valley of the Ued M'Gurdami, 28 miles to the south, the first gum-tree was met with, some 40 miles further on a group of eight was observed; they are the *Acacia tortilis*. The fauna, including mammals, birds, and reptiles, is distinguished by a peculiar reddish-grey hue. The specimens brought home belong to the desert properly so-called. Some are known in the Upper Senegal, in the Nile region, &c., but others are quite new.

— June 20th, 1890: Vice-Admiral VIGNES, Vice-President, in the Chair.— The Chairman announced that M. A. Thouar, the well-known explorer of Paraguay, was present at the meeting. Various communications were read, the principal of which were by M. E. Blanc on the Trans-Saharan railway scheme, and on the dunes of the Sahara. Captain Brosselard Faidherbe gave an account of the French colonies in the region of the Casamana and Fogy (Western Africa).

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* R.G.S.)

EUROPE.

Baedeker, K.—Great Britain. Handbook for Travellers. With 15 maps, 30 plans, and a panorama. Second edition. Leipsic, Karl Baedeker; London, Dulau & Co., 1890: 12mo., pp. lxiv. and 540. Price 10 marks. [Presented by Messrs. Dulau & Co.]

The present edition has been revised and brought down to date. The section devoted to Scotland has been extended and improved, and the number of maps and plans considerably increased.

Borrow, George.—The Bible in Spain; or, the Journeys, Adventures, and Imprisonments of an Englishman, in an attempt to circulate the Scriptures in the Peninsula. With a Biographical Introduction. Second edition. (The Minerva Library of Famous Books. Edited by G. T. Bettany, M.A., B.Sc.) London, &c., Ward, Lock, & Co., 1889: 12mo., pp. xx. and 394, illustrations. Price 2s. [Presented by the Publishers.]

Ward, C. S.—Surrey and Sussex (including Tunbridge Wells). Sixteen maps and plans. London, Dulau & Co., 1890: 12mo., pp. xi. and 156. Price 3s. 6d. [Presented by Messrs. Dulau & Co.]

This is a new volume of Messrs. Baddeley & Ward's well-known guide-books, and appears in every respect to be up to the standard of others of the series. It contains a description of Surrey, south of Epsom; the part of Kent near, and on the way to, Tunbridge Wells from London; and the whole of Sussex. The maps and plans, by Bartholomew, are clear and well executed.

ASIA.

[**Ceylon.**]—A Belgian Physician's Notes on Ceylon in 1687–89. Translated from the Dutch by D. W. Ferguson, Esq. [Extracted from Journal No. 35, vol. x., 1887, of the Royal Asiatic Society, Ceylon Branch.] 8vo., pp. 34. [Presented by D. W. Ferguson, Esq.]

Drury, [Colonel] Heber.—Reminiscences of Life and Sport in Southern India. London, W. H. Allen & Co., 1890: 12mo., pp. viii. and 230. Price 5s. [Presented by the Publishers.]

Reminiscences of sport in Southern India, principally in Travancore, interspersed with anecdotes of the people, and remarks on their habits and customs.

Ferguson, Donald.—Captain João Ribeiro: his work on Ceylon, and the French Translation thereof by the Abbé le Grand. [Extracted from Journal No. 36, vol. x., 1888, of the Royal Asiatic Society, Ceylon Branch.] 8vo., pp. 47. [Presented by the Author.]

Naumann, E., and Neumayr, M.—Zur Geologie und Paläontologie von Japan. Wien, F. Tempsky, 1890: 4to., pp. 42, maps and plates.

Vambéry, H.—Die Sarten und ihre Sprache. 8vo.

AFRICA.

[**Aboulqâsem Ben Ahmed Ezziâni.**]—Le Maroc de 1631 à 1812, extrait de l'ouvrage intitulé "Ettordjemân Elmo 'arib 'an Douel Elmachriq ou 'Lmaghrib," de Aboulqâsem Ben Ahmed Ezziâni, publié et traduit par O. Houdas, Professeur à

l'École des Langues Orientales Vivantes. [Publications de l'École des Langues Orientales Vivantes, II^e Série, vol. xviii.] Paris, E. Leroux, 1886: large 8vo., pp. ix. and 216. [Presented by the French Minister of Public Instruction.]

Africa.—No. 6 (1890). Correspondence respecting the Anglo-German Agreement relative to Africa and Heligoland. July 1890. London, Eyre & Spottiswoode: folio, pp. 11. [C.—6046.] Price 2*d.*

— No. 9 (1890). Declarations exchanged between the Government of Her Britannic Majesty and the Government of the French Republic with respect to Territories in Africa. Signed at London, August 5, 1890. August 1890. London, Eyre & Spottiswoode: folio, pp. 3. [C.—6130.] Price ¼*d.*

The Anglo-Luso African Difficulty Explained, by V. de S. London, 1890: 8vo., pp. 16.

[Drury, Robert.]—Madagascar; or Robert Drury's Journal, during Fifteen Years Captivity on that island. And a further description of Madagascar by the Abbé Alexis Rochon. Edited with an Introduction and Notes by Capt. Pasfield Oliver, R.A., Author of "Madagascar." London, T. Fisher Unwin, 1890: 8vo., pp. 398. Price 5*s.* [Presented by the Publisher.]

This forms No. 2 of "The Adventure Series," now in course of publication. The original narrative, of which the present is a reproduction, was published in 1729. It contains the "journal" of Robert Drury during his fifteen years' captivity in Madagascar, including I. His voyage to the East Indies, and short stay there; II. An account of the shipwreck of the *Degrave* on the island of Madagascar, &c.; III. His being taken into captivity, hard usage, marriage, and variety of fortune; IV. His travels through the island, and description of it, as to its situation, product, manufactures, commodities, &c.; V. The nature of the people, their customs, wars, religion, and policy, &c.; VI. His redemption from thence by Capt. Mackett, Commander of the *Prince of Wales*, in the East India Company's service; his arrival to England and second voyage thither; VII. A vocabulary of the Madagascar language. Many doubts prevail as to the authenticity of Drury's travels, and Capt. Oliver himself is of opinion that the narrative is not to be trusted in its entirety. The volume, however, is an entertaining one, and gives some useful information regarding the country and people of Madagascar.

[European Possessions in Africa.]—Possedimenti e Protettorati Europei in Africa, 1890. Raccolta di Notizie geografiche, storiche, politiche e militari sulle regioni costiere Africane. Seconda edizione. Roma, 1890: 8vo., pp. x. and 196, maps.

The previous edition of this work was noticed in the 'Proceedings' for April, p. 246. In the present edition the subject has been brought up to date.

Junker, [Dr.] Wilhelm.—Dr. Wilhelm Junker's Reisen in Afrika, 1875-1886. Erster Band (1875-78). Nach seinen Tagebüchern unter der Mitwirkung von Richard Buchta, herausgegeben von dem Reisenden. Wien u. Olmütz, E. Hölzel, 1889: 8vo., pp. xvi. and 585, maps, portrait, and illustrations.

— Travels in Africa during the Years 1875-78. Translated from the German by A. H. Keane, F.R.G.S. London, Chapman & Hall, 1890: pp. viii. and 582, with maps and illustrations. [Presented by the Publishers.]

The first feeling of disappointment on finding that this book does not contain the narrative of Dr. Junker's more recent travels soon passes away, for the countries described in these pages are among the least known and explored parts of North-eastern Africa, and they were visited by our author only a few years before the rise of the Mahdi's power, when they ceased to be accessible to Europeans.

Dr. Junker began his travels with a short journey, undertaken at the suggestion of his friend Dr. Schweinfurth, in the region bordering on the coast

of the Mediterranean. His observations in that country led him to conclusions opposed to those of Gerhard Rohlfs, the well-known traveller in the early part of the present century, who thought it possible to open a waterway into the interior of Africa by means of depressions below sea-level, the existence of which has now been disproved by barometrical measurements. From the coast-lands Dr. Junker proceeded south to the so-called Natron Valley, and visited its four surviving convents of Koptic monks. These Kopts claim to represent the earliest Christian religious communities, and are therefore of extraordinary interest to the historical student. Formerly numerous, their numbers have dwindled to some 350,000 in the whole of Egypt, where, like the Nestorians in Asia, they have adhered to their religion through 1200 years of Moslem rule.

Our author's next explorations were in the Khor (valley) Baraka, which reaches the plains of the coast-lands near the Red Sea some distance south of Sawâkim (Suakim). Here he studied the habits and customs of the Hadendos, Beni Amr, and other Arab tribes whose warlike instincts and bravery won the admiration of British soldiers when they fought against them during the late war. Their condition is described as truly deplorable. On the one hand they came under the sway of Abyssinia, which was not strong enough to protect them against the Egyptians, the common enemy of all; on the other they were plundered by the Mudir of Kassala, who also afforded them no security. Thus constantly threatened by one or other of the rival powers, and weakened by tribal feuds, they were fain to seek shelter in their almost inaccessible uplands. Kassala, capital of the former Egyptian province of Taka, is described in the heyday of its prosperity, when the camels camped before its gates were numbered by the thousand, and telegraph lines connected it with Sawâkim and Massawa. Hence Dr. Junker travelled to Khartum via Qedaref, passing through a country watered by the Atbara, the last tributary of the Nile.

Khartum, when Dr. Junker reached it in 1876, was a peaceful, prosperous, city, already doing a large trade with the Sudan, and serving as a base for the government of the newly-created Equatorial Province. Outwardly, at all events, there was nothing to indicate the storm which was soon to burst over all those regions. On one of Gordon's steamers, the *Ismailia*, our author ascended the White Nile to its important feeder, the Sobat, which he surveyed. He had now passed beyond the range of the Arabic language, and entered the territory of the negro inhabitants of the Upper Nile basin. The first with whom he made acquaintance were the Shilluk and Dinka, concerning whom much was told us by Dr. Schweinfurth in his book, 'The Heart of Africa.' More extended explorations were then undertaken by Dr. Junker to Lado, and from this place, then capital of the province, to the region lying to the west, between the Bahr-el-Jebel and the Niam Niam country, inhabited by the Bari, Makaraka, and other intermediate tribes. From the station of Kabayendi he made several tours in Makaraka-land, extending his journeys northward to the Rôl basin and westward to the Welle, which he reached at its source the Kibbi, being the first white man to penetrate into those regions.

Dr. Junker's chief object in all his wanderings was to collect ethnological objects, and to study the habits and manners of the various tribes he met with during several years passed in their midst; he also gives us much information on the events of world-wide importance taking place in the Sudan. With many of the chief actors on the scene he was on terms of intimate friendship. From Gordon he received much kindness and assistance. He paints him as he saw him, with his many admirable qualities, always ready to do a kind action, and never so happy as when he was giving away. He brings before us Emin Effendi, now the well-known Emin Pasha, and Romolo Gessi, who successfully quelled the insurrection of the Bahr-el-Ghazal province: Zibêr (Zebêr) and his son Soliman, the ivory and slave dealers, besides many other Europeans and Egyptians, whose names are more or less familiar to our readers, are mentioned in this book.

The explanation of Arabic words and proper names, given in footnotes signed with the initials R. B., standing for Robert Buchta, is a great addition to the text, which has throughout been well edited. The illustrations are excellent, the map (though containing less detail than is to be found in those of the

German edition) is well worth studying, and the whole book is a welcome addition to our store of works on Africa. More volumes of Dr. Junker's travels are to follow.—[E. D. M.]

[**Madagascar.**]—Observatoire Royal de Madagascar. Résumé des Observations Météorologiques faites à Tananarive par le R. P. E. Colin, S.J., 1889. Tananarive, 1890: 8vo., pp. 56. [Presented by Rev. J. Richardson.]

Nozhet-Elhâdi.—Histoire de la Dynastie Saadienne au Maroc (1511–1670) par Mohammed Esseghir Ben Elhadj Ben Abdallah Elonfrâni. Traduction Française par O. Houdas. [Publications de l'École des Langues Orientales Vivantes, III^e Série, — Vol. iii.] Paris, E. Leroux, 1889: large 8vo., pp. vii. and 560. [Presented by the French Minister of Public Instruction.]

Sapeto, [Prof.] Giuseppe.—Etiopia. Roma, 1890: 12mo., pp. xi. and 436, map. [Presented by the Publisher.]

The author, who has made several visits to Abyssinia, has here produced a little summary of information on that country, principally intended for the Italian public. It is divided into four parts. Part I. deals with the Constitution, Religion, Military and Social Customs; Part II. is a geographical and topographical dissertation on Tigré; Part III. is devoted to a History of Ethiopia from the beginning of the 19th century down to 1868; and Part IV deals with Agriculture and Commerce, with accompanying statistics.

[**Sierra Leone.**]—Gazetteer of places in and adjacent to the colony of Sierra Leone. London, Waterlow & Sons, 1889: sq. 18mo., pp. 51. [Presented by J. C. Ernest Parkes, Esq.]

AMERICA.

Baldrich, J. Amadeo.—Las Comarcas Virgenes. El Chaco Central Norte. Buenos Aires and La Plata, 1889: large 8vo., pp. 292.

This volume is descriptive of the Central Chaco, a region lying between the rivers Pilcomayo and Bermejo in the northern part of the Argentine Republic. It includes notes on the geography, geology, climatology, flora, and fauna, &c., of the country, with descriptions of the people, and is illustrated with a map.

Bancroft, H. H.—The Works of Hubert Howe Bancroft. Vol. XXIV. History of California, Vol. VII. 1860–1890. San Francisco, The History Co., 1890: 8vo., pp. xii. and 826.

Bourgade, [Dr.] E. de.—Le Paraguay. Paris, E. Plon, Nourrit & Cie. [1889]: 12mo., pp. 460.

A detailed account of Paraguay under a variety of aspects, including its geography, geology, soil, animal life, population, immigration, ways of communication, industries, cultures, &c., &c. The volume is illustrated, and contains a good map of Paraguay.

Bristowe, Lindsay W., and Wright, Philip B.—The Handbook of British Honduras for 1890–91, comprising Historical, Statistical, and General Information concerning the Colony. Edinburgh and London, W. Blackwood & Sons, 1890: 8vo., pp. xiv. and 258, map. [Presented by the Publishers.]

This edition, which has been corrected to date, contains, in addition to the usual matter, a descriptive account of the towns of Stann Creek and Punta Gorda, as also the American settlement of Toledo.

[**Buenos Ayres.**]—Ministère de Gouvernement, Direction Générale de Statistique. Annuaire Statistique de la Province de Buénos-Ayres publié par M. Adolphe Moutier, Directeur-Général de Statistique de la Province de Buénos-Ayres. Huitième Année, 1888; La Plata, 1889: 4to., pp. lxxviii. and 380.

- [**Columbus' Letter.**—*De Insulis nuper inventis.* The Letter of Christopher Columbus announcing the Discovery of the New World. A facsimile of the earliest edition, with illustrations, reproduced for John S. Kennedy, President of the Lennox Library. New York, 1890: 12mo. [Presented by John S. Kennedy, Esq.]
- Darapsky, [Dr.] L.**—*Las Aguas Minerales de Chile.* Valparaiso, 1890: large 8vo., pp. viii. and 193, plates.
- Horsford, Eben Norton.**—The discovery of the ancient city of Norumbega. A communication to the President and Council of the American Geographical Society at their special session in Watertown, November 21, 1889. Cambridge, privately printed, 4to., pp. 63, maps and illustrations. [Presented by the Author.]
- Levey, G. C.**—*A Handy Guide to the River Plate, including the Argentine Republic, Uruguay, and Paraguay. Their Physical Features, Resources, Railways, and Finances.* With Map. London, Hutchinson & Co., pp. 228. Price 2s.
- Lorne, Marquis of [K.T.]**—*Canadian Pictures drawn with Pen and Pencil.* With numerous Illustrations from Objects and Photographs in the Possession of, and Sketches by, the Marquis of Lorne, Sydney Hall, &c. London, the Religious Tract Society, 1885: 4to., pp. viii. and 224. Price 8s.

ARCTIC.

- Dunsford, H. A. H.**—*The Opening of the Arctic Sea.* London, W. Ridgway, 1890: 12mo., pp. 24, map.
- [**Greenland.**—*Meddelelser om Grønland, udgivne af Commissionen for Ledelsen af de geologiske og geographiske Undersøgelser i Grønland.* Trettende Hefte. Kjøbenhavn, C. A. Reitzel, 1890: 8vo., pp. iv. and 247. [Presented by the Author.]

This thirteenth contribution to the 'Communications on Greenland' consists of an important bibliography of Greenland, commenced by Dr. C. G. F. Pfaff, and completed by Mr. P. Lauridsen. It contains full lists of books treating of Greenland in almost every department of science—geography, mineralogy and geology, hydrography, meteorology, earth magnetism and astronomy, botany, zoology, history, missions, Eskimo literature and language, maps, &c. An index of authors is given at the end of the volume.

AUSTRALASIA.

- Australia, Western.**—*Annual General Report for 1888-89.* By Harry Page Woodward, F.G.S., F.R.G.S., Government Geologist. Perth, 1890: 8vo., pp. 60. [Presented by the Author.]

This report commences with a short historical account of the geological work up to the end of 1887, and a brief description of the geographical configuration, followed by longer papers on the physical geography and geology of the colony; concluding with a sketch of the mineral wealth, and the author's reports of the country examined during the past two years.

- Foster, J. J.**—*The Jenolan Caves.* Issued by direction of the Honorable Sydney Smith, M.P., Minister for Mines and Agriculture. Sydney, Charles Potter, 1890: 8vo., pp. viii. and 96, map and plan. Price 2s. 6d.

The Jenolan Caves have already been described by Mr. Samuel Cook, whose volume was noticed in the 'Proceedings' for last year at p. 635. The present account gives, in a handy form, a systematic and concise description of the various routes to the caves, the Cave House and its surroundings, the fauna and flora of the district, discovery of the caves and subsequent explorations, and an account of each separate cave, with its various passages and chambers, and the numerous objects of interest contained therein. The volume is intended as a book of reference for visitors to this interesting district of New South Wales.

Queensland.—Report on the Sellheim Silver Mines and Surrounding District, by Robert L. Jack. [Brisbane], 1889: folio, pp. 8, maps and plan. [Price 1s.] [Presented by Mr. R. L. Jack.]

Schellong, [Dr.] O.—Die Jäbim-Sprache der Finschhafener Gegend (N. O. Neu-Guinea; Kaiser Wilhelmsland). Leipzig, W. Friedrich, 1890: 8vo., pp. 128. [Presented by the Publisher.]

GENERAL.

Chisholm, George G., and Leete, C. H.—Longmans' School Geography for North America. New York, Longmans & Co., 1890: small 8vo., pp. 384, illustrations. [Presented by the Publishers.]

This is the American edition of Longmans' School Geography, which was issued in 1888. Certain portions of the volume have, of course, been changed to suit the American instead of English or Australian pupils. Thus the portions on America in general, North America, and the United States, have been newly written. With the exception of a few alterations and adaptations, other parts of the volume are changed but little. A full index is appended.

Deniker, J.—Essai d'une Classification des Races Humaines basée uniquement sur les caractères physiques. Paris, 1889: 8vo., pp. 16. [Presented by the Author.]

Dictionary of National Biography. Edited by Leslie Stephen and Sidney Lee. Vol. XXIII. Gray—Haighton. London, Smith, Elder, & Co., 1890: 8vo., pp. vi. and 448. Price 15s.

The following names, of interest to geographers, appear among the notices in this volume:—G. B. Greenough, who acted as President of the Society in 1839 and 1840, by G. S. Boulger; Sir J. F. J. von Haast, by R. E. Anderson; and W. Hadfield, by Francis Watt.

[French Colonies.]—Les Colonies Françaises. Notices illustrées publiées par ordre du Sous-Secrétaire d'État des Colonies sous la direction de M. Louis Henrique, Commissaire Spécial de l'Exposition Coloniale.—L'Inde Française—Cambodge Cochinchine—Annam—Tonkin—Notice sur Madagascar—Mayotte, les Comores, Nossi-Bé, Diego-Suarez, Sainte-Marie de Madagascar—La Réunion—Saint-Pierre et Miquelon—La Guadeloupe—La Martinique—La Guyane—Notice sur les Nouvelles-Hébrides—Tahiti, Iles-sous-le-Vent—La Nouvelle-Calédonie—Les Wallis, Futuna, Kerguelen. Paris, Maison Quantin, [1889]: 12mo.

A useful little series dealing with the various French colonies in their historical, geographical, administrative, and social and political aspects. Each volume—averaging 90 pages—contains a map, besides a number of illustrations.

NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

THE WORLD.

Halbkugel.—Generalkarte der öestlichen und westlichen —, von F. Handtke. Scale 1:45,000,000 or 10 $\frac{1}{2}$ ° to an inch.

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Norge.—Turist - Kart over —, udarbejdet ved N. N. Sontum. Scale 1:800,000 or 11 geographical miles to an inch. 2 sheets. Bergen, Beyer. Price 2s. 6d. (*Dulau*.)

Norway.—Beyer's Map of Western —, by Viljam Olswig. Scale 1:2,000,000 or 27 geographical miles to an inch. Bergen, Beyer. Price 3s. 6d. (*Dulau*.)

Romsdalsfjord.—Standlinien und Terrassen im —. Mit Zugrundelegung norwegischer Seekarten (hauptsächlich "Havbankerne fra Stat til Smolen" und "Kart over Romsdals Amt"), nach eigenen Untersuchungen, gezeichnet von Dr. Christian Sandler. Scale 1:200,000 or 2·7 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 10. Gottha, Justus Perthes. (*Dulau.*)

Schweiz.—Vogelschaukarte der —. Blatt 12, Glarus-Ragaz-Chur. Zürich, Orell, Füssli, & Co. Price 1s. 6d. (*Dulau.*)

Tyrol, Sudbayern und Salzburg.—Reise-Relief-Karte von —, nebst den angrenzenden Gebieten. Scale 1:500,000 or 6·8 geographical miles to an inch. Augsburg, Lampart's Alpiner Verlag. Price 3s. (*Dulau.*)

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Area Books:—

Staffordshire: Handsworth, 2s.; Harborne, 1s.; Rowley Regis, 2s.; Sedgley, 2s. 6d.; Tipton, 1s.; Wednesbury, 1s.; West Bromwich, 1s. 6d.; Wolverhampton, 3s.

(*Stanford, Agent.*)

ASIA.

Indian Government Surveys:—

Indian Atlas. Quarter Sheet, No. 76, S.E. Parts of Districts Nellore, Kistna, and Kurnool (Madras Presidency). Scale 4 miles to an inch. 1884.—Railway Map of India. Corrected up to January 1890. Scale 32 miles to an inch. 6 sheets.

(*Stanford, Agent.*)

Palestine.—Map of —, from the Surveys conducted for the Committee of the Palestine Exploration Fund, and other sources. Compiled by George Armstrong, and revised by Colonel Sir Charles W. Wilson, K.C.B., F.R.S., &c., and Major C. R. Conder, D.C.L., R.E. Scale 1:168,960 or 2·3 geographical miles to an inch. Engraved and printed for the Committee at Stanford's Geographical Establishment. London, 1890. 21 sheets. Prices, in sheets, 2*l.*; mounted in case, 4*l.*; mounted on rollers and varnished, 4*l.* 5*s.*

In this map is incorporated the whole of the work executed for the Palestine Exploration Fund, commencing with Sir Charles Wilson's preliminary surveys, begun in 1865, and ending with the surveys of Eastern and Southern Palestine, which were carried out in the years 1881-3. In addition to this, Herr Schumacher's survey of about 500 square miles, the work of the American Palestine Exploration Society, the survey of the Lebanon made by the French Engineers, and sketches supplied by travellers east of the Jordan, have all been used in the construction of the map.

The area mapped includes the whole of Palestine both east and west of the Jordan, and extends on the north to Beirût, on the south to Ain Kadis, on the east it embraces the Hauran and the Eastern Trachonitis.

Two editions of this map are now offered to the public, uniform in size and price; one, the "Modern Edition," on which the topographical features, and modern names only are given; the other, "The Old and New Testament Edition," on which in addition to the modern names, those of all places mentioned in the Old and New Testaments, the Apocrypha, Josephus, and the Talmud are given; the New Testament, Josephus, and Talmudic names being printed in blue, the Old Testament and Apocrypha names in red.

Taken as a whole, the map is a fine specimen of cartography. The amount of detail given in some of the sheets east of the Jordan is, however, by no means uniform, it being evident in some portions that the survey was interrupted, and that the topographical features of some districts are only approximately indicated. The territories occupied by the twelve tribes are clearly distinguished by different colours, and a full list of the topographical and geographical terms used in the map, in English and Arabic, is given. This map is a most important addition to the Society's collection, and reflects credit on all concerned in its production.

AFRICA.

Africa.—Map of —, by J. Arrowsmith. New edition, 1890. Scale 1:16,473,600 or 225·6 geographical miles to an inch. E. Stanford, London. Price 3*s.* 6*d.*

On this map the boundaries of States and the Protectorates of European powers are generally speaking correctly laid down, but in some instances they are not; as, for example, the south-eastern shores of Lake Nyassa are coloured green for Portuguese, instead of red for British, as they really are. The name of the river Pungue, which holds a very important place in the agreement between the British and Portuguese Governments, does not appear at all. There are also other corrections which should be made, and the map itself is printed from such an old plate, that in some instances it does not represent the present state of our geographical knowledge of Africa.

Klerksdorp Gold Fields.—Map of the —, situated in the District of Potchefstroom, S.A.R. Scale 350 Cape roods to 1 English inch. Compiled by P. G. Poole, M.E., &c. Klerksdorp, 1890. Lithographed and published by the Diggers' News Co., Ltd., Johannesburg. (*Dulau.*)

Willander.—Politische Übersichtskarte der —, von Heinrich Kiepert. Neubearbeitung von Rich. Kiepert. Scale 1 : 5,000,000 or 66·6 geographical miles to an inch. Berlin, D. Reimer. Price 1s. 6d. (*Dulau.*)

Southern Central Africa.—Political Map of —, by J. G. Bartholomew, F.R.G.S. Scale 1 : 5,600,000 or 76·1 geographical miles to an inch. J. Bartholomew & Co., Edinburgh, 1890. Price 1s.

This is a very clearly drawn map of Southern Central Africa, on which the extents of the Protectorates are correctly laid down. It would, however, have been well if the name of the Pungue river had been printed on the map instead of "Aruangua" which is given, and which will hardly be recognised as the river which holds such an important place in the recent agreements between Great Britain and Portugal. On an inset map of Africa all political boundaries are laid down, but the scale is far too small for any but general reference; and to convey an idea of the vast extent of the different Protectorates a map of England and Wales, drawn on the same scale as the larger map, is also given.

Witwatersrand Gold Fields.—Section of the —, South Africa, from original drawings, dated January 1889. By Thos. D. Williams, F.G.S., M.I.M.E., M.S.A. B. B. Bingley, Litho., Halifax.

AMERICA.

Rand, McNally, & Co.—General Map of the United States, with portions of the Dominion of Canada and the Republic of Mexico. Compiled from the most reliable sources, and engraved by Rand, McNally, & Co., Chicago, 1890. Scale 1 : 2,852,110 or 39 geographical miles to an inch. Price 10s. (*Stanford.*)

AUSTRALIA.

South Australia.—Map of —, inclusive of the Northern Territory, showing Pastoral Leases and Claims. Compiled from the most recent information in the Survey Department, Adelaide, under the direction of G. W. Goyder, Surveyor-General, January 1890. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch.

— Plan of Boundary Line between Northern Territory of South Australia and Queensland. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Showing 138th Meridian of Longitude from Latitude 26° South to the Gulf of Carpentaria, as defined on the ground 1885-6. Compiled from Surveyor's original notes in the Office of the Surveyor-General, Adelaide, May 1890.

The progress that has been made in the survey of South Australia and the Northern Territory is shown not only on the map itself, but also on the plan, that accompanies it, of the boundary line between the Northern Territory of South Australia and Queensland. This plan, which is drawn on double the scale of the map, has been compiled from the surveyor's original notes, and shows the topography of the country along the 138th meridian, from Lat. 26° S. to the Gulf of Carpentaria. On the large map land sections have been laid down, and it has in all respects been brought up to the date of publication.

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in July and August 1890.

No.		Inches.	
183	m =	2·8	Mediterranean, Morocco :—Tetuan bay, 1s. 6d.
313	m =	0·9	North America, east coast, St. Lawrence river :—Saguenay river to Orignaux point, 2s. 6d.
314	m =	0·9	North America, east coast, St. Lawrence river :—Orignaux point to Goose island, 2s. 6d.
315	m =	0·9	North America, east coast, St. Lawrence river :—Goose island to Quebec, 2s. 6d.
1214	m =	0·78	Canada, lake Huron :—Cape Rich to Cabot head. Plans, Lion's head harbour, Owen sound, McGregor harbour, 2s. 6d.
1499	m =	0·05	North-west America, Alaska :—Cross sound to Kadiak island, 2s.
1500	m =	0·05	North-west America, Aleutian islands :—Kadiak island to Sigum island, 2s.
1501	m =	0·04	North-west America, Aleutian islands :—Sigum island to Attu island. Plans, Chichagoff harbour, Kyska harbour, Bay of islands, Korovin bay, Nazan bay, Suchikoff bay, Bay of Waterfalls, 2s.
1433	m =	3·6	North America, west coast, Alaska :—Anchorages in Sumner and Clarence straits—Port Protection, St. John harbour, Steamer bay, Dewey anchorage, 2s.
1457	m =	various.	North America, west coast, Alaska :—Anchorages in Alaska—Popoff strait and Humboldt harbour. Coal harbour. Ohignik bay. Lituya bay. Port Mulgrave. Sanborn harbour. Iliuliuk harbour, 2s.
1454	m =	various.	North-west America, anchorages in Alaska :—Port Etchee. Port Graham. Port Wrangell. St. Paul harbour. Shumagin islands. Chernoffski harbour. Eagle harbour. Kulibyak bay. Pribiloff island. St. Mathew island, 2s.
1449	{ m =	3·6 }	North-west America, Alaska :—Anchorages in Sumner strait. Port McArthur. Red bay, 2s.
	{ m =	7·3 }	
1577	m =	0·16	Africa, east coast :—Sketch of the Lower Zambesi and Shire rivers, 2s.
1420	m =	0·24	India, west coast :—Dwarka point to Diu head, 2s.
1430	m =	3·4	Russian Tartary :—Slavianski bay (Port Bruce), 1s. 6d.
1485	m =	0·6	North Pacific, Caroline islands :—Tomil bay, 1s.
523			Vera Cruz and Anton Lizardo anchorage :—Plan added, Port of Vera Cruz.
157			Italy, sheet 1 :—Plan added, San Remo.
1385			South Pacific, Tonga islands :—Plans added, Mamuka anchorage. Falcon island.

(*J. D. Potter, Agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
2295	Plan of Trondhjem on this chart	{ New plan, Trondhjem on this chart	2295

No.		Cancelled by	No.
157	Plans on this sheet, Portofino, Sestri à Levante, Port Mau- rizio	New plans, Portofino, Sestri Le- vante, San Remo on this sheet }	157
313	Green island to the Pilgrims ..		
314	Pilgrims to Ouelle point ..	New charts, Saguenay river to Ori- gnaux point	313
315	Ouelle point to Seal islands ..		
316	Seal islands to Orleans isle ..		
317	Quebec and Orleans isles ..		
311	Point de Monts to Bersimis river.		
1088	Plan of Samarai anchorage on this sheet	New plan, Samarai anchorage ..	1088
779	Plan of Tomil bay on this sheet.		
		New plan, Port Tomil	1485

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2615. England, south coast:—Bill of Portland to St. Alban's head. 2255. England, south coast:—Weymouth and Portland. 1411. England, west coast:—New quay to Holyhead. 1170a. England, west coast:—Holyhead to Liverpool. 1413. England, west coast:—Holyhead bay. 1447. Ireland, east coast:—Dublin bar and the river Liffey. 1887. Germany:—Eider river to Blaastrand point. 2361. Baltic, sheet 3:—Öland to Landsort. 2377. Baltic sea:—Ports on the east coast of Sweden. 2150. Germany:—Fermern to Bornholm. 185. Baltic sea:—Port Swinemünde and approaches to Stettin. 235. Arctic sea:—Davis strait and Baffin bay. 863. Labrador:—Hudson bay and strait. 490. Canada lakes:—Lake Erie, west end. 2843e. North America, east coast:—Chesapeake bay. 2843f. North America, east coast: Chesapeake bay, sheet 6. 539. South America, east coast:—Port Maceió. 597. Africa, east coast:—Delagoa bay to cape Guardafui. 760. Madagascar, southern portion:—Cape St. Mary to cape St. Vincent, and Matane. 38. Persian gulf, Beluchistan:—Maskat to Karachi. 71a. Bay of Bengal: Coromandel coast, sheet 1. 2056. Sumatra, west coast:—Sunda strait. 138. Japan:—Saigo harbour, Ohama harbour. 1011. Russian Tartary:—Eastern Bosphorus strait. 2759a. Australia:—Northern portion. 1998. New Zealand, north island:—Kawau island. 780. Pacific ocean:—South-west sheet. 765. Pacific ocean:—Union group.

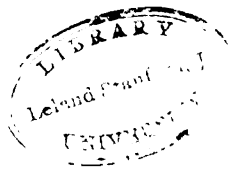
(*J. D. Potter, Agent.*)

United States Charts.—No. 1223. Pichilinque Harbour (La Paz Bay). From a survey in 1874 by the officers of the U.S.S. Narragansett, Commander George Dewey, U.S.N., commanding. Price 2s. 1d.—Pilot Charts of the North Atlantic Ocean for August and September 1890. Published at the Hydrographic Office, Navy Department, Washington, D.C. Henry F. Pickering, Captain U.S.N., Hydrographer.

ATLASES.

Hachette et Cie.—Atlas de Géographie Moderne, édité par ——. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, figures, diagrammes, etc. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Hachette et Cie., 1890. Parts 18, 19, 20. Price 10d. each part. (*Dulau.*)

Part 18 contains general maps of the Balkan Peninsula, the Caucasus, and India. Part 19:—a map of North-west Africa, a map of North-east Africa, and a map of South Africa. These three sheets make a complete map of Africa, on which the boundaries of the possessions, and spheres of influence of European nations are laid down; those of Portugal, however, are not correctly shown. Part 20:—A physical map of the World, and political maps of the Chinese



PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Zambezia, the new British Possession in Central South Africa.

By E. A. MAUND.*

Map, p. 712.

A VIGOROUS spirit of commercial enterprise is now busily opening up that rich territory of Zambezia so long traversed by our explorers and ivory hunters, and which only so lately was declared "within the sphere of British influence." The British South Africa Company, empowered by royal charter, will in the immediate future find occupation, homes, and probably riches for thousands of our overteeming population, who are ever eager to colonise, when, as in the present instance, so promising a land is brought within their reach.

Five years ago Sir Charles Warren's expedition opened up the grazing farms of Bechuanaland as a new field for emigration. This has since grown into a thriving crown colony with two fast growing towns, Vryburg and Mafeking, and a railway in construction to traverse it. Matabeleland was then a *terra incognita*, difficult and dangerous to approach. Ignorance created these illusions, which a more intimate acquaintance has now happily dispelled. The telegraph is fast connecting us with nearly a thousand of our countrymen, gone in to prospect and settle in this once far-off Matabeleland. They are now about Mount Wedsa, at the head of the Sabi river, a locality for years much coveted by trek Boers, as the rich valleys there afford splendid farming opportunities.† There is now an organised post and coach communica-

* Read at the Geographical Section of the British Association for the Advancement of Science, Leeds Meeting, on Sept. 5th last.

† Since the reading of this paper, the above-mentioned expeditionary force has arrived at Mount Hampden, lat. 17° 35', long. 31° 22', without let or hindrance from the Matabele. The occupation of Mashonaland is therefore an accomplished fact. Mount Hampden is, we are informed, to be the headquarters of the Company for administrative purposes. The natives have heartily welcomed the white man; and reports from the experts show that the auriferous nature of the country has not been overrated; indeed, the richness of the country traversed by this pioneering expedition, both in gold and farm lands, caused many of its members to wish to settle long before reaching the objective point, Mount Hampden, and many prospecting parties from the Transvaal and Cape Colony, are now fast trekking for this New Eldorado.—E. A. M.

tion with Kimberley; and Gu-Bulawayo, the king's chief kraal, is actually within thirty days of London.

I wish to draw the attention to this territory of Zambezia, so quickly being developed, of those who have few opportunities of reading the Royal Geographical Society's reports, and who rarely see our instructive, but too quickly pigeon-hóled blue-books.

Of course, many of those forming the Mashona Land pioneering party are fresh to African travelling experiences, and consequently may form and give adverse opinions on the country. It is, however, a splendidly equipped expedition, responsible positions being held by good men, capable of sound judgment—men, too, who have been, seen, and think it good enough to go again. For years past, unfortunately, there have been those who, when they got down country, from what used to be the "interior," loved to pose as heroes by accounts of the dangers and difficulties they had gone through, and it was this foolish way of mountainising molehills which retarded many from going to see for themselves.

Matabele Land, which lies between 16° and 22° S. lat. and 27° and 33° E. long., is the most promising country for colonisation in South Africa, lying high, generally healthy, rich in minerals and soil, and sparsely populated. The people are not half so black as they are painted (I mean in character). Notwithstanding all the malicious reports to the contrary, the king and people have kept to their promises of friendship to the English, given, when their headmen came to England last year, to see if we were more respectable than the Boers made us out to be.

Lobengula has allowed the construction of a road on to Mount Hampden, at the sources of the Mazoe river, which, passing the Lundi river at 20½° S. lat., goes on viâ Mount Wedsa to open up Mashona Land; he even sent his Indunas to greet the expedition now passing through his territory. Of course savages are proverbially fickle, but the chartered company are now in a position, should it ever be necessary, to protect their working parties from the much overrated Matabele hordes.

The country dominated by the Matabele (I cannot say governed) is as big as Germany, and very thinly populated; while the actual territory occupied by them is very small, and would compare about as Bavaria does to the German Empire. They rule from this centre much as the Roman military colonies did in barbarian Europe, without, however, the same civilising influence. Their kraals occupy the plateau forming the watershed between the Zambezi and the Crocodile rivers, which varies between four and five thousand feet above sea-level.

It is unnecessary to dwell here upon the Matabele nation, whose history has been one of bloodshed since their exodus from Zululand, and who still live under a military despotism of the worst kind. The terror

of their assegais reaches beyond the Zambezi, while witchcraft claims many a victim among their own kraals. No better illustration can be given of these horrors than the sinister name of Lobengula's head kraal, *Gu-Bulawayo*, which means, "The place of killing."

We have now gone among them not as judges, but to change all this killing and slavery by civilising influences; for we should not ourselves forget that, though it may be three-hundred years since we burned bishops and tortured for religion, yet it is actually as late as the eighteenth century that we burned a witch in Perthshire.

It is with reference to the country where the Matabele chief kraals are situated that I would now speak, as during visits in 1885 and 1888, as well as during several months' stay with the king this and last year, I have had the chance of mapping and prospecting this district. It will also give some idea of what England is now busily opening up. Witchcraft so terrorises the people that many were the amusing stratagems I had to have recourse to in obtaining angles from the hill-tops. Their confidence in me, after bringing their Indunas safe home again from their wondrous voyage, was often rudely shaken. "Maundi must be a bit of a *tagati* (witch) when his sextant brought down the sun," and they were very doubtful whether shooting a kraal with a prismatic compass might not keep the rain off the cornfields in its vicinity. The rains, however, were particularly heavy this year; in the neighbourhood of Bulawayo no less than 40 inches of rain were measured during the months of November, December, January, and February. Like all tropical rains they are not continuous, but come on in terrifically heavy thunderstorms, with hot sunshine between. For several weeks before the rains actually fall the clouds bank up and threaten. Then is the king busy with his witch-doctors, making fell potions to charm the clouds to break. One sees him anxiously gazing at every heavy cloud, for the people come in from all parts to beg rain from him, "their rain-maker," for their parched grounds. And many is the laugh I have had with him on the subject when, after a heavy rain, the people come to "*bonga*" (praise) him. Great then is his good humour, but he is far too shrewd to be a believer in his own powers in the rain-making line.

The months of September and October, before the rains, are the hottest in the year. All vegetation appears to be burnt up, and the country has a dreary aspect. Cattle grow thin, and the vast herds are sent off low down the rivers to find grass and water. In September I have registered a maximum in the shade ranging between 105° and 111° F.; but the atmosphere is so dry that one does not feel it; 85° near the sea coast, with the air saturated with moisture, being comparatively much hotter. The evenings and mornings are delightful, and at an elevation of 4000 feet the heat is not enervating, in fact we used to play lawn tennis through it, much to the amusement of the natives. During the winter months, May, June, and July, it is often very cold at night

in these highlands. Even on the Macloutsie river, at elevations under 3000 feet, I have known 15° of frost at night, with the thermometer ranging over 80° in the day, as measured by instruments registered at Kew. Mealies put in soak for the horses over-night have been frozen nearly solid in the morning. Notwithstanding this great variation in temperature, this season is particularly healthy. Trek oxen suffer from the dryness of the grass and cold; so do the poor unclothed natives, who do not thaw out until the sun has well aired the day. The climate is, however, well adapted to the Anglo-Saxon, who can work all the year round in it. There are Englishmen who have lived up there for the last 15 or 20 years. And what is more essential for good colonisation, white children thrive well, some of the missionaries and traders having reared large families. Of course, low down the river banks, during the rainy season, one expects to find fever, as in every new country, but houses built a few hundred feet above the river avoid any such danger.

The Matabele corn-land principally lies in the district embraced by the map accompanying this paper, and when the clouds begin to bank they begin to pick, for as yet the king sets his face against ploughs. Sowing goes on in October and November, and after the first rains it is marvellous the rapidity with which the grass and corn grow. The russet brown country changes suddenly to an emerald green, and the grassland, which is good and abundant, and forests are ablaze with flowers of every hue. Those so soon to have farms up there will assuredly choose this season when wishing to effect a land sale. Harvesting goes on in May and June, and much of the corn is soon turned into Kaffir beer, the national drink, while a good deal is traded for coloured cotton and beads. Kaffir corn was traded last year for five-shillings' worth of goods per sack, but mealies were more difficult to buy. There is a great future in the corn as also in the cattle trade for this country. As I have mentioned, during the winter, or dry season, the cattle are sent off the plateau down the rivers, as higher up the water only remains in pools, the rains being so heavy that they run off quickly into deep channels; but by judicious storage of this rain supply vast tracts might be irrigated, while springs are numerous and only want opening up. In the Gu-Bulawayo district the soil is very deep and rich. Anything and everything seems to grow and flourish. At Shiloh, where Mr. Thomas, a missionary, now dead, led on water from a spring, and made a large garden, I reaped and thrashed out several sacks of excellent English wheat. I planted potatoes too, which gave a very good crop. Cabbages, carrots, onions, marrows, beans, peas, cucumber, tomatoes, and lettuce also thrived well. In fact, all European vegetables, as well as sweet potatoes and mealies, grew very quickly in this irrigated ground. The rivers are generally in beds too deep to run the water off except at great expense; but windmill pumps, nuriyas, and dams could be utilised. With the aid of water, almost any fruit seems to flourish.

From the same garden, we enjoyed large crops of oranges, lemons, figs, grapes, bananas (or rather plantains), peaches, apricots, pomegranates, mulberries, and Cape gooseberries. The date-palms and apple-trees, though growing well, were too young to bear. The orange and lemon trees grow luxuriantly and fruit well. So too do the figs. There were beautiful groves of them in this missionary's garden. The vines grown over high trellised alleys also bore a great deal of luscious fruit. The white ant is the gardeners' enemy, but luckily he seems to prefer the sandy soil to the rich loams. Many will be the splendid market gardens by and by to supply the mining centres. The Matabele women are the labourers. One sees during the picking season long rows of girls, often with a queen among them, keeping time with their mattocks to a not unmelodious chant. Great quantities of excellent tobacco are grown by the Mashonas and Makalakas, that grown at Inyoka, of which the king receives a yearly tribute, being considered the best. It is principally converted into snuff. The rice grown in Mashona Land is excellent, and cost last year about eighteen shillings' worth of goods per sack. The grass, corn, rice, tobacco, and gardening capabilities of this country are sufficient allurements for farming colonists, while undoubtedly it would produce coffee and sugar. Cotton and indiarubber we know it produces in the north, as the Mashonas weave blankets of the former, and make candles of the latter. Indigo grows as a weed, and is used by the Mashonas for dyeing their home-made blankets.

Farmers have to combat lung sickness among cattle and that terrible scourge horse-sickness. Inoculation and quarantine laws will stamp out the former. The natives now inoculate for lung-sickness, a treatment which is very successful, but they do not understand closing infected districts. For horse-sickness a specific has still to be found. It comes on yearly after the rains. In good years one per cent. perhaps will die, whereas in a bad season like the last one, a high percentage succumb. I lost eleven horses out of thirteen in a week. A "salted horse," or one which has gone through the sickness, and therefore is supposed to be proof against it, will cost you 50*l.* or 60*l.*, whereas a very serviceable horse can be bought for 10*l.* down country.

Matabele Land is well wooded, though the timber is not large. The *mopani*, a hard-wood capable of withstanding white ants, is useful for building and firewood, while its bark tans excellent leather. Until coal is found nearer than the Zambezi valley there is a good and sufficient supply for mining purposes.

It is to the mineral riches, however, that we must look for the quick development of this country. The gold in Mashona Land will, I believe, create a "rush" only to be paralleled in the development of California and the Western States of America. In the accompanying map no less than twenty reefs will be seen marked, which, as far as the suspicious natives would allow, I prospected. In some of these we found free gold,

and colour in the watercourses below them. Old workings, too, were visible, which shows that at one time this quartz was worth working, even with crude appliances. There is a banket formation similar to that in the Transvaal in this district. While north of the Ramaquoban river the Charter Prospectors found a large body of reef which returned as much as 2 oz. of gold to the ton. These riches running among and even through the Matabele kraals must for the present lie undeveloped. The rich gold reefs in Mashona Land have been written and talked about for the last twenty years, and below Mount Hampden alluvial deposits are known to exist. This poor man's gold-field the Company has now sent experts to develop. It is from this Mazoe and Hanyani district that the natives bring gold-dust in quills for sale to the white men, notwithstanding the known penalty of death they risk in the traffic. But all this we will hope is now changed. The natives know that the white man will have the gold where it is known to exist, and they have wisely made the best of the situation by putting themselves in the hands of a strong company countenanced by the Great White Queen, who will befriend and not dispossess them.

From numbers of natives who yearly go from here to find work in Johannesburg and Kimberley, the people generally have learned that it is better to have the benefits arising from these mines nearer their own homes. Hence the mass of the working population are in favour of the white man crushing their quartz, and thus saving them 800 miles' tramp southwards.

The Makalakas and Mashonas, the original inhabitants of the country, though physically much inferior to their masters, the Matabele, are clever and willing workers. They fashion the hematite iron, in which mineral the country is particularly rich, into a variety of objects, principally, however, at present into assegais. The copper, too, in the country was formerly smelted by them, as is evidenced by old copper workings I have seen.

When once the Matabele learn the benefits and freedom to accrue from the white man's rule they will soon, I believe, work as well as the Zulus in Natal. If, however, they will not change the assegais for the pick and the plough, then gradually they will disappear beyond the Zambezi before the inevitable march of civilisation; and from among the downtrodden Mashonas and Makalakas we shall find plenty of labour for both mines and fields.

It is strange that this country, so long reputed to be rich in gold and other minerals, of which Baines wrote twenty years ago as being the Land of Ophir, should until now have baffled our colonising instincts. The work, however, has now begun under the most favourable auspices. The administration of Zambezia is already organised, law and order will reign wherever the Chartered Company penetrate. The revolver, bowie knife, and spirit saloon will there have no place. Gold laws are

framed, and the ivory-giver, the elephant, will now be preserved instead of exterminated. Raiding and slavery must cease; and Christianity will spread where hitherto the missionary's labours have been well nigh fruitless.

We English colonise native territories to make them pay. We know that "a strong executive means order," and that stirring up native strife only necessitates costly expeditions. Slavery it is our ambition to abolish. So, too, we suppress the liquor traffic as breeding infinite troubles. Bechuana Land is a happy example of what can be done in this line. Khama's people are rapidly becoming civilised, and afford a good market for our goods. The greed for gold will always overcome climatic difficulties.

The Partition of Africa.

Map, p. 712.

Now that the greater part of Africa has been parcelled out among the European Powers, it may be useful to indicate what are the limits of the claims of each of these powers, and on what these claims are based. It has been sought to show in the accompanying map the boundaries of the claims of the various Powers, so far as these have been settled by international agreement. Where the space has been left blank it is because there is no express agreement, or the limits have been left vague intentionally by the Powers concerned, or the particular districts are so far independent. An unbordered wash of colour is intended to signify that the area indicated is left to the undisputed operations of one Power. In the text we have embodied some valuable notes compiled by Mr. John Bolton, F.R.G.S.

Except Morocco, Liberia, certain Central Sudan States, the Sahara to the south of Tripoli, and a small area south of Darfur and Wadai, there is hardly any part of Africa that is not directly or indirectly "within the sphere" of some European Power.* Algeria and Tunis are admittedly French by right of conquest. Tripoli, with Fezzan, are acknowledged as being part of the Turkish Empire. Egypt proper acknowledges Turkish suzerainty in so far as to pay an annual tribute. In all other respects Egypt is practically independent of Turkey; as a matter of fact she is at present under British control. What is still known as the Egyptian Sudan will be dealt with later on.

Starting from the west coast of Morocco and proceeding southwards, we find that to the north of Cape Nun, on the coast of Morocco itself, at the mouth of the Ifni river, a small concession of 15 square miles has been made by the Sultan to Spain, though up to the present date the

* These States in the map have a blackish tint.

Spanish Government has not taken actual possession. On some maps the coast-line between Cape Nun and Cape Blanco is laid down as Spanish, though the Spanish Government (since 1886) only claims as a protectorate the strip between Cape Bojador and Cape Blanco, measuring about 500 miles ($26^{\circ} 8' N.$ to $20^{\circ} 51' N.$). The coast boundary between the French and Spanish claims is fixed by arrangement between the two countries, but the interior limit of the Spanish possessions has not yet been settled between France and Spain. According to Spanish authorities treaties have been made with the Sultans of Adrar and neighbouring territories, placing them under Spanish protection; so that the southern limit extends inland 600 miles towards Timbuktu, and the northern limit 420 miles from the coast towards Tenduf. The Spanish Government has formally notified this protectorate to the British Foreign Office. There is a British factory at Cape Jubu, but the British Government makes no claim to any protectorate there.

The French Senegambian possessions begin at Cape Blanco. The whole coast-line down to British Gambia is French. France, by right of conquest and by treaties with native chiefs, claims the whole of the basin of the Senegal, all the basin of the Gambia except the British strip, and nearly the whole of the Upper Niger basin as far as Sego. The map of M. Binger's travels just published, extends the French sphere further south and further east than international agreement justifies. With regard to the coast delimitation, we find that the first check coming southwards is met with at the river Gambia. The boundary here is framed by Article I. of the arrangement concerning the delimitation of the English and French possessions on the West Coast of Africa, signed at Paris, August 10th, 1889.

"In Senegambia the frontier line between the English and French possessions shall be established as follows:—1. To the north of the Gambia (right bank) the line shall start from Jirmak creek and follow the parallel, which traversing the coast at this point (about $13^{\circ} 36' N.$), intersects the Gambia at the great bend it makes towards the north, opposite a small island situated at the entrance of Sarmi creek, in the country of Niama. From this point the frontier line shall follow the right bank as far as Yarbata, at a distance of 10 kilometres from the river. 2. To the south (left bank) the line starting from the mouth of the San Pedro shall follow the left bank as far as $13^{\circ} 10'$ of north latitude. The frontier shall thence follow the parallel which, starting from this point, goes as far as Sanding (end of the Vintang creek, English map). The line shall then trend upwards in the direction of the Gambia, following the meridian which passes through Sanding, to a distance of 10 kilometres from the river. The frontier shall then follow the left bank of the river at the same distance of 10 kilometres as far as, and including Yarbata."

French territory extends from the southern boundary of the Gambia colony to Cape Roxo, south of the Casamansa river, where a wedge of Portuguese territory intervenes. This is known as Portuguese Guinea, and extends from Cape Roxo on the north to the mouth of the river Cajet on the south, between Catack Island (which is Portuguese) and

Tristão Island (which is French). According to a convention of May 12th, 1884, ratified August 31st, 1887, between France and Portugal, the northern boundary between the territories of the two countries, starting from Cape Roxo, proceeds eastwards at an equal distance from the rivers Casamansa and San Domingo de Cacheu, to the intersection of the meridian of $15^{\circ} 10'$ W. of Greenwich with the parallel of $12^{\circ} 40'$ N. lat. Between this point and $13^{\circ} 40'$ W. of Greenwich the frontier coincides with $12^{\circ} 40'$ N. On the east the frontier follows $13^{\circ} 40'$ W., from $12^{\circ} 40'$ N. to $11^{\circ} 40'$ N. On the south the boundary starting from the mouth of the Cajet river proceeds in a northerly direction at an equal distance north of the Componi river and the Cassini river, then of the northern branch of the Componi and the southern branch of the Cassini, at first, and afterwards of the Rio Grande, ending at the point of intersection of $13^{\circ} 40'$ W. and $11^{\circ} 40'$ N.

Then follows about 200 miles of French coast until the boundary of the British colony of Sierra Leone is reached. A little more than half-way south we find the small group of the Los islands, at Conakri, which are claimed as British.

At Sierra Leone, Great Britain has a stretch of coast-line extending 200 miles from the Mahela Creek north of the Scarcies river to the Manoh river near Cape Mount. The colony reaches inland about 200 miles in its northern section, tapering off in the south to a narrow strip. The eastern limit has not yet been defined. An expedition will shortly leave England in order to take part in the delimitation towards the interior. Article II. of the Anglo-French Arrangement states:—

“To the north of Sierra Leone, in accordance with the provisions of the treaty of 1882, the line of demarcation, after having divided the basin of the Mellacoree from that of the Great Scarcies, shall pass between Bennah and Tambakka, leaving Talla to England and Tamisso to France, and shall approach the 10th degree of north latitude, including in the French zone the country of the Houbbous, and in the English zone Soulimaniah and Falabah. The line shall stop at the intersection of the 13th degree of longitude west of Paris ($10^{\circ} 40'$ of Greenwich), as marked on the French map, and of the 10th degree of latitude.

The Manoh river forms the boundary between Sierra Leone on the north and the Republic of Liberia on the south. The coast-line of Liberia extends for about 450 miles to the San Pedro river, with an average breadth of 150 miles in the interior. No precise delimitation of Liberia towards the interior has been arranged.

Between the eastern boundary of Liberia and the western boundary of the French territories on the Gold Coast, is a strip of territory which up to the present is no man's land, probably, with the exception of that at Cape Juby, the only unclaimed bit of all the African coast; it is about 100 miles in length. The French strip of coast here, extending from Grand Lahou to Newtown, and including Grand Bassam and Assinie, measures about 100 miles. The Anglo-French Agreement (Article III.)

defines the boundary between the French and British claims on this part of the coast as follows :—

“On the Gold Coast the English frontier shall start from the sea coast at Newtown, at 1000 metres to the west of the house occupied in 1884 by the English Commissioners. It shall thence go straight to the Tendo Lagoon. The line shall then follow the left bank of that lagoon and of that of Ahy and the left bank of the river Tance, or Tendo, as far as Nougoua. Starting from Nougoua the frontier line shall be fixed in accordance with the various treaties which have respectively been concluded by the two Governments with the natives. This line shall be prolonged to the 9th degree of north latitude.

The Gold Coast extends eastwards for 350 miles to Bé, east of the Volta river, where it adjoins the German acquisition of 1884.

The eastern boundary is defined by Article IV of the Anglo-German Agreement signed at Berlin, July 1st, 1890 :—

“In West Africa—1. The boundary between the German Protectorate of Togo and the British Gold Coast Colony commences on the coast at the marks set up after the negotiations between the commissioners of the two countries of the 14th and 28th July, 1886; and proceeds direct northwards to the 6° 10' parallel of north latitude; thence it runs along that parallel westwards till it reaches the left bank of the river Aka; ascends the mid-channel of that river to the 6° 20' parallel of north latitude; runs along that parallel westwards to the right bank of the river Dchawe or Showe; follows that bank of the river till it reaches the parallel corresponding with the point of confluence of the river Deine with the Volta; it runs along that parallel westward till it reaches the Volta, from that point it ascends the left bank of the Volta till it arrives at the neutral zone established by the agreement of 1888, which commences at the confluence of the river Dakka with the Volta.”

The precise boundaries in the interior (both on the French and German sides) cannot be regarded as definitely settled. Our knowledge of the interior is scanty, and the situation of towns and the course of rivers as laid down on our maps erroneous. German Togo-land extends to 1° 41' E., where it marches with another wedge of French territory. The points occupied by France (1884) are Grand Popo, Agoué, or Ajigo, Porto Novo, and Kotonou. Although on December 22nd, 1887, Portugal withdrew her protectorate over the sea-coast of Dahomey, she actually still occupies the port of San Juan de Ajuda (Whydah) with a military force.

Next in order come the Colony of Lagos, the Royal Niger Company's Territories, and the Oil Rivers, with a coast-line of 500 miles, the British sphere extending inland a distance of over 600 miles, bounded on the west as far north as the ninth degree of north latitude by the French Slave Coast territory defined thus in Article IV. of the Anglo-French Arrangement :—

“On the Slave Coast the line of demarcation between the spheres of influence of the two Powers shall be identical with the meridian which intersects the territory of Porto Novo at the Ajarra creek, leaving Pokrah, or Pokéa to the English colony of Lagos. It shall follow the above-mentioned meridian as far as the 9th degree of north latitude where it shall stop. To the south it shall terminate on the sea-shore

after having passed through the territory of Appah, the capital of which shall continue to belong to England."

The eastern limit is bounded by the German sphere in the Cameroons and is provisionally defined in Article IV., paragraph 2, Anglo-German Agreement:—

"It having been proved to the satisfaction of the two Powers that no river exists on the Gulf of Guinea corresponding with that marked on maps as the Rio del Rey, to which reference was made in the Agreement of 1885, a provisional line of demarcation is adopted between the German sphere in the Cameroons and the adjoining British sphere, which starting from the head of the Rio del Rey creek goes direct to the point about 9° 8' of east longitude, marked 'Rapids' in the British Admiralty chart."

The boundary to the north is fixed by paragraph 2 of "Declarations exchanged between the Government of Her Britannic Majesty and the Government of the French Republic," signed at London, August 5th, 1890, thus:—

"The Government of Her Britannic Majesty recognises the sphere of influence of France to the south of her Mediterranean Possessions up to a line from Say on the Niger to Baruwwa on Lake Tchad, drawn in such manner as to comprise in the sphere of action of the Niger Company all that fairly belongs to the kingdom of Sokoto; the line to be determined by the Commissioners to be appointed."

The eastern and western limits other than those above defined are left for future settlement—the latter by English and French Boundary Commissioners, the former by treaties to be made with the native rulers under the English or German Powers, the following clause having been inserted in Article V. of the Anglo-German Agreement:—"All treaties made in territories intervening between the Binu  and Lake Chad shall be notified by one Power to the other."

This, then, disposes of the whole coast down to the mouth of the Rio del Rey and of the corresponding Hinterland, although details of delimitation remain to be settled. The French traveller, Captain Binger, is stated to have concluded treaties with several powerful chiefs in the Mandingo region, including Kong. These will, of course, be the subject of further international deliberation. Timbuktu and the Niger down to Say is virtually recognised by Britain as within the French sphere; as is the whole of the Sahara north of the irregular line from Lake Chad to the mouth of the Senegal. Morocco is not likely to claim Hinterland; the limits of Spanish claims in the interior will no doubt be amicably adjusted; while of course Turkey, on behalf of Tripoli, may reasonably object to France encroaching on the region to the south of that country. Ashanti is quite clearly within the British sphere, though there is a disposition on the part of the Government to allow Germany to claim at least a portion of it; the interior limits are being arranged by an international commission. Sokoto and its tributary states are acknowledged to be British, while British enterprise is free to include in its sphere Bornu, Bagirmi, Wadai, and neighbouring regions not expressly allotted

to either France or Germany. From both sides they come naturally within the British sphere. As to Darfur and Kordofan, the latter is entirely, and the former to a large extent (see map), within the British sphere according to the Anglo-German agreement of July 1890; this gives the western waterparting of the basin of the Nile as the western boundary. The rest of the Egyptian Sudan may be regarded as at present in revolt.

South of the German Cameroons comes the enormous territory acquired by France, including the Gabun and the French Congo Territory. There is, however, a block on the rivers Muni and Campo, 40,000 square miles, claimed by Spain, but the claim is not admitted by France.

By agreement between France and Germany, dated December 24th, 1885, the latter agrees not to interfere in any way south of a line running eastwards from the mouth of the river Campo to a point 15° east from Greenwich. On the south side of her Congo territory, France marches on the coast with the small enclave of Cabinda, which Portugal was allowed to retain at the Berlin Conference. By a treaty between France and Portugal, dated May 12th, 1886, ratified August 31st, 1887, the frontier between the possessions of the two countries in the Congo region follows a line from Chamba Point, at the confluence of the Loema and the Lubinda, keeping at an equal distance from the two rivers, and from the most northerly source of the Luali follows the line which separates the basins of the Loema and the Chiloango to 12° 50' E. of Greenwich; the boundary then coincides with this meridian till it meets the Chiloango, which is here the frontier between the Portuguese possessions and the Congo Free State. This latter frontier is continued down the Chiloango to its confluence with the Lucalla, up the latter river to its junction with the Culacalla, thence directly south to the parallel of Cabo Lomba, thence westward to the coast at Cabo Lomba.

This arrangement was simple enough, but it was a much more difficult task to adjust the boundary between the territories of the Congo Free State and the French Congo territory. There was no difficulty on the Lower Congo. According to the "Declaration of the Administrator-General of the Department of Foreign Affairs of the Independent State of Congo, February 1885" (accepted by the Berlin Conference), the boundary follows the Chiloango to its source, the water-parting between the Niadi-Kwilu and the Congo till it reached the meridian of Manyanga; then follows a line (subsequently, 22nd November, 1885, determined by commissioners) down to beyond Manyanga on the north bank of the Congo. It was different when France came to fix the eastern limit of her claim. The limit given in the Convention of February 5th, 1885, was found to be inconsistent with the geographical position; and the discovery of the course of the

Mobanji by Mr. Grenfell, in March 1885, led to further complications. Suffice it to say that by an agreement made at Brussels, April 29th, 1887, it was decided that the Mobanji as far as its intersection with 4° N. lat. should form the frontier between the French possessions and the Congo Free State. In the spirit, if not in the letter, of the declaration above referred to, the Mobanji-Welle forms the northern boundary of the Free State till it reaches the 4th parallel, which then becomes the boundary as far as 30° E., the river being included when it bends north of 4°. It is understood that an agreement exists between France and the Congo Free State, by which the former claims the whole of the Congo basin north of the line just referred to, and east of 15° E. long. The further boundaries of the Free State will be seen on the map; they are so precisely stated in the Declaration referred to that they cannot be mistaken, at least in the east. They leave outside the boundary the south-west corner of Lake Tanganyika, the east coast of Lake Moero, and all but the south-west corner of Lake Bangweolo. From 12° to 6° S. the boundary is the "partage des eaux qui appartiennent au bassin du Kassai." It then goes west along the 6th parallel to the Kwango, down the Kwango to the parallel of Nokki, thence to the mouth of the river Ango-Ango, and down the Congo to the sea. Portugal claims Lunda by virtue of treaties alleged to have been made by Captain Carvalho some years ago, but these claims are strongly opposed by the Free State, which maintains that Lunda is in its sphere; as a matter of fact it mostly belongs to the basin of the Kassai above referred to. At present the difference remains unsettled.

With this exception, about the limits of Portuguese West Africa there is now no difficulty. Its northern boundary, where it marches with the Congo Free State, is settled by the Berlin Act, and so indeed was thought to be its eastern boundary along the Kwango, so far as Lunda is concerned, until a few weeks ago. Its southern limit is equally definite. According to the agreement between Germany and Portugal, December 30th, 1886, the river Cunene forms the boundary between Portugal and Germany in West Africa as far as the cataracts south of Humbe. Hence the dividing line goes direct eastward to the Cubango; along that river to Andara and eastwards to the Katima rapids on the Zambezi. Both France and Germany in their arrangements with Portugal recognised in general terms the liberty of the latter to extend her influence in the region between her East and West African possessions. But, as will be seen, the claim was not admitted by Great Britain, and the special arrangement with Germany was afterwards modified.

Into the history of the acquisition by Germany of Damaraland and Namaqualand, it is not necessary to enter. It was here, at Angra Pequena Bay, that Germany made her first annexation beyond Europe, April 24th, 1884. By Memoranda, exchanged in September and October

1884, between the two Governments, the German Protectorate was recognised over the region between the Orange river and Cape Frio, Walvisch Bay being reserved for the Cape. This British territory is undefined; it extends about 40 miles north and south by 20 east and west, and is thus referred to in the concluding paragraph of Article III. of the Anglo-German Agreement:—

“The delimitation of the southern boundary of the British territory of Walvisch Bay is reserved for arbitration, unless it shall be settled by the consent of the two Powers within two years from the date of the conclusion of this Agreement. . . . Until a settlement shall be effected, the territory shall be considered neutral.”

As the earlier arrangements as to the interior limits of the German sphere have been annulled by those quite recently made with Germany and Portugal, it is unnecessary to quote them. We now come to British South Africa, the provisional limits of which are regulated by the Anglo-German Agreement of July 1st, 1890, and the Anglo-Portuguese Agreement of August 20th, 1890 (not yet, Nov. 1st, ratified). The total area included within the limit is close upon 1,000,000 square miles, or more than ten times the area of Great Britain.

The western boundary of the British sphere in South Africa is defined in part by Article III. of the Anglo-German Agreement:—

“In South-west Africa, the sphere in which the exercise of influence is reserved to Germany is bounded:—1. To the south by a line commencing at the mouth of the Orange river and ascending the north bank of that river to the point of its intersection by the 20th degree of east longitude. 2. To the east by a line commencing at the above-named point and following the 20th degree of east longitude to the point of its intersection by the 22nd parallel of south latitude it runs eastward along that parallel to the point of its intersection by the 21st degree of east longitude; thence it follows that degree northward to the point of its intersection by the 18th parallel of south latitude; it runs eastward along that parallel till it reaches the river Chobe, and descends the centre of the main channel of that river to its junction with the Zambezi, where it terminates.”

It is understood that under this arrangement Germany shall have free access from her Protectorate to the Zambesi by a strip of territory which shall at no point be less than 20 English miles in width.

The sphere in which the exercise of influence is reserved to Great Britain is bounded to the west and north-west by the above-mentioned line. It includes Lake Ngami. The rest of the western boundary is described in Article IV. of the convention between Great Britain and Portugal, signed in London, August 20th, 1890, but not yet ratified.

“It is agreed that the western line of division separating the British from the Portuguese sphere of influence in Central Africa shall follow the centre of the Upper Zambezi, starting from the Katima Rapids up to the junction with that river of the river Kabompo, and thence up the centre of the channel of the Kabompo.”

The coast-line of this immense territory reaches in one continuous sweep from the mouth of the Orange river to Kosi bay, a distance of upwards of 1500 miles. Its eastern boundary is defined by Article III. of the convention (unratified) between Great Britain and Portugal.

"Great Britain engages not to make any objection to the extension of the sphere of influence of Portugal south of Delagoa Bay as far as a line following the parallel of the confluence of the river Pongola with the river Maputa to the sea coast." And further, by Articles I. and II. of the same convention, "Great Britain agrees to recognise as within the dominion of Portugal in East Africa the territories bounded—

"2. To the west by a line which, starting from the above-mentioned frontier on Lake Nyassa (the parallel of the confluence of the river M'singe with the river Rovuma), follows the eastern shore of the lake southwards as far as the parallel of latitude of 13° 30' S., thence it runs in a south-easterly direction to the eastern shore of Lake Chiuta, which it follows. Thence in a direct line to the eastern shore of Lake Chilwa or Shirwa, which it follows to its south-easternmost point; thence in a direct line to the easternmost affluent of the river Ruo, and thence follows that affluent, and subsequently the centre of the channel of the Ruo to its confluence with the river Shiré. From thence it runs in a direct line to a point half-way between Tété and the Kebrabassa Rapids. The settlement of Zumbo with a radius on the northern bank of 10 English miles remains under the dominion of Portugal. . . .

"To the south of the Zambezi the territories within the Portuguese sphere of influence are bounded by a line which, starting from a point opposite the western extremity of the 10 mile radius of Zumbo, runs directly southward as far as the 16th parallel of south latitude, follows that parallel to its intersection with the 31st degree of east longitude (Greenwich), thence running eastward direct to the point where the river Mazoe is intersected by the 33rd degree of east longitude; it follows that degree southwards to its intersection by the 18° 30' parallel of south latitude, runs along that parallel westward to the affluent of the river Save or Sabi, which is called the river Mashike, follows that affluent and afterwards the centre of the main channel of the Save to the confluence of the Lunde, whence it strikes direct to the north-eastern point of the frontier of the South African Republic, and follows the eastern frontier of the Republic and the frontier of Swaziland to the river Maputa."

By Article V. of this convention, the islands in Lake Nyassa south of latitude 11° 30' S. are included in the British sphere.

The northern boundary of this territory is partly defined by Article I. of the Anglo-German Agreement, which thus defines the southern limit of the sphere of Germany in East Africa:—

" . . . it reaches Lake Nyassa (at a point on the parallel of the junction of the river M'Sinje with the river Rovuma), thence striking northward it follows the eastern, northern, and western shores of the lake to the northern bank of the mouth of the river Songwe; it ascends that river to the point of its intersection by the 33rd degree of east longitude; thence it follows the river to the point where it approaches most nearly the boundary of the Geographical Congo Basin defined in the 1st Article of the Act of Berlin, as marked in the map attached to the 9th protocol of the Conference. From that point it strikes direct to the above named boundary; and follows it to the point of its intersection by the 32nd degree of east longitude; from which point it strikes direct to the point of confluence of the northern and southern branches of the river Kilambo, and thence follows that river till it enters Lake Tanganyika."

The rest of the northern boundary of this territory is limited by the "Declaration of the Administrator-General of the Department of Foreign Affairs of the Independent State of Congo, February, 1885," referred to above.

Enclosed in British South Africa are the Orange Free State and the South African Republic,* the boundaries of which have been fixed by various conventions, and which need not be referred to in detail. The western and northern boundaries of the latter are fixed by the convention of Feb. 27th, 1884, on the Zululand side by the Proclamation of June 21st, 1887. The final fate of Swaziland cannot as yet be regarded as settled, while Tonga Land may be deemed as in the British Sphere.

The southern boundary of German East Africa, just described, is fixed by the Agreements of October 26th, 1884, and July 1890. Its northern limits are thus defined in the latter Agreement.

“In East Africa the sphere in which the exercise of influence is reserved to Germany is bounded:—1. To the north by a line which, commencing on the coast at the north bank of the mouth of the river Umba, runs direct to Lake Jipé; passes thence along the eastern side and round the northern side of the lake, and crosses the river Lumé, after which it passes midway between the territories of Taveita and Chagga, skirts the northern base of the Kilimanjaro range, and thence is drawn direct to the point on the eastern side of Lake Victoria Nyanza which is intersected by the 1st parallel of south latitude; thence crossing the lake on that parallel it follows the parallel to the frontier of the Congo Free State, where it terminates. It is, however, understood that on the west side of the lake (Victoria) the sphere does not comprise Mount Mfumbiro; if that mountain shall prove to lie to the south of the selected parallel, the line shall be deflected so as to exclude it, but shall nevertheless return so as to terminate at the above-named point.”

On the west, therefore, the German sphere may be regarded as marching with the eastern limit of the Congo Free State as far as the south of Lake Tanganyika.

This brings us to the sphere of the British East African Company. But in passing it may be stated that according to the last Anglo-German Agreement, Germany recognises the Protectorate of Great Britain over the Islands of Zanzibar and Pemba, a Protectorate which the Sultan has accepted. The sphere of the British East Africa Company is thus defined in the Agreement referred to:—

“The sphere in which the exercise of influence is reserved to Great Britain is bounded:—1. To the south by the above-mentioned line running from the mouth of the river Umba to the point where the 1st parallel of south latitude reaches the Congo Free State. Mount Mfumbiro is included in the sphere.

“2. To the north by a line commencing on the coast at the north bank of the mouth of the river Juba; thence it ascends that bank of the river and is conterminous with the territory reserved to the influence of Italy in Gallaland and Abyssinia as far as the confines of Egypt.

“To the west by the Congo Free State, and by the western waterparting of the Basin of the Upper Nile.”

This virtually includes a large part of Victoria Nyanza, the whole of Uganda and Unyoro, and part of Karagwé, Lakes Albert and Albert

* Hence the colouring is slightly different from other independent or quasi-independent States.

Edward, and the countries on their shores, as well as Emin Pasha's Province, part of Darfur and Kordofan. Of course it remains for the British East Africa Company to take advantage of the agreement, and supplement it with treaties by native chiefs, and possibly also by an arrangement with Egypt with reference to the Sudan.

The Italian sphere of influence is recognised as extending on the East Coast from the Juba river to the neighbourhood of Ras el Khyle, by virtue of arrangements with the British East Africa Company, and treaties with native chiefs within the last two years. But the sphere of Italy in Africa is at present under the consideration of a joint commission. It will have to be adjusted with reference to the British sphere on the Somali Coast, from the entrance of Tajurah Bay to Bunder Ziahdeh (Protectorate established 1887), including the Island of Sokotra, formally annexed October 1886. For unintelligible reasons the British protectorate has not yet been carried round Cape Guardafui as far as Ras Hafun. The interior limits of the British Somali Protectorate remain to be adjusted. Where it ends in Tajurah Bay, the French Protectorate of Obook begins. This was acquired in March 1862, but actually occupied only in 1883. By treaties with native chiefs, the Protectorate extends over an area of 2300 square miles.

Italy's first possession in Africa, in Assab Bay (240 square miles,) was purchased as a coaling station by an Italian shipping company, from the Danakil chiefs in 1870, and taken over by the Italian Government in 1880. Italian claims have since been gradually extended along the Red Sea coast by treaties with native chiefs, and, with the tacit assent of Great Britain, from Cape Kasar ($18^{\circ} 2' N.$) to the southern limit of the Sultanate of Raheita ($12^{\circ} 30' N.$). This tract comprises Massowah and its territory, with the neighbouring Dahlak Archipelago. In 1889 an arrangement was concluded with the King of Abyssinia, whereby the whole of that country, including Shoa, was placed under Italian protection, so far as foreign relations are concerned. There has, however, been as yet no international arrangement respecting Italian claims; so far as Great Britain is concerned, these will no doubt be placed on a definite footing by the joint commission referred to. It need only be said that by the recent Anglo-French agreement Madagascar is recognised as within the French sphere, while the Comorro Islands were taken under French protection in 1886.

Thus it has been sought to show how far Africa has been partitioned among the European Powers. Including the independent Central Sudan States (and of these it is to be mentioned that the Niger Company is in close relations with Bornu), the undisposed-of Sahara (south of Tripoli and Morocco), and excluding the Italian claims, and accepting the Anglo-Portuguese agreement, it is doubtful if there are more than two million square miles open to disposal by international arrangement or otherwise, that is, about one-sixth of the whole continent.

It is difficult to estimate the area of the territories claimed by each European country. Out of the 11,900,000 square miles of Africa, probably the share of Great Britain is not less than two million square miles. This includes the Niger territories and the region naturally coming under the sphere of the Company, some of the most hopeful districts of tropical Africa; while in the Great Lake Region and the Upper Nile countries the British East Africa Company has a sphere capable of great development. In British South Africa again, we have obtained that section of Africa most adapted to European colonisation, rich in minerals and agricultural possibilities. All but a fraction of the German area (about a million square miles) is within the tropics, and includes a great percentage of desert and valueless country. Portugal, with about half-a-million square miles, possesses, especially in West Africa, much territory requiring only energy assisted by labour and capital to yield profitable returns. Of the Congo Free State (about a million square miles) a purely tropical region, it is difficult to make any prediction. Including Algiers and Tunis (both favourable to European enterprise), and the Hinterland accorded to her by the recent agreement, along with Madagascar, the whole of the Senegambia territories, and those on the Guinea Coast, France may claim an African empire of about 2,500,000 square miles, much of it requiring enormous expenditure to convert it from the desert condition. If the whole of Italy's claim be admitted, her African possessions will cover 340,000 square miles. Egypt, the Egyptian Sudan, Tripoli, Morocco, and the Sahara in the south, the Spanish territory on the north-west coast, the country to the east of the German Cameroons, make up the balance not expressly disposed of. It would be out of place in these pages to forecast their fate; but it seems evident that the partition, begun six years ago, is likely to be concluded before many more years are passed.

J. SCOTT KELTIE.

GEOGRAPHICAL NOTES.

Explorations in West Africa.—Considerable additions to our geographical knowledge as well as to other branches of science may be expected from the labours of the expeditions which will soon be on foot in the interior of the West Coast of Africa, engaged in the work of surveying the frontier countries between British territories and those of France and Germany. One, under Dr. R. A. Freeman who has already had much experience in the interior of Ashanti and the countries beyond its northern frontier, left for Accra last month. Two others, under the command of Major W. Peacocke, R.E., and Captain Kenney, R.E., leave early in the present month for Sierra Leone and the

Gambia, respectively. The British parties will co-operate with commissioners of the other powers concerned, and the work will necessarily extend into interior districts of which little or nothing is at present known.

Death of Sir Richard Burton.—Captain Sir Richard F. Burton died at Trieste on the 20th of last month. In him we have lost one of the greatest and most accomplished travellers of our generation, the pioneer in the long series of discoveries in the Lake Regions of Equatorial Africa. An account of his life and chief explorations must be reserved for our next number.

Mr. Arnot's Expedition to the Garenganze Country in Central Africa.—Mr. F. S. Arnot's second expedition from Benguella to Garenganze, on which he started in June 1889, has been stopped at Bihé, owing to the disturbed state of the country, and he has been obliged to return to the coast, leaving his party at Bihé, in order to renew his supplies and make a fresh start. In a letter to his family he says he was well received by the Portuguese Governor-General, to whom he delivered the effects of the deceased traveller Silva Porto, and expected to be able to start for the interior on the 8th of August. He had heard on the way down to the coast that the Portuguese were blaming him for being the cause of the revolt at Bihé and their expulsion from that place, and that they were threatening him with arrest, but the rumour proved to have no real foundation.

Dr. O. Baumann in Usambara.—An account of the continuation of Dr. Baumann's surveys in Usambara * is given in the current number of 'Petermann's Mittheilungen,' in a letter dated 31st July, 1890, from Korogwe, from the traveller himself to Dr. Hassenstein. Dr. Baumann's exploration of the South Pará Mountains occupied fourteen days, the line of route being in a zigzag from south to north, and crossing the main ridge five times. The range is not broad; in the north and south it consists merely of a crest line, but in the middle it broadens into a rolling table-land, covered with extensive virgin forest. Below this table-land there are high meadow-lands, where the fine, short-horned Pará cattle find excellent pasture. The abodes of the Wapare lie scattered in a belt about midway between the slopes, and reminded the traveller of the Chaga dwellings. The country is open, well-watered and cultivated, and artificially irrigated by numerous channels. The western slope is, speaking generally, poorer in water and less fertile than the eastern, which receives the moisture-laden sea winds. The Pará range consists mostly of crystalline rock running north and south. All the brooks bring down iron-dust; the smelting of iron is not confined to the Wagueno people. From the high ground the traveller observed that the Kinsuani river, noted by Kersten, is a

* 'R.G.S. Proceedings,' 1890, p. 615 *et ante*.

northern affluent of the Mkomasi. On the Ruvu side he descried between this river and the Kibaia Mountains in the Masai Plain, a lake basin, Lake Kiniarok, which appeared to be of considerable proportions. From the southern end of the Paré Mountains the traveller following the right bank of the Pangani at some distance, proceeded to Useguha and to Mgera in North Nguru; on the way he was attacked by the Wasegna. From Mgera he marched to Panghai and Kilwa, thus connecting his surveys with those of Last,* and then returned through Useguha by another route. Dr. Baumann intends, after having explored the country nearer the coast, to embody his surveys in a map, which will be an important addition to the cartography of the northern part of German East Africa.

Results of MM. Grum-Grijmailo's Explorations in the Eastern Tian Shan.—The brothers Grum-Grijmailo have reported in detail to the Imperial Geographical Society of Russia the results of the first portion of their journey in the Eastern Tian Shan.† It appears that our maps of the northern slopes of the Tian Shan range are full of errors. The Kiityka Pass has no existence; the Mengete Pass conducts from the basin of the Kash into that of the Shusta, whence the route turns, not to the north, but to the south-east, joins the route coming from the winter pass of Ulan-ussu, and then leads to the pass of the Keldyn, and finally to the Jullus or Sullus. To the north of this route rises the magnificent knot of mountains called Doess-meghene-ora, the discovery of which by the expedition was announced in the last number of the 'Proceedings.' In this mountain mass, with the ranges branching off from it, lie the head-waters of the rivers Khorgos, Ulan-ussu, Shusta (which is an immense stream, known as the Manas in its middle course), Shindsha-cho, Jullus, Kash, and other smaller streams. A grand prospect over the six peaks of Doess-meghene-ora was obtained from a summit of the Manas range; the peaks are not visible from the valleys of the Kash and Jullus, being hidden by the Keldyn range. The altitude of Doess-meghene-ora is now stated to be over 19,700 feet (6000 metres) instead of 21,500 feet as previously announced. The masses of snow clothing its summits are very great, but the glaciers are not of importance, on account of the precipitous nature of the sides of the main mountain mass and of its offshoots. Along the route from Atschal to Urumtsi the Tian Shan forms an inaccessible wall, which is crowned with an almost unbroken line of snow. The base of the northern slope of the range, which in the meridian of Dshin-cho-shicho is inconsiderable, increases further east, and in the meridian of Manas reaches its greatest extent, just at the point where the mountain system of Doess-meghene-ora develops. The expedition visited some

* See 'Proceedings,' 1882, p. 148 and map.

† 'R.G.S. Proc., 1890,' p. 616.

coal-mines. Incrustations and sulphur crystals were visible everywhere in the valleys. Nearly all the rivers of the Tian Shan bring down gold, which is obtained from the river-deposits, but not from other strata or from quartz veins. The Tian Shan is uncommonly rich in vertebrate animals, but much poorer than the Pamir in birds and insects, in consequence of the want of variety in the flora. Eight points were fixed by astronomical observations.

The Exploration of Lake Toba (Sumatra).—It is announced that the well-known Italian zoologist, E. Modigliani, author of the 'Viaggio a Nias,' commenced in July last a journey to Sumatra, for the purpose of exploring the vicinity of Lake Toba, the topography of which is still so little known.

On the Teaching of Geography in Russia.—In a paper on this subject read at the Leeds meeting of the British Association, Dr. Hugh Robert Mill states:—The teaching of geography in Russian schools is in accordance with an official syllabus enforced by Government. During a recent visit to Russia the author procured copies of the chief class-books, a summary of the contents of which formed the substance of the paper. A set of three books by K. Smirnoff embodies the general part of the syllabus. The first is a general summary of mathematical, physical, and political geography for lower schools, in which physical geography is treated as a description of the configuration and climates of the earth, thus avoiding the tendency to discourse on general physiography under this name. A series of original and remarkably ingenious diagrams illustrates the letterpress. In one the relative sizes of lakes is shown by giving on one sheet, drawn to the same scale, all the inland waters from the Caspian Sea to the Lake of Constance, grouped under their respective continents. Another serves to show the double relation of climate to altitude and latitude in the northern hemisphere. The second book pertains to the gymnasial course, and treats of the geography of 'Asia, Africa, America, and Australia, considered physically, ethnographically, and politically'; while the third treats of extra-Russian Europe in the same way, commencing at the Balkan Peninsula and working north-westwards to the British Islands. Both these are volumes of about 150 pages, with numerous statistical diagrams showing the relative areas and populations of countries in a graphic form. There are maps in black and white of the continents and chief countries, and these are usually in pairs—a physical and political. They are clearly cut, uncrowded, and names as a rule are replaced by contractions, to which there is a complete index opposite each map. This series, while unattractive and designed from a standpoint very remote from that of Western Europe, appears to be systematic and complete. The last subject in the higher school course is the geography of the Russian empire, a textbook on which, by E. A. Lebedeff,

contains 196 pages of letterpress and a large coloured map of European Russia. The exceedingly unattractive nature of Russian geographical teaching is fully illustrated by these books; and instances came to the author's knowledge of absurd confusion of ideas in consequence of the habit of viewing Asia rather than Western Europe as the next neighbour of Russia. A small treatise by P. Beloch must be accorded a distinctly higher place educationally than the foregoing. The preface describing the plan of the work may be quoted:—"According to the plan followed in an elementary course of general geography, attention is first given to the development of the pupil's knowledge of the immediate locality with which he is most familiar. Then, after being accustomed to representations on paper of the places he sees about him, the pupil acquires information, both on the map and practically, about the surroundings of his residence to the limits of the visible horizon. The use of maps is taught from the beginning, and, after this is fully understood from the visible examples, it is extended so as to afford a general knowledge of the whole fatherland. Finally a brief review of the entire terrestrial sphere is given, adapted to serve as an introduction to more advanced courses in earth-knowledge." The method is applied to St. Petersburg, and the description is enforced by maps:—(1) A large-scale plan of the city and islands; (2) a smaller scale map of the district visible from the church towers, extending to 30 versts; (3) a map on still smaller scale, taking in the whole country within a radius of 300 versts; (4) the Russian empire; and (5) European Russia on a very small scale. Notes follow showing how to adapt the system to any locality. Judging from the small amount of space allotted to the birthplace and fatherland, the execution of the design is not equal in value to its conception. Russian school atlases are clear, accurate, and cheap. Most of the space is naturally given to the Russian empire and Central Asia, which rarely figure to any extent in the atlases of other nations. Both in books and in maps remarkable prominence is given to ethnography, and it may be said that in the mind of Russian geographers political geography presents itself as a function of physical geography and ethnography.

The Population of Denmark.—According to the preliminary results of the census taken in Denmark in February of this year, the total population amounts to 2,185,159, consisting of 1,065,447 males and 1,119,712 females. The yearly increase during the past decade has been at the rate of 0·99 per cent. The town population forms over one-third of the total. The increase in the population of the capital has been very remarkable, having been at the rate of 3·7 per cent. per annum, and the present population of Copenhagen with its suburbs amounts to 375,251. Aarhus has 33,308 inhabitants; Odense, 30,277; Aalborg, 19,503; Horsens, 17,290; Randers, 16,617; Helsingör, 11,802; and Fredericia, 10,044.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION
OF THE BRITISH ASSOCIATION.

LEEDS MEETING, 1890.

(Concluded from p. 635.)

Friday, September 5th.

Notes on the Country lying between Lakes Nyassa and Tanganyika By Dr. W. KERR CROSS.—Will be published in the next number of the 'Proceedings.'

Journeys in Ashanti and Neighbouring Regions. By R. AUSTIN FREEMAN, M.R.C.S.—This paper will be published in a subsequent number of the 'Proceedings.'

Zambezia. By E. A. MAUND.—'Proceedings R.G.S.,' *ante*, p. 649.

The Commercial Geography of Africa. By J. SCOTT KELTIE.

The Political Partition of Africa. By A. SILVA WHITE, F.R.S.E.

A Journey in the Kalahari. By E. WILKINSON.

Monday, September 8th.

Joint Meeting with Section F, to consider the Subject of the Lands of the Globe still available for European Settlement. The subject was introduced in a paper by Mr. E. G. RAVENSTEIN, which will be published in a subsequent number of the 'Proceedings,' with accompanying maps.

Explorations in North-eastern Cilicia. By J. THEODORE BENT.—This paper will be published in a subsequent number of the 'Proceedings.'

Report of the Committee for the purpose of investigating the Geography and the Habits, Customs, and Physical Character of the Nomad Tribes of Asia Minor and Northern Persia, and to excavate on sites of ancient occupation. Report to the Committee by Mr. J. THEODORE BENT (Secretary).—The substance of this Report was given in Mr. Bent's paper on "Cilicia Tracheia" in the August number of the 'Proceedings.'

The Physical Geography of Brazil, and its bearings on the Industrial Development of the Country. By J. W. WELLS.—The purpose of the paper was to point out the contrast between the configuration of the land of Argentina and of Brazil: how in the former it is so extremely favourable to the rapid and inexpensive extension of railways; whereas in the latter country it has long been an obstacle to similar progress. Now that such obstacles have largely been overcome, there is every prospect of a speedy construction of a vast system of rail and fluvial communication over the vast area of Brazil—a result which will be, and, as a matter of fact, actually is, the means of attraction of a considerable number of desirable immigrants. And railway construction, and a free and abundant immigration, inevitably lead to the development of all sorts and conditions of industries, and prosperous commerce.

Explorations in Eastern Bolivia and the Gran Chaco. By M. A. THOUAR.—M. Thouar confined himself to giving a brief outline of his four journeys in the immense region of the Gran Chaco, mentioning only the chief features of interest which he himself has observed, during his explorations, which commenced at the time of the

massacre of the Crevaux mission in 1882. His first journey was made under the auspices of the Bolivian Government in 1883, when he explored both margins of the Pilcomayo river from Bolivia to the river Paraguay. The second, in 1885, under the auspices of the Argentine Government, was devoted to an overland exploration of the delta of the Pilcomayo lying in the Argentine territory, as far as the rapids observed by Feilberg, returning by the Pilcomayo on a raft to the Paraguay. The third, in 1886, under the patronage of the Bolivian Government, was made in a northerly direction from Rosario to Salta, reascending the Humahuaca and the Cordilleras, exploring the Upper Pilcomayo above the cataract of Guarapendi or Pirapo. The fourth, under the auspices of the Bolivian Government, when he explored the Parapiti, the Izozog, and all the central part of the Northern Chaco for the purpose of discovering a navigable route eastward for the commerce and production of Bolivia.

The Gran Chaco is situated between the 18th and 30th parallels S. lat. and 57th and 63rd degrees of long. W. of Greenwich, and is divided into three sections. The most northerly is called the Chaco Boreal, and is situated between Chuquitos and the Pilcomayo, and contains an area of 80,730 square miles. The Chaco Central is situated between the Pilcomayo and Bermejo, and contains 71,996 miles. The Chaco Austral lies between the rivers Bermejo and Salado, and contains 77,625 square miles.

The whole is an immense sandy formation, sloping from north to south, and inclined from W.N.W. to E.S.E. At Formosa, on the Paraguay and Caiza, at the foot of the Andes, the difference in the altitude is only 656 feet. The surface is uniformly flat, except the region in the Chaco Boreal, which divides the basin of the river Parapiti from that of the Pilcomayo. In the north-west corner of the Chaco Boreal runs the Parapiti, which descends from the Andes and waters the province of Izozog. In the wet season its volume is very considerable, but in summer it dries up rapidly. Running from W.S.W. to E.N.E., it forms the beautiful lake Ancararena, from which it issues considerably diminished in volume, and has a changing course to Chiquitos. In the centre of the Chaco there are two beautiful salt-water lakes, San José and Santiago; otherwise, lakes or ponds are rarely seen, the water being so quickly evaporated, or absorbed by the soil.

The climate is warm in summer and temperate in winter; the maximum reached is often 104° F. in the shade during the months November to April. The minimum falls sometimes below 26° F. from June to August. The prevailing winds blow either from the north or from the south, the former being very hot, and the latter cool, and the meeting of the two currents at the end of their season is always accompanied by torrential rains, which in a few hours cause a fall in the temperature varying from 10° to 15°. It is very rare to note a storm coming from west to east, or vice versa, and in consequence a severe drought is often experienced. The mean temperature of the Chaco Boreal is 71° 6' F., the fluctuation of the hypsometer varies between 98° 68' and 98° 90'.

The Pilcomayo takes its course in the high Bolivian plateaus in the vicinity of Potosí. It traverses the eastern slope of the Andes and enters the Chaco at the mission of San Francisco de Solano, 21° 16' lat. S. and 63° 20' long. W. of Greenwich, and enters the Paraguay opposite the Cerro Lambare 25° 20' 32" lat. S. and 57° 36' 15" long. W. of Greenwich. It receives several tributaries in the highlands of Bolivia, the most important being the Pilaya and the Cachinayo, its current is here very impetuous and intercepted by rapids, the most important being the Guarapetendi. Its course between Lambare and San Francisco is 840 miles, and the fall between those stations 1400 feet. The width of its banks varies from 674 yards to 45 yards. The right bank is 19 feet and the left 22 feet above the water. The depth in the driest season is never less than three feet. More favoured

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than his predecessors, M. Thouar has traversed its course on different occasions from Bolivia to the Paraguay, and has satisfactorily proved that the Pilcomayo runs in continuity the whole year, and is not lost in the plains of the Chaco as some travellers have stated.

Respecting the Indians, the Tapuis Indians occupy the region called Izozog, on both sides of the Parapiti, from Carumbel to the Parapiti. They are a branch of the Guaranis tribe, have the same habits and language, and devote themselves to agriculture. Immediately to the south of them are the Chiriguanos, who occupy all the territory of the Misiones from Machareti to Aguarranda. All these Indians, although uncivilised, are becoming completely submissive. In the north, in the thickest part of the Boreal forests, dwell the Sirionos, or Itiru Coimbae, or Guarinocas, or En Pelotas, who go about entirely naked, and are in a state of complete savagery. They are tall and strongly built, but the body is bent nearly double in consequence of the posture they adopt in penetrating the thick forest. They lay in wait for the traveller, and try to take him by surprise when sleeping. Their arms consist of a spear and a club six feet long. Of all the Indians who live in the Chaco it must be observed that none are cannibals, and they ignore the use of poisoned darts. The Sirionos live almost exclusively on honey, which is exceedingly abundant, and the plant they call *Oipohi*—*cipo* plant, *hi* water.

On the banks of the Pilcomayo, on the left, are grouped the Tobas, the Charotis and the Tapihetes, on the right bank the Matacos, the Noitenes, the Guisnayas, and the Tobas. All these tribes much resemble each other. They make fermented drink from the Algaroba, which intoxicates them, and then they become warlike. They believe in a Superior Being, whom they represent by the sun.

From the foot of the Andes throughout the whole of the Chaco Boreal to the river Paraguay, it is one immense ocean of forest, in which the Quehachos and Algaroba trees predominate. The Bromeliaceæ family is well represented, and their fibres are turned to good account by the Indians in the manufacture of nets, baskets, hammocks, &c. After them the cacti of all sizes and dimensions, which with the Duraznillar, a kind of Polygonacea, form an impenetrable barrier, through which one can hardly make his way with the *machete*. Near the banks of the rivers the palms are met with, and also a kind of myrtle, the arrayan, the leaves of which make an excellent tea. The ramie plant, the fibres of which are now attracting much attention, is also found, and the palo santo or *lignum vitæ*, guayacon, lipachos, and many other hard indestructible woods. In the south, in the vicinity of the Pilcomayo and the Chaco Central, pasture grounds abound.

The carnivorous animals are represented by the jaguar, the puma, the wild cat, the aguara (*Canis jubatus*), and a species of fox. Many varieties of deer are found, as well as the tapir, peccari, capybara, &c. The condors, the vultures, urubus, gallinazo, and the carancho represent the birds of prey; while paraquets, parrots, and all varieties of ducks, storks, cranes, herons, flamingoes, and ibis abound.

In conclusion, the efforts of both the Governments of Bolivia and Argentina have been to unite the eastern and southern departments of the former to the latter country by means of a railroad across the Chaco. The oft-deferred question of boundaries has now been decided; the navigation of the river Pilcomayo, as also the construction of the railroad projected between Formosa and Caiza will bring to the markets of Europe the immense and varied productions of the Chaco, as well as developing the rich gold and silver regions at the source of the Pilcomayo, to the mutual benefit of both countries.

Tuesday, September 9th.

Some Notes of a Journey in Ruthenia. By Miss MENIE MURIEL DOWIE.—Miss Dowie's paper dealt with her experiences among the people who inhabit the Carpathian mountains on the Eastern or Polish side. She gave a brief description of the life of these people, their work, costume, and character, and included an account of her journeys, alone, on horseback there, the mountains, and the conditions under which she was obliged to live. She concluded with some remarks upon the future of Galicia and its great natural resources in the shape of petroleum wells, salt and silver mines, together with the immense industries in connection with its woods, yet to be fully developed.

On the Present State of the Ordnance Survey, and the paramount necessity for a thorough Revision.—By HENRY T. CROOK, C.E.—In his presidential address to this section at the Brighton meeting, eighteen years ago, Mr. Francis Galton dwelt on the comparative neglect and indifference which the public showed to the work of the Ordnance Survey.

In proportion to the area of which Government maps are procurable the demand for the maps at the present time, judged by the sales has not increased. It would seem, therefore, that the productions of the Survey have become less instead of more popular since the time when Mr. Galton drew attention to the matter. In a scientific age, when the purposes for which accurate maps are required are ever increasing, the falling off in the sales of the national maps, for the making of which the country has paid an enormous sum of money, is to say the least a startling phenomenon. Nearly twenty years ago, estimating from the annual value of the maps sold at that time, General Sir Henry James thought that when the Survey was completed (which in theory at all events it is now supposed to be) the yield from sales would be at least 30,000*l.* per annum, whereas for the year ending last December the value of sales only reach the paltry amount of 13,164*l.*, whilst the value of presentations to public departments and Government institutions and under the provisions of the Copyright Act amount to nearly 6000*l.* It would be difficult indeed to find a parallel for a work of equal magnitude and importance yielding such disappointing results. The partial failure of our great national cartographical institution to realise the legitimate expectations formed of it seems a proper subject of inquiry for the British Association, one of whose objects is the removal of disadvantages impeding the progress of science. There are only three ways in which this condition of things can be explained They are :—

1. That even with the schoolmaster abroad the present generation requires fewer maps.
2. That the maps are not accessible, and therefore not known.
3. That the maps do not meet popular requirements.

The first explanation is obviously untenable; there is a good deal to be said for the second; but after careful examination and inquiry I have come to a decided conclusion that there is far more importance to be attached to the third. Speaking of the one-inch maps only, Mr. Galton said, "It is much to be regretted that these beautiful and cheap maps are not more accessible. They are rarely to be found even in the principal booksellers' shops of important country towns, and I have never observed one on the bookstall of a railway station. Many educated persons seldom, if ever, see them; they are almost unknown to the middle and lower classes; and thus an important work made at the expense of the public is practically unavailable to a large majority of those interested in it, who when they want a local map are driven to use a common and inferior one." This can be more truly said of the large-scale maps than of the one-inch, which is the only one at all popularly known, and,

in fact, is often spoken of as *the* Ordnance map. The latter is by far the most important of the series to the bulk of the map-using public, and something more than the mere difficulty of obtaining it is required to account for its unpopularity.

We cannot arrive at a right conclusion as to what it is that stands in the way of the full and complete utilisation of the Ordnance Survey, unless we take into consideration its work as a whole. The department has attempted or has been directed to undertake far more than it had the means to carry out in any reasonable time. The cadastral surveys have, during recent times especially, occupied the chief share of the department's energies, to the exclusion or indefinite delay of the original and more popular work. It has almost abandoned cartography for land surveying—maps have given place to plans. No one, in these days, will dispute the advisability of carrying out the parent survey on the largest required scale, but, like most scientific undertakings, the survey has suffered severely from constant Parliamentary interference; the scope of the undertaking has been enlarged without a corresponding increase in the establishment and in the annual grant. Since the general lines upon which the work was to proceed were finally determined in 1863, the chief difficulty has been with the throttle-valve of the Treasury; the result is that after more than a century's existence the department has not yet completed one of its works. Apart from mere skeleton or index maps, it has not yet produced on any scale a uniform map of the British Isles.

A generation has elapsed since the completion of the great triangulation, and yet of the original scheme, the one-inch hill-shaded map of the kingdom, there still remain to be completed 30 out of the 131 sheets of Scotland, and 25 out of the 205 comprised in Ireland. The six-inch map commenced in Ireland in 1825 is the nearest to completion; it is stated that it will be finished early next year. The 1:2500 map, commonly known as the 25-inch, the true cadastral survey, was commenced in 1854; considering the magnitude of the task, it has so far been executed more rapidly than any, but still a great deal remains to be done. The important counties of Lancashire and Yorkshire, several counties in Scotland, and almost the whole of Ireland, excepting Dublin County, have still no maps on a larger scale than six inches to the mile. It has, in fact, only just been decided to re-survey Ireland on the 25-inch scale. In those districts where the one-inch map had not been published, the change, first to the six-inch and then to the 25-inch for the parent survey, necessarily delayed the publication of maps on the smaller scales until the introduction of the photographic and photozincographic methods of reduction and printing. Still one cannot fail to be struck by the phenomenal slowness of production which has characterised the work as a whole. In consequence of the length of time which it has taken, and the neglect to provide for a timely revision, the major portion of the maps are obsolete and of little more than historical interest.

No one who knows anything of the subject questions the original accuracy and finish of most of the maps which the Ordnance Office has produced, or of the valuable work which has been done in the advancement of geodetical and astronomical science. It is necessary to say this, for it has frequently been charged against those who have from time to time presumed to criticise the work of the Survey that they have been oblivious of these things. At present we are concerned merely with the question why the maps are so little utilised, and the reasons for the apparently low estimation in which they are held by the public. Stated in the probable order of their importance, I think the reasons may be tabulated thus:—

A. The maps fail in many cases to meet the requirements of the classes of users for which they are presumably designed, on account of—

- (1) Age. For want of revision large portions of even the 25-inch, but r

particularly the six-inch and one-inch maps, are very incorrect, and in many cases quite obsolete.

(2) Bad impressions, or impressions from old and worn-out plates.

(3) Complexity (in the one-inch map) through overcrowding of detail, causing confusion, the map being printed in only one colour.

(4) Deficiency in information as to ground forms, particularly in the six-inch map (excepting Lancashire and Yorkshire).

(5) Want of uniformity.

(6) High price, especially in the case of the six-inch quarter sheets, and on all scales where sheets are partially blank.

(7) Lack of explanatory information with the maps.

B. Inaccessibility. The general public knows little or nothing about the maps because of—

(1) The system of sale.

(2) Bad indices, and absence of information as to age and style of maps published of particular districts.

It is impossible to estimate the separate effect of each of these defects in the maps and in the means of distribution, but a few examples will establish the fact of their existence, and the way in which they operate in depreciating the value and checking the sale of the productions of the Survey.

Suppose, for instance, a member of this Association coming to Leeds desires a handy map of the district, and turns to see what the Ordnance Survey provides for him. He will find the town of Leeds is in the south-west angle of sheet 70 of what is facetiously called the new one-inch hill-shaded map, date 1858. He will be able to obtain the sheet to the west of the same series, but for the southern half of the desired map he will have to fall back upon two sheets of the old survey, dated 1841-3, much inferior, of a different shape, containing only three-quarters of the area of the new sheets, but equally expensive. The resulting map is eminently unsatisfactory; it shows defects 1, 2, and 5 very conspicuously. To the environs of Leeds as they are to-day it is no guide whatever. So far as the ground forms are concerned the two upper sheets are good enough, but in the two lower the hill-shading has practically vanished, and in many places the roads and rivers are fast fading away also. The plates are obviously quite worn out.

Let us now look at the English Lake district. Here, at all events, if the maps meet popular requirements, they ought to be in constant use. But what do we find? Traverse the Lake district from one end to the other, you will see plenty of maps of all kinds in use, but seldom indeed will you find that any one of them is an Ordnance map.

Here are four sheets, 29, 30, 38, 39, again of the new series, though this time the date is only a quarter of a century back. Defects 1, 2, 3, and 5 are all more or less noticeable.

Here the want of uniformity is not in the age and style or shape of the sheets, but in difference in depth of shade of the impressions. It may be said that by careful selection the sheets might be better matched—possibly so, at the Survey stores. This is the best the agent could do; it is a fair specimen of what the public gets, and therefore one by which the Survey must be content to have the productions judged. The hill-shading, particularly in the Coniston sheet, has become quite woolly, consequently the hill forms are deficient in relief and character. A very large proportion of the names are unreadable, and the plate seems to have been injured in places by the erasure or alteration of some of the figures denoting the heights of mountains. The roads and footpaths are very indistinct, and some of the most frequented are not even shown. I have recently compared the maps of

this district by Bartholomew in a well-known guide-book, and for pedestrian purposes, bald as they are, they are more useful than the Ordnance maps.

The important question of price also comes in. The Ordnance sheets alone cost 4s., but to be any use they must be made up in a portable form, which can only be done by sectioning and mounting. Thus, before the Ordnance map of this district can be utilised, an outlay of 7s. 6d. is required, a sum sufficient to buy two copies of a good guide-book with all its maps. Can we be surprised, then, that the public do not buy the Ordnance maps?

Sheet 38 is printed from an electrotype taken in 1882. I do not know at what date the plan of keeping the original plate or the first electrotype matrix was introduced, and it may be that the plates of these sheets, for which at one time there was a great demand, are much worn, which would account for the fact that the Lake district sheets now sold are some of the worst of the new series of the northern counties. Compare, for example, the Hawes sheet, No. 50, which retains nearly all its original beauty and crispness of definition in the ground features.

If it be of the south of England that we require a topographical map, we shall fare no better, rather worse. Last year I required a map for the Volunteer manoeuvres in the neighbourhood of Eastbourne. There is no map suitable for military purposes, that is, showing the ground features, of more recent date than

13. It is one of the earliest maps of the Ordnance Survey, published at the Tower by Colonel Mudge. For the time of its execution, undoubtedly a most creditable piece of work, curiously enough it is in a better state so far as regards definition than the maps of the Lake district made fifty-two years later: but speaking from experience, I can say that the ground features are by no means correctly delineated. This can be proved by another sheet, No. 8, also done under the direction of Colonel Mudge, and evidently by the same hand, when a comparison can be made with the new hill-shaded map. From about 1830 onwards, the hill-shading much improved, and has continued to improve until it can now be fairly claimed that maps recently issued are unsurpassed in this particular by the productions of any country, but it is no satisfaction of the claims of inhabitants of Sussex to be told that they can have an exquisite map of the Western Highlands of Scotland, and no one will maintain that these maps of sixty to eighty years ago answer the reasonable requirements of to-day. Towns, such as Eastbourne, Hastings, St. Leonards, and Newhaven, are shown as mere villages. It is upon an entirely different England we are gazing in these sheets, and one is inclined to resent the attempts made here and there to modernise them by addition and alteration; the railways especially seem a shocking anachronism. Such additions and alterations destroy the real value of the maps as antiquarian documents. In this connection it is particularly interesting to note the disappearance of the commons and the village greens in comparing the new and the old maps.

Why should the public buy these maps when it can get maps at one-quarter the price, which, for most purposes, are as useful, and, what is of greater importance, up to date? The truth is that of the whole of the southern counties of England (except in the few places where the new hill-shaded map is published) no topographical map worthy the name exists, and for the remainder of England and Wales, where it does exist, its antiquity robs it of much of its utility, and the plates of populous areas are worn out. The so-called new survey, north of the line Preston, Leeds, Hull, we have seen is from twenty-five to thirty-five years old; whilst the few sheets published of Surrey, Kent, and Hampshire, are from surveys at least twenty years old. The more recent sheets published of this map do not bear the date of the survey. The Aldershot sheet, for example, published in 1878, is from a survey of 1870-71. Reference has to be made to the six-inch map to obtain

this information. This is not fair to the purchaser, who, in most cases, is ignorant of the internal arrangements of the Survey, and imagines the map to be corrected up to or within a short time of the date it bears.

The new one-inch map, published without the hill features, called the outline map, gives no idea of the nature of the ground. Only contours of each 100 feet are given, and these are so fine drawn as to be barely visible. Even without the hill-shading this map is often so crowded with detail that it is very confusing and difficult to read. Take, for example, sheet 28.

Many sheets are spoilt by the number of names of parishes and boundaries which might very well be omitted from both the outline and hill-shaded one-inch maps. Of the 360 sheets comprised in the new one-inch map of England and Wales, 179 have been published in outline and 81 with the hills shaded. The outline map cannot be considered anything more than a stop-gap publication. It is true the Director-General says the outline map appears from the numbers sold to be more popular than the hill-shaded. One is loth to assume that the ignorance of topographical representation in this country is so great that there is a preference for the sweet simplicity of a map giving practically only the horizontal development of the ground over one representing both the horizontal and vertical configuration. But it can easily be understood that an outline map from a survey of 1870 may be preferred to a hill-shaded one of 1813, which, as we have seen, is the only choice open to a Sussex man. There is a danger, too, in the publication of the outline map which may be overlooked, and that is that the Treasury may consider it an excuse for still further delays in the publication of the topographical map. Looking at the return for the last four years, it would appear as if advantage had already been taken for that excuse. Here is the return :

ENGLAND AND WALES, 59,540 SQUARE MILES.

New one-inch map. State of publication.

Year ending.	Total area completed.		Area completed during year.	
	Outline.	Hills.	Outline.	Hills.
Dec. 31st, 1886	18,616	11,544	432	52
„ 1887	24,150	11,955	5,534	411
„ 1888	25,101	12,524	951	569
„ 1889	29,478	12,524	4,377	Nil

This table shows that last year the hill-shaded map was not advanced at all, whilst the maximum rate any time during four years has been two or three sheets per annum: at this rate the map will be completed towards the close of the next century. Fortunately the case is not quite as bad as it would seem to be from the present rate of progress. In his last report the Director-General estimates that it will be completed in 1925. Any way we shall have to wait for nearly a generation before we shall be in possession of a complete and tolerably uniform topographical map of the United Kingdom. Surely such a statement by itself is sufficient to condemn the system by which the Treasury doles out the grants for each map bit by bit.*

* In consequence of the limited sum spent on it annually, the hill-shaded map of England and Wales alone will have, when completed, occupied 53 years in the making.

The deficiencies of the one-inch map have been treated at some length, because it is the most important from the particular point of view. Most of the defects it will be seen are due to the age of the maps and the want of revision, and the same will be found to hold good of the six-inch and larger scale maps.

The six-inch or county map has undergone more vicissitudes than any other of the Ordnance series. The maps of the counties in England and Scotland first surveyed on this scale are the finest productions of the Survey (for examples see sheets 78 and 79 of Lancashire). Commenced in a style which soon aroused the attention of the economists in Parliament, it was stopped in 1851. Then came the battle of the scales, after which the 1:2500 scale was finally adopted as that of the parent survey. When ultimately it was decided to resume the publication of the six-inch map by reduction from the larger scale, it was with a greatly reduced number of contour lines. Unfortunately, it appeared to the Commission of 1858 that the original work was too elaborate, and it recommended some economies which of course the Treasury jumped at, consequently the rest of the country has been deprived of the only map which gives an ample delineation of the forms of ground. For nearly all scientific purposes, but especially geological and engineering, maps on this scale are essential (where the 1:2500 scale is published there is little other use for them), in fact, it was from the representation of geologists and engineers that the publication was continued. Being a map intended for the use of particular classes, it ought, as far as possible, to meet the requirements of those classes, which in its present form it does not. The adoption of the photographic method of reduction and printing necessitated the publication in quarter sheets, which can never have the exquisite finish of the old sheets of Lancashire and Yorkshire; but, however much the absence of artistic merit may be regretted, a process which ensured more rapid publication would have been welcomed had it not been accompanied by an advance in price equal to 60 per cent. Before the introduction of the photo-zincographic method of printing, the introduction of photographs for the reduction of the cadastral maps is said to have effected a saving of 35,000*l.* on the survey. The users of the six-inch map can fairly claim that, as they have to pay so much more for an inferior map, the least that could be done for them is to spend the money saved at their expense in completing the contouring at 25-foot intervals throughout the country.

One of the most irritating defects of the large scale maps is the partly blank sheet. In the case of the more recent issues this defect has been remedied by transferring a portion of the contiguous county map, but when the two surveys are of very different dates and style this can hardly be successful; but still it is better than the expensive patchwork arrangement which is required to make a map of a river basin, when the river and tributaries are county boundaries, as, for example, the Mersey. To complete one Cheshire sheet, No. 20, of the valley of the Goyt, no less than six quarter sheets of the Derbyshire county map are required. The six-inch, when up to date, affords a handy town map, but where the sheet lines happen to cross a town the number of sheets required (which may be many as four, costing 4*s.*) gives the Ordnance map no chance in connection with inferior but very much cheaper reproductions. If the maps for which the nation has paid so large a sum are to be freely circulated, the Department must learn to cater for public requirements. If private individuals find a remunerative sale for cheap productions of the Survey, the Department must compete with them, not necessarily as to price, but the price and quality combined must be such as will, in the case of an educated purchaser, turn the scale in favour of the Ordnance map. There is no reason why special sheets of all considerable towns and environs should not be prepared by transfers on the six-inch and one-inch scales. There is amongst the

miscellaneous maps of the Survey one of the environs of Glasgow, on the one-inch scale, prepared in this way (price 2s.), which, if printed in colours, hill-shaded, and folded into a cardboard cover, would answer the purpose.

It cannot be denied that most of the Ordnance maps are very expensive. Sir Charles Wilson says that the selling prices per square inch of the Ordnance Survey maps are cheaper than those of foreign countries, excepting France and Italy. This, however, is hardly the point. The Survey costs, roughly speaking, a quarter of a million per annum, and the value of the maps sold annually is about 13,000*l*. Clearly, the price of the maps is a matter of very little importance for the amount yielded, but it is of the greatest importance if the maps are to be made available for general use. The basis upon which the prices of the different maps are fixed does not seem a very rational one. It lies in a very refined distinction between the cost of production and the cost of publication. The cost of production is supposed to end with the engraved copper plate in one case and with the photographic negative in the other. The subsequent processes of printing, preparing new editions, cost of storage, &c., are called expenses of publication. These being heavier in the photographic process the price of the maps produced by this method is greater. Thus, whilst the total cost of map-making has been largely reduced by the introduction of photozincography, the nation getting more work for the same money, the selling price of the maps has been raised 60 per cent. A system which can produce such an absurd result as this is surely in need of reform.

So far as the great cadastral map is concerned, there is no ground for complaint; it fully answers all that is required in a work of that class, and is one of which the department may feel justly proud. But the very best work in maps becomes of very little value if not kept up to date. It is quite time that a permanent revision department was instituted on a liberal basis if the great work which has been accomplished is to retain its value. Already large portions of it are disgracefully obsolete, and consequently the smaller scales reproduced from it. The new one-inch lags so far behind that it is often obsolete before publication. Does any other nation in the world exhibit such a spectacle as a Government cartographical institution engaged in the production of obsolete maps? Again and again has this, the necessity of revision, been pointed out. Every Director-General has pressed the matter on the attention of the Government; it is dwelt on in every annual report. In 1882 the Treasury "recognised the necessity of a revision of the survey, which should be constantly in progress at such a rate as would complete the whole in every fifteen years at least"; but it was not until December, 1886, that they decided to commence, adding the following extraordinary memorandum: "It is to be clearly understood that in agreeing to the commencement of the revision they do not bind themselves to any fixed term for its completion, or to the annual provision of any fixed sum for carrying it out." This is the sort of thing which is absolutely fatal to the proper conduct of a department like the Ordnance Survey. It is a repetition of the indecision and blundering which have cost the country so much in the past, and to which most of the deficiencies of the Survey are attributable.

It would be a good plan for the information of the map users if this Treasury memorandum were printed in red on the margin of every sheet which has not been revised for more than fifteen years.

The cadastral map and the town plans can never be expected to have anything but a limited sale, but they might be much more largely utilised if the arrangements for sale and distribution were put upon a reasonable basis, and measures taken to let the inhabitants of various localities know something of the state of publication in their own districts. If the six-inch and one-inch maps were better known it would probably lead to an increased sale of the larger maps. There is

another and important step to be taken for the utilisation of cadastral surveys which is pointed out by Sir Charles Wilson in his last report, namely, the compulsory use of the Ordnance Survey as the basis of valuation for local and imperial taxes and transactions affecting land.

Since Mr. Galton referred to the inaccessibility of the maps an even worse arrangement than that in vogue at the time has been devised for the sale of the maps. In 1882 the Office of Works closed the London depot, and, notwithstanding the opposition of Colonel Stotherd, then Director-General of the Survey, abolished the agencies throughout the kingdom, handing over the business of the sale of maps to Her Majesty's Stationery Office. The transfer was made on the ground that an undivided responsibility and control would be secured, and from the intimate relations of the Stationery Office with publishers, the sales would be increased. The Stationery Office, however, apparently had no intention of taking the responsibility, for they straightway appointed Mr. Stanford sole agent for England, at 33½ per cent. commission, the Government to pay the cost of carriage from Southampton. In 1886 tenders were asked for a contract as sole agent for ten years on these terms. Mr. Stanford's offer of 600*l.* per annum for the English agency was accepted.

Other arrangements were entered into for sole agencies in Edinburgh and Dublin.

General Sir Henry James recommended that postmasters throughout the country should be agents, a proposal which was also advocated by Mr. Galton, but the Treasury refused to appoint postmasters. Of course no new arrangement for the sale of maps can now be entered into until the expiration of the contracts.

One of the effects of the agency monopoly is that the local retailers of the maps seldom know much about the survey, except in cases where they were formerly agents under the old system, and it is only in the larger towns that they keep any stock. In the country it is a matter of extreme difficulty to obtain information. If a resident in Carnarvonshire or Anglesea, for example, wanted a six-inch map of his neighbourhood, and were successful in obtaining it in ten days' time, he would have shown himself to be a man of energy and resource. For the absence of an intelligible guide to its publication the department presumably is responsible. The official catalogue is a bewildering maze. The index maps, excepting that to the one-inch, with which it is furnished, are beneath contempt. In addition to the catalogue, there is published a series of Chinese puzzles, at 2*d.* each, called county indices. They profess to show the sheet-lines and reference numbers of the 25-inch, six-inch, and the new series one-inch scale maps, but without the assistance of a skilled interpreter are useless. Those of the counties just mentioned are fair specimens. If a would-be purchaser of some of these has finally hazarded a guess at the number of the sheets he requires, there is nothing to indicate whether they are published or not. If he requires a one-inch map, he will, sooner or later, discover that he must get another index, the sheet-lines shown on the county index referring to a map which does not exist, and which may not be published for many years to come.

Something might be done if public institutions such as the central free libraries in our great towns were supplied with copies of the Ordnance Survey publications of the locality, and full explanatory particulars of their objects, purposes, and the means by which copies could be obtained.

Certainly it is high time that steps were taken to remove the obstacles which interfere with the full utilisation of the Ordnance Survey. The establishment of a revision department on an adequate footing is of first importance. This can only be done by increasing the proportion of the annual grant devoted to the revision to a sum sufficient to clear off all arrears. As the cadastral survey is now nearly complete, the expenditure under that head will rapidly diminish, so that if the total

vote for the survey is maintained at its present level for a few years, the arrears of revision might be overtaken without addition to the present annual cost of the survey to the nation. That this will not be done unless very strong representations are made to the Government is evident from the amount of the grants of the four years since an allowance was first made for the revision and from the remarkable Treasury minute quoted above. By a thorough revision most of the defects in the maps pointed out above might be remedied, and a great national work saved from ruin for want of the proverbial ha'porth of tar.

Year.	Total Vote for Survey.	Under head of Cadastral Survey.	Under head of Revision.	Cadastral Survey and Revision together.
	£	£	£	£
1886-7	258,000	189,951	5,000	194,951
1887-8	230,000	149,079	15,000	164,579
1888-9	223,000	93,164	64,000*	157,164
1889-90	215,000	—	—	—

Mr. Crook then read the following letter on the subject of his paper, which he had received from Sir Charles Wilson, Director-General of the Ordnance Survey :—

2nd Sept., 1890.

DEAR MR. CROOK,—All Government Departments are the better for criticism, especially when it comes from such a well-informed critic as yourself. The Ordnance Survey Department cannot, however, be held responsible for the obsolete character of many of the maps, or for the system under which Ordnance Survey maps are now sold to the public.

No one can be more sensible than the Director of the Survey of the pressing need for a revision of the maps, but the question is really one of money, which it is for Parliament and not for the Department to decide. I think you have underestimated the pressure which has from time to time been brought to bear upon the Government to complete the 25-inch survey of Great Britain, and, however much we may regret it, we can scarcely be surprised that the survey was pushed forward at the expense of revision. The result is that in many places revision must now be virtually a re-survey.

The present system under which Ordnance Survey maps are sold by sole agents for England and Wales, Scotland, and Ireland respectively, was adopted, as you remark, contrary to the advice of the Director of the Survey. Mr. Chaplin, however, under whom the Survey now is, stated in reply to Mr. Webb last Session, that "when a favourable opportunity occurred a change in the system would be carefully considered." I believe that under a proper system the sale of the maps would be enormously increased, and exceed the sum mentioned by Sir Henry James.

I must point out one or two errors in your generally accurate paper. The six-inch map of the kingdom was completed in March last; that of Ireland has long been completed, and officially recognised as the basis for all dealings in land, and for valuation for local assessment. About one-half of the six-inch map of Ireland has been revised to date on that scale. Until recent legislation with regard to land in Ireland, the six-inch map was considered large enough for all practical purposes

* The actual amount set apart for revision is nothing like so large as here shown, the survey of Lancashire and Yorkshire on the 1 : 2500 scale having been charged to the revision account.

by those who used it, and the necessity for a 25-inch survey has only been felt during the last few years.

I do not know what you mean by a "so-called new survey" of the Northern Counties. There is a "new series" one-inch map, so called to distinguish it from the old one-inch map, which was not based on a large-scale survey as the new one is.

The complexity in the one-inch map of which you complain is a matter of opinion. No country has such an enormous amount of what may be called artificial detail, buildings, roads, railroads, enclosures, &c., as England, and it is a question of taste how much of this should be shown on the one-inch scale. We have more complaints of omissions than of want of clearness; it is impossible to please every one, and the boundaries to which you personally object are the very things which most people insist should appear on the map. They are undoubtedly found very useful, but I agree with you that they do not improve the appearance of the map as a work of art.

With regard to price; if the one-inch sheets were printed on an inferior paper from a transfer to zinc, as is done in France and Italy, they could be sold at 6*d.* each.

You are right as to the one-inch hill sheets of the Lake District. The originals were beautiful specimens of engraving, and there was a great demand for impressions. Unfortunately the plates were worn before the present mode of preparing matrices and duplicates was perfected, and all that could be done was to arrest the disease. The plates will eventually have to be re-engraved, but this cannot be taken in hand until the new map of the south of England has been engraved. The slow progress of the new hill map is due to the difficulty of obtaining qualified engravers, and of training young men to this artistic work.

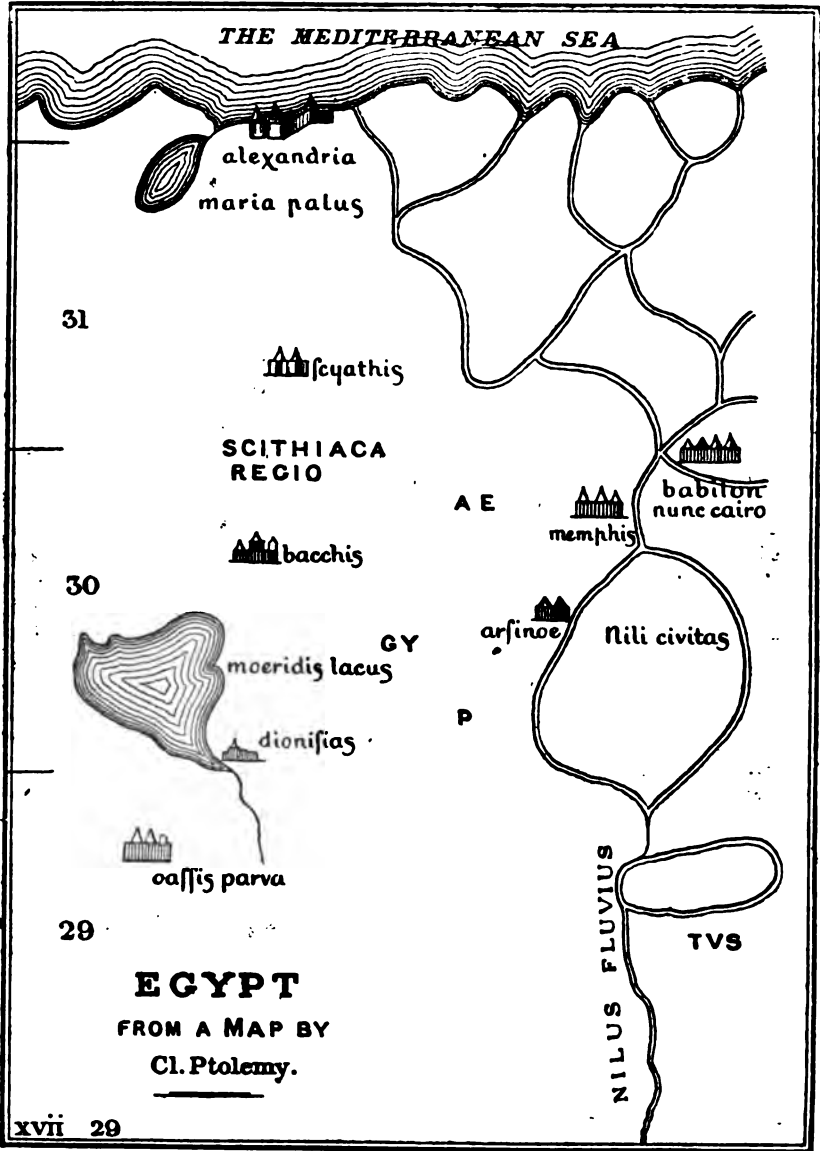
I gather from your paper that one of the faults you find with the Department is that it does not construct maps for popular requirements, such as a combination of sheets, so as to give large towns, like Leeds, with their environs on a single sheet. I think that in this you are rather ignoring the principle upon which, whether rightly or wrongly, the Ordnance Survey has always been conducted. The department is directed to make maps on certain scales, which were settled after many years of controversy, for State purposes. The construction of special maps for popular use was designedly left to private enterprise, and any attempt to compete with private firms in "catering for the public" has been discouraged. I may remind you that the Guide Book maps to which you allude are all based on the Ordnance Survey, and could not have been produced and sold at such slight cost without it. The public thus, and in many other ways, indirectly derive benefit from the great national survey.—Yours truly, C. W. WILSON.

In the discussion which followed,

Sir DOUGLAS GALTON said that it would be well if the British Association could be induced to address the Government on the subject, in order that the whole question of the position of the survey and the scale of the maps might be thoroughly agitated and discussed, especially now that the direction of the survey has been transferred from the Office of Works to the Board of Agriculture, where, no doubt, Mr. Chaplin would be most anxious to do everything he could to promote the interests of those who wanted good maps. The farmer was especially interested in the publication of good maps. He therefore urged the section strongly to pass some resolution on the subject. Perhaps the council might be requested to consider the question during the recess.

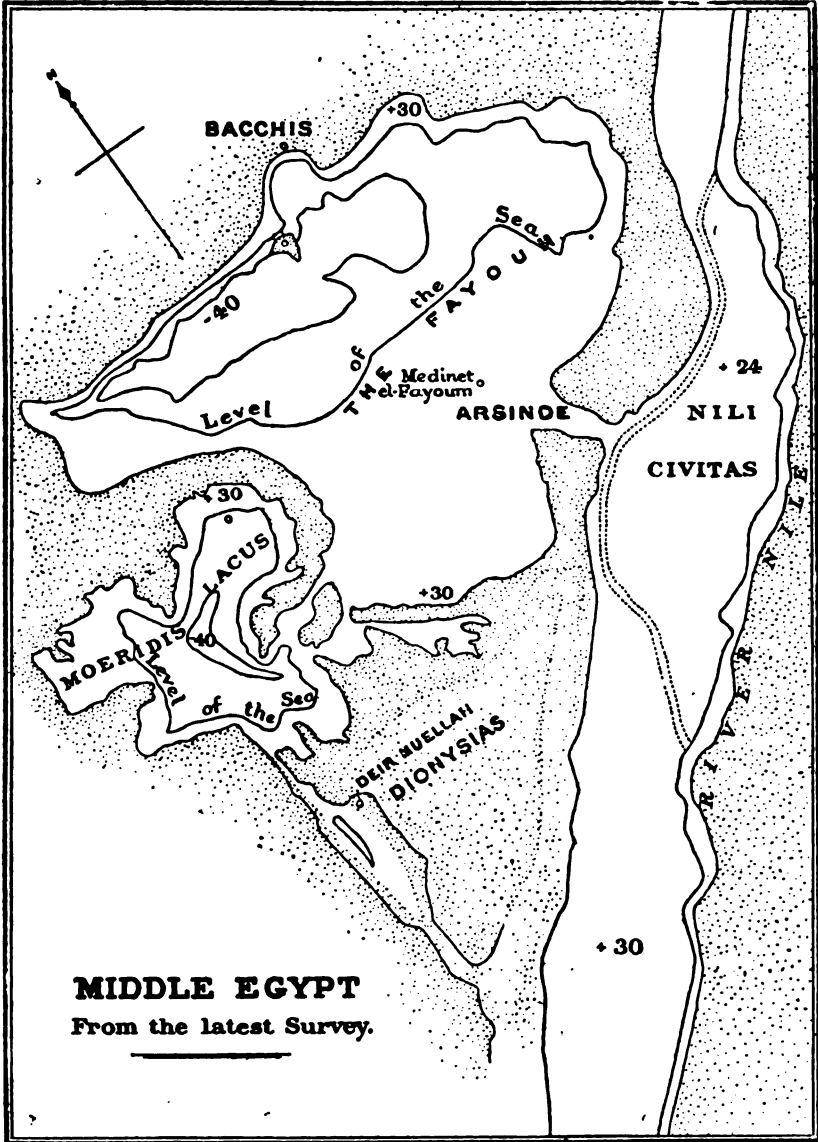
On the motion of Sir DOUGLAS GALTON, seconded by Professor SIMONS, it was resolved that the council should be requested to consider the matter in the recess, and that strong representations should be made to the Government on the subject.

Ptolemaic Maps, with especial reference to Lake Moeris. By CORN WHITEHOUSE.—Prior to 1881 no scholars cited Ptolemaic maps as containing trustworthy information other than that contained in the text. The maps were treated as the plotting by mediæval draughtsmen of the places mentioned by the Alexandrian



geographer, on continents and seas whose general shape was that current in their own time. This practice has continued, and a map of "Cl. Ptolemy" thus evolved by a German cartographer was substituted for the original at the Manchester

meeting of the British Association. It is, however, evident that if it could be shown in a single case that a map depicted facts which are not contained in the text, and could not have been ascertained by the study of other ancient authors, and were also unknown to the draughtsmen of the charts, portolans, or maps of the middle



ages, this would be sufficient to prove that some graphic representation accompanied the written text from an earlier period than the revival of learning.

Such a convenient test is furnished by the "*Moeridis Lacus*," in its shape and

other circumstantial features, as found in the maps of Egypt. The oldest manuscript of Ptolemy—that of Mount Athos—is probably of the twelfth century. It does not represent the natural features of Egypt except in the simplest way, and no attempt is made to give to bodies of water other than the Nile any definite form. The printed editions of Berlinghieri, A.D. 1478; Rome, A.D. 1490; and the so-called "Agnese" (Palmese), A.D. 1554, represent families of manuscripts, of which a very large number have been examined by me. These printed maps are more accessible, and therefore more conveniently cited. The fac-simile atlas of Baron Nordenskiöld (1890) has reproduced two of them. The "Agnese" has been photographed by Orgagnia.

In the protracted discussion in regard to Lake Mæris, on which depended not only the credibility of Herodotus, Strabo, Diodorus, and Pliny, but the scientific reputation of the whole ancient world of letters, the Ptolemaic maps were excluded. Thus Jomard referred to "la position géographique du lac de Mæris fixée par Ptolémée à la hauteur de 29° 20'." But in discussing its *form* he confined himself to the text of the classical authors. Their statements clearly indicated an enormous sheet of water filling a large part of the Fayoum, and connected with the Nile valley by the defile between Howara and el-Lahûn. Thus Ortelius draughted it in 1595, and Jomard was positive that the Birket el-Qerûn, extended in area by an increased depth, corresponded sufficiently to the description of the Greek travellers. D'Anville had arrived at a different conclusion, and Lepsius corroborated the well-known and, prior to my researches, universally accepted theory of M. Linant de Bellefonds. They all agreed in certain particulars, and disregarded or rejected the maps.

The map of Berlinghieri simply encloses by a conventional sign an area represented as water by parallel dashes. The Roman Ptolemy depicts a lake, differing in form from every other body of water in Egypt or elsewhere, and utterly at variance with the plain statements of Herodotus and Strabo as graphically reproduced by every cartographer of modern times. The "Agnese," xvii. 29, is on a larger scale, and with an obviously greater attention to physical features. These maps furnish us with a large number of points both negative and positive.

(a) The Lake of Mæris is not (1) near the Nile, (2) communicating with it (3) near the mountain above Memphis; (4) has no island; (5) and neither Bacchis nor Arsinoe is on its shores or near them.

(b) It is (1) south of the Fayoum, (2) of a most extraordinary shape (somewhat resembling a clover leaf and stem), (3) with a town, Dionysias, on the lake, (4) at the north-east end (5) of a long narrow valley (6) losing itself in the Libyan hills.

A comparison with the map of Middle Egypt, as revised by the War Office (1890), or any of those which have been published as the result of the minute surveys undertaken by the Egyptian Government with a view to the conversion of this area into an impounding reservoir for the Nile flood, shows that the Wadi Raiyân, if filled to the level of high-Nile, and at no other level, has the shape and position of this lake as represented on the best Ptolemaic maps. At the Deir-Muellah are capitals of columns and other indications of its existence in the 2nd century A.D. The map, therefore, represents Egypt after cultivation in the Fayoum (or Arsinoite Nome) had displaced the large body of water seen by Strabo and Diodorus, but before the decay of those vast irrigation works which elicited the admiration and astonishment of the ancient world.

The embankments and canals which kept this depression in communication with the Nile probably perished in the third century A.D. The Bahr Jûsuf and the dam of the Fayoum required but slight annual repairs. The benefits received and the dangers averted immediately affected those who lived upon the canal and its

branches. Mæris, however, existed chiefly for remote provinces. It therefore required for its maintenance a strong central government, with sufficient administrative skill and energy to take precautionary measures, and expend 10,000*l.* annually in opening and closing the canal (Diodorus). This was done largely in behalf of towns and fields, threatened by the Mediterranean, an excessive inundation or drought, in provinces 200 miles distant. Alexandria, Pelusium, and Heroum Oppidum suffered, as the three ports of Egypt on the Mediterranean and Red Sea suffer to-day, when an excessive share of the insufficient summer-supply is served to those who are nearer to the apex of the Delta. As with Roman roads in Britain or aqueducts in Southern Gaul, such a public work could not survive a serious shock to the administrative system. There were local interests which were at once preferred to the public weal. Profiting by intestine disorder and foreign invasion, the Nile resumed its ancient freedom and thrust aside the restraints by which it had been controlled for 2000 years. It swept over and obliterated the canals by which "Sesostris had changed the face of the Delta" (Herodotus). As the inundation subsided, its ancient ally, the Mediterranean, penetrated into the heart of Lower Egypt. The king's object "to supply Nile water to the inhabitants of the towns situated in the mid-country and not lying upon the river" was defeated (*ib.*). As at present, the inhabitants of villages 70 miles from the sea were "obliged after the subsidence of the flood to drink a brackish water which they obtained from wells" (*ib.*, chap. 108). Deprived of this essential to existence, the population abandoned the struggle and quitted the once-fertile and populous areas now known as the marshes or lakes of Bourlos and Menzaleh, and the adjacent plains ruined by saline efflorescence.

The "Moeridis Lacus" of Ptolemy, therefore, is the southern basin only of the extraordinary depression, whose changes of water and land have been repeated and various since Joseph first converted the deep lake of el-Hun, or Phiom, into the fertile province of the West (Arabian tradition *passim*). Although limited in area to 250 square miles, it would naturally retain the name of the larger sheet. It was still the "Lake of Lakes" in size and importance. "There is no doubt," said Col. Ardagh, "that the Raiyân basin is capable of being turned into a storage reservoir fulfilling all the purposes of the ancient Lake Mæris." In matters of evidence, as in mathematics, the chance of accidental coincidence diminishes with great rapidity as the lines are multiplied. Three are sufficient to establish a point in space. If the number and character of the converging lines here enumerated be fairly considered, it must be admitted that we have in the Ptolemaic atlas fair copies of maps sold in Alexandria in the 2nd century A.D.; and that they are, so far as genuineness is concerned, good evidence to the natural features which they depict.

Ptolemy's Topography of Eastern Equatorial Africa. By Dr. SCHLICHTER.—Will be published in a subsequent number of the 'Proceedings.'

The Actual State of the Question of the Initial Meridian for the Universal Hour. By the Rev. C. TONDINI DE QUARENGHI.

On Recent Exploration in New Guinea. By COURTS TROTTER.—A paper on the results of recent exploration in New Guinea up to 1885 having been read before this branch of the Association by the present writer five years ago, it has been suggested that a résumé of the work done since that date may be not unacceptable to the section.

The most striking, if not the most important, piece of exploration done within this period is the ascent, by Sir William Macgregor, of Mount Owen Stanley, the lofty peak which has so long stood forth as a challenge to explorers, additional interest being given to the journey by the fact that his route lay through a new country, that is, up

the course of the Vanapa river, which rises in the range itself, and takes a direct course to the sea at Redscar Bay. Previous exploration towards the main range had hitherto always gone up through the difficult broken country at the back of Port Moresby, much of which has already been surveyed by Mr. H. O. Forbes, whose valuable work in that district is well known to geographers. With slenderer resources Mr. Forbes had, in fact, ascended from Port Moresby, and, following partly the valley of the Goldie river, attempted the ascent from the south-east, and had arrived within eight or nine miles of the summit, which rose before him apparently within a fair day's climb at the opposite side of the Warumi Valley, when he was forced to return by the desertion of his native followers, who were filled with superstitious terror at the proposal to ascend the lofty mountain. This is not an uncommon dread among the Melanesians, and yet, curiously enough, no such feeling seems to have existed among the natives encountered by Sir W. Macgregor, approaching from the westward—if, indeed, he rightly understood their remarks on the subject.

After passing through the alluvial belt on the coast, the country at 12 to 15 miles from the mouth of the Vanapa becomes very broken, low forest-covered hills of clay and slate occur, the river is rapid, with snags, and boulders of conglomerate and basalt; further inland the schistose rocks are highly metamorphosed, passing in the higher ranges into very micaceous schists, highly crystalline on Mount Victoria, and approaching to gneiss, with intersecting veins of quartz. Four successive ranges were crossed, rising from 2600 to over 11,000 feet, till at length, by turning the head waters of the Vanapa, at about 10,000 feet, the Owen Stanley range itself, lying north-west and south-east, was reached; and the party following the ridge for about 20 miles arrived at its culminating point, which is at the south-east end.

Between 6000 and 8000 feet they passed through a region of dense fog and mist, where the silence was unbroken even by the voice of a bird; the trees were draped with moss, and everything was saturated with moisture, the travellers for a considerable distance dragging themselves, or climbing along through the roots and branches and gnarled trunks without touching the ground, as in a mangrove swamp. Above 8500 feet an undergrowth of bamboo begins, and the mists are replaced by a fine dry climate. The bamboos continue up to 11,000 feet, easy at first to cut through, but growing stronger higher up, and covering even the large trees, making travelling very difficult. Arboreal vegetation ceases at about this height, the shrubs continuing for another 1000 feet, while the genuine Alpine flora begins at about 10,500 feet, about one-fourth being of Himalayan type, among them several ericaceous (including vacciniaceous) plants—so rare in Australia, and a few British plants not cosmopolitan; but there is a marked preponderance of New Zealand and sub-Antarctic forms, and some plants only hitherto found on Mount Kinibalu, in Borneo. Strawberries were found on the highest ridge, and were very welcome, the commissariat being, perhaps, the principal difficulty of the journey. Fortunately the few natives met with were very friendly, and ready to supply food; but for this the expedition must have failed. No native gardens were seen at above 5000 feet. Of birds, two new species of bower-bird were found, the differentiating characters lying rather in the mode of construction of the bower than in the birds themselves; also a todopsis, and a blackbird, but no change towards types of cold or temperate regions corresponding to the change in climate and altitude.

The highest crest of the Owen Stanley range, which Sir W. Macgregor has named Mount Victoria, runs north-west and south-east, and appears to be over a mile in length, and to consist of six peaks, those at either extremity being a few feet higher than those between. Great precipitous buttresses bristling with peaks are thrown out from either flank of the range at about 12,000 feet. Sir W. Macgregor estimates the highest point of the crest approximately at 13,121 feet; the old

Admiralty Survey gives the height at 13,205. From the summit a great detached mountain, estimated at 12,750 feet, is visible to the north, about 30 miles distant, and two more to the north-east, and at a much greater distance others, which seem to be the peaks of the D'Entrecasteaux Islands off the north coast. The country towards the north coast is pronounced to be very much less mountainous and more thickly peopled than that towards the south; but detailed speculations on these subjects seem hazardous, for Sir William had just sketched three large lakes into his note-book, when, by the accident of a native setting fire to one of them, he discovered they were merely grass clearings. To the south-east a broken mountain tract of much lower elevation seemed to separate the Owen Stanley from the Mount Obree range, the further end of which, some 60 miles from Mount Victoria, has been visited from the south, and described by Mr. Cuthbertson.

The natives of the Owen Stanley district, though very friendly and fairly trustworthy, were timid and suspicious, and effectually scared by any attempt at sketching, even the landscape. They are somewhat shorter and more muscular than the coast men, frequently with broad, prominent cheek-bones and Semitic noses, the nostrils less arched than in the ordinary Papuan type, and the chin and lower jaw stronger. The old men wear elaborate caps of cuscus skin ornamented with cassowary feathers, dogs' teeth and boars' tusks, all this corresponding closely with what Mr. Forbes saw of the people to the south-east.

A fine suspension bridge, a remarkable work for so primitive a people, crosses the Vanapa lower down. It is 70 yards in length, constructed entirely of rattan, skilfully and securely fastened at the ends, the footway consisting of four rows of these canes, while there are two rows of rails on either side, a cross section of the bridge thus having the form of a somewhat rounded V. The lower course of the Vanapa is well suited to bring down the valuable timber which grows on the neighbouring ranges.

Mount Obree.—Mr. Cuthbertson's expedition to Mount Obree, above referred to, started for Kappa Kappa, 30 miles south from Port Moresby, and passed for some 20 miles through an undulating grass country with occasional jungle, chiefly along the river banks, with numerous villages and gardens, the sugar-canes, wild and cultivated, being specially abundant. After striking the Kemp Welsh river the country rises gradually, ridge after ridge, the grass on the mountain sides being generally replaced by thick jungle, towards Mount Obree, which is about 45 miles in a straight line from the coast. Here Mr. Cuthbertson encountered, though in a modified degree, the usual superstitious fears about a high mountain. The people believed it to be inhabited by the spirits of their dead and other evil beings, still they promised to accompany Mr. Cuthbertson, only stipulating that he should not offend these powers by cutting trees, breaking stones, &c. Their fears, however, at last overcame them, though it was mainly a physical dread of the steepness of the mountain sides, which they feared would fall on them. At 7500 feet Mr. Cuthbertson encountered a stratum of the dense fog which was found on the Owen Stanley range at the same height. From the highest point reached he saw the peak of Owen Stanley bearing 317° , his own altitude being 8000 feet. No higher peaks were visible, but, as the Admiralty Survey records a height of 10,246, it seems probable, without impugning the measurements of this very capable explorer, that some higher peaks may have been obscured, either by the forest which extends to the summit, or by the prevailing mist.

An interesting feature of this expedition was the assemblage and friendly association, in Mr. Cuthbertson's service, of a large number (some 200), of people belonging to different tribes, hitherto unacquainted with each other, and therefore presumably enemies.

No mere résumé, however, can give any idea of the difficulties of the explorer in

managing such a party of native carriers, on whom the success or existence even of the party mainly depends. He mentions a curious instance of superstition: a kangaroo having been caught by his dog, the people were afraid to eat it, because it was taken on hostile soil.

The Fly River.—The ascent by Sir W. Macgregor of the Fly river, which is by far the largest in the Possession, to a distance of over 600 miles from its mouth, and the discovery and ascent to about the same distance and latitude (about $5^{\circ} 31'$ S.) of its eastern affluent, the Strickland, by Captain Everill, add somewhat to our knowledge of the interior; but the country traversed, a vast level, and at times partly submerged alluvial tract, probably extending to a great distance both to the east and west, offers but little interest in proportion to its extent.

The Strickland is the broader, but shallower and more rapid stream of the two. It enters the Fly at 240 miles from its mouth, and at their furthest points the two explorers seem to have been within 40 miles of each other, and the country and distant ranges seen and described by Sir W. Macgregor from his furthest point seem to have had the same appearance for Captain Everill.

The tide ascends the Fly 150 miles, and coco palms were found at 414 miles from the sea.

For nearly 400 miles the windings are great, and the intervals probably at times under water. Only occasional low elevations occur on which villages are built. After 400 miles the banks are higher and better defined, with real grass on them, but even here the land slopes away back into swamps. It is therefore a country unfit for permanent occupation, the forest supplying little or no natural food but some occasional sago and inferior bread-fruit. At 486 miles the first stones occur, as pebbles in the stream, volcanic, granitic, or slate with quartz veins. The lower hills now entered are tertiary and cretaceous, the distant mountains, which, judging from the pebbles, belong to primary formations, and probably contain metalliferous deposits, lie apparently within German territory.

From his furthest point Sir W. Macgregor saw in front of him, about 10 miles off, and probably in British territory, a range some 1500–2000 feet high, and 20–25 miles in length, beyond which, at about 40 miles, was the Victoria Emmanuel range of D'Albertis, apparently some 12,000 feet high. Between the two, and beyond the north-east end of the former range, is another very steep range, running south-east and north-west, perhaps 50 miles in length, and 5000 to 6000 feet high. As its highest point seemed to be in German territory, Sir W. Macgregor gave it the name of Blücher.

A good deal of this upper country is available for continuous cultivation; the traces of population are numerous, and, so far as could be known, they are peaceable, for the party was a good deal separated and no attempt was made to molest them.

Tobacco with a very small leaf was found cultivated here, yet its use was unknown to the natives in the previous 180 miles. But probably the tribes are not only isolated, but, unless in these upper regions, to a great extent migratory. There is a settled population only for the first 50 or 60 miles of the river, wherever any land is available, and again at one or two points higher up. Speaking generally, the commercial possibilities of the region seem small; there is a certain amount of cedar and other useful timber, but this is limited by the swampy character of the soil.

Kiwai Island.—Certain places in the estuary of the river, however, offer more points of interest. The island of Kiwai, a great deltaic segment at the mouth of the estuary, 36 miles in length, and with an area of 60 square miles, holds out a prospect of greater commercial importance, both from its geographical position, and from the exceptionally prosperous condition of its numerous population. It is nowhere more than six feet above high water level, and a good deal of its area is below the level of

spring tides, but the people are assiduous and careful cultivators, and there is a great variety of vegetable produce. The most important articles of food are the coco-nut and sago, the latter being always in use, whatever other vegetables may be available in addition, and next to these the banana. No less than 36 varieties of banana, we are told, were observed; 20 kinds of yams, 10 of sweet potatoes, and 11 different kinds of fibre. The mango, taro, sugar-cane, and melons were found, but no member of the orange family. Mr. Bevan, who had visited the island, asserts that the people are cannibals, and describes their orgies; but his narrative was put to a severe test, for it was translated and read to the supposed cannibals, and was received by some with shouts of laughter, while others profess themselves greatly scandalised! Sir William himself seems to think it a calumny.

Their houses are elaborately constructed, and are described as models of cleanliness, order and regularity.

The mainland just beyond Kiwai seems to be hardly anywhere above, and much of it below high-water level, and mostly covered with forest and impenetrable inter-lacing scrub. It is conceivable that such land might be utilised by a people accustomed to rice culture, but besides the enormous cost of clearing, the new comers would have to reckon with a numerous and warlike people, who already occupy all the localities now available for cultivation.

In his dealings with the natives on this voyage, Sir W. Macgregor displayed a tact and forbearance which had the happiest results. On the few occasions when hostilities were threatened, actual fighting was avoided. Every opportunity was taken by Sir William to deposit little presents in canoes, or other places where they would be found, and nothing was taken away. The consequence was that on the return journey they were hailed as friends, even by those who had threatened mischief before. This is the more remarkable when we recollect what has happened here in former years, and many of the natives, before they could be persuaded to hold any intercourse, enquired nervously whether there would be "pu," which expressed their reminiscences of a gun-shot!

They were keen traders, and yet nothing would induce them to part with some of their personal ornaments, whether because they represent a great deal of labour, or because they are family heirlooms, who can say? At all events one can understand their resentment at the loss of such articles when thoughtlessly carried off as curios by previous explorers.

Aird River, &c.—The Aird river and other streams at the head of the Papuan Gulf seem to give more ready access to a fine valuable country than any other road yet discovered.

The region, so far as yet explored, is at least 100 miles in width, and probably extends as far westwards as the Fly river. For some 30 miles from the sea it is alluvial and more or less swampy, but rises thence into an undulating well-wooded hill country. Throughout its known extent, besides the great rivers that come down from the interior, there are intersecting channels communicating with these and forming a valuable inland waterway from one end of the district to the other. Mr. Theodore Bevan ascended the Aird river (so named by Captain Blackwood in 1848, and which Mr. Bevan has unnecessarily renamed the Douglas, and higher up the Philp), and found himself, at about 45 miles from the coast, in a beautiful country with steep wooded hills, 300 to 2000 feet high, of cretaceous limestone, and higher up of basalt. The avifauna and flora are rich and beautiful; among the valuable plants seen was the massoi, whose bark is in so great demand in China and elsewhere. Water-worn pebbles of metamorphic rocks and diorite, and magnetic iron sand, which yielded colours of gold, seem to indicate the presence of primary rocks in the ranges higher up.

To the north Mr. Bevan asserts that he saw the distant peaks of the Bismarck and Finisterre Mountains. Another great stream, 60 to 80 miles east of the Aird river, which he has named the Queen's Jubilee, but which might perhaps be better called by the native name of its eastern channel, the Aivei, was also ascended. At 100 miles up the stream it was still 200 yards wide and very deep, with a rapid current, the undulating country around very fine, the ranges beyond rising tier above tier, the watershed probably lying within the German territory. The great fluctuations of level, common in New Guinea rivers, were indicated by accumulations of drift-wood 20 feet above the then level. Great tracts of country, which were apparently uninhabited when Mr. Bevan first went up, were found afterwards swarming with people, showing probably that in all these deltaic tracts the population is migratory, and (one may add) cautioning us against drawing hasty conclusions about them, even from the most honest and trustworthy reports. The character of the people, too, differed greatly within a very short space. On the lower waters Mr. Bevan found a fine-looking people, tall and muscular, boisterous and fearless, while up stream they were distrustful and timid, frightened by loud shouting—the dislike to loud speaking is a common and curious characteristic of these people—and had to be carefully enticed into intercourse by presents floated down to them in empty bottles. The latter condition is the less wonderful of the two. We can hardly over-rate the courage of a savage who, never having seen any vessel but a canoe, suddenly encounters a puffing steamboat and ventures on board.

And here, although the details of adventures encountered on all these expeditions do not come within the scope of this paper, it is only fair to recall the fact of the arduous labours undergone on each occasion, and the imminent dangers run, as well as the readiness and fertility of resource displayed, without which success would have been impossible.

Mai Kassa River.—Another interesting and characteristic river system, which has been recently explored, is the Mai Kassa, which drains the district lying in the angle formed by the right bank of the Fly and the coast to the westward. At its mouth the Mai Kassa is over a mile wide, and more than 13 fathoms deep in the centre. The banks are low and muddy, and lined with mangroves for 30 miles, where the stream is still 300 yards wide with 6 fathoms of water. Here a somewhat smaller branch, the Wassen Kassa, leaves the main stream to the westward and flows down to the sea, having a similar character throughout. Above the parting of the streams the river runs through undulating open forest country, and at 50 miles from the sea, in lat. $8^{\circ} 33' S.$, is only 10 yards across. The country on either side of the two channels is swampy, with open forest and long grass, and occasional ridges 10 to 20 feet high, formed of good loamy soil and covered with dense jungle. The two streams are connected by more than one channel, thus dividing the delta into islands. It has been hitherto supposed that the rivers had some connection with the Fly, but this last survey seems to show that they form a system of their own. Some interesting facts are learned of a mysterious pirate tribe, the Togari, who ravage the neighbourhood occasionally, coming from the westward every other year, and forming temporary camps. They are described by the natives as varying in colour from black to nearly white, with long curly hair, and wearing short-sleeved shirts made from the pith of a tree. It would seem that their home cannot be far off, for their canoes are very crank and without outriggers, 33 to 38 feet long, 4 feet wide, and 4 feet deep, but their precise habitat has not yet been ascertained, though Sir W. Macgregor encountered several of them, a very fine, light brown people, not far from the Dutch frontier ($141^{\circ} E.$).

St. Joseph River.—Another interesting district recently explored lies between Mount Yule and the sea in Hall Sound. It is watered by the St. Joseph river, which

appears to be navigable for 40 miles, having a depth of 12 to 18 feet, though there are only five to six feet on the bar. The country up to the foot of the hills, some 38 miles, is fairly level and accessible to horses, well grassed and watered, and fertile, with some 150-200 square miles of very good country, while the slopes of the lower hills at the foot of the great range are suited for plantations of tea, coffee, cocoa, or vanilla; but this district is thickly peopled, and although a good deal of land is unoccupied, the amount really available for European settlement would be very small. At one time or another it has been all under cultivation, for there is no old forest.

The people, though not unfriendly, have not the savage virtue of hospitality, and indeed throughout New Guinea it is very rare to get even food given without payment, but they are relatively well advanced. There are regular market-places, and intercourse between friendly tribes, and though between the rest there is a regular debtor and creditor blood account, they are above cannibalism, and there is no head-hunting nor trophies of skulls. They dance quietly every night, except after a death, when dancing is stopped for a month. Their houses are clean, and each contains a large bag, into which the whole family retires at night to escape the mosquitoes. The women, though both house and field work is done by them, have a good deal of influence in the management of affairs, and some of the chiefs are very intelligent, though as a rule their want of influence makes it difficult for us to deal with their people. For this end, appeals to the influence of the women were sometimes found more effective. A single language, that of Roro (Yule Island), is spoken over an exceptionally wide area, which marks a relatively advanced condition, and is a great help in administrative matters. The whole district seems to have a future, and is chiefly under the Roman Catholic missionaries of Yule Island.

The different levels of civilisation and intelligence among the different tribes of New Guinea, not necessarily corresponding to any markedly different ethnic characteristics, are remarkable. It has often been observed that the cannibal tribes are by no means the most degraded; on the other hand, there is evidently a stage of progress above which cannibalism is not found.

Our knowledge of the country has been a good deal extended by the expeditions which have been undertaken to arrest criminals in their own villages. Until recently the authorities have been content to avenge an outrage by shelling the village, no other measures being available; and this was, after all, in accordance with the native idea that responsibility in such matters should be rather collective than individual. Latterly, however, it has been carefully impressed on them that our quarrel is only with the actual criminals, and by no means necessarily with the tribe to which they belong, and a very wholesome effect has been produced by the gallant way in which these have been followed up and seized in the midst of their own people. We also incidentally learn much from these expeditions of the conditions of life among the inland tribes. In the forest country about 40 miles south of Port Moresby a small and decreasing tribe, the Veiburi, was being slowly exterminated by a more powerful neighbour, the Manukoro, who, occupying a fertile and beautiful hill-country, and having numerous allies, thought they could defy the Government, and had recently murdered five of the Veiburi people. The chief, however, was given to understand that we only wished to secure the actual perpetrators of the crime, and though thinking the proposal very eccentric, he said he would not oppose it. Accordingly a small party marched up to the headquarters of the tribe, which they found to consist of three strong villages. The murderers, who, far from seeking concealment, were the heroes of the day, were here seized and carried off from among a circle of admiring friends, who were oiling and otherwise honouring them after their exploit.

The condition of the Veiburi is described as pitiable, the entire population,

under constant apprehension of such attacks, living for safety in houses built high up in the trees, one enormous tree containing four large houses of the kind, each with its platform, on which is stored a heap of stones to be used in defence.

The prestige of the Manukoro being thus broken, they submitted readily to the new order of things. This case is by no means a solitary instance of such relations between two tribes: in some cases the oppressed admit their condition to be a part of the settled order of things, while in others it is resented as unjust, and depending only on the *droit du plus fort*; but each alike gratefully accepts the relief brought by the new régime, and it is plain that the establishment of a "Pax Britannica" among people living under these conditions must be indeed an unmixed advantage.

East Cape.—The entire peninsula lying between the head of Milne Bay and the extreme eastern limit of New Guinea at East Cape, a district comprising some 150 square miles, has also been thus visited. A ridge 3000 to 4000 feet high runs through its entire length, with occasionally a level or undulating tract between it and the sea, wider on the north side. The whole region is densely wooded, with a clearing here and there, the soil generally very fertile, large groves of coco-palms occupying the level ground.

The natives, who had at first opposed us bravely in defence of their offending clansmen, at last cordially gave in, apologising for having fought us, on the ground that they had no idea how strong we were. They do not build over the water on piles, but on dry, well-chosen sites. The villages are clean and well laid out, surrounded by trees and ornamental plants; the spaces between the houses are gravelled with basaltic or coralline shingle from the beach. They seem to have the usual Polynesian dislike to grass. So far as we know, there is only one "village green" in the whole territory.

Weather and Climate.—No definite report or suggestion has come from any of these expeditions recommending any special locality as a desirable place of residence for Europeans, or as a sanatorium, such as the high mountains of the interior might be expected to furnish. Before this can be done, however, much more has to be learned of the climatic conditions—e. g. of the times of the principal rainfall in the different districts. All New Guinea is within the latitude of the south-east trade winds, which blow from March or April to October. After this, the sun passing south and heating up the Australian plains, the wind draws round to the north-west, bringing the clouds, which are condensed on the relatively cool mountains and forest-clad surface of New Guinea. But the south-east trades, by the time they reach New Guinea, are also charged with considerable moisture; accordingly, in certain districts where the south-east winds impinge most directly—e. g. about Huon Gulf on the north coast, this, and not the north-west monsoon, constitutes the rainy season, for such districts have high lands behind them which intercept the moisture brought by the north-west winds. As a rule, on the south coast the period of the south-east trade, though the force of the wind often makes it dangerous to navigation, is the dry and healthy season; but there are exceptions, and Mr. Cuthbertson, during his expedition in July and August, met with very heavy rains.

Again, in many districts local accidents interfere and materially alter the normal conditions. On the north coast the rainfall has been noticed to vary much, both as to period and amount, according as the wind strikes the land directly or obliquely, or as the land first reached is high or flat.

On his journey to Mount Owen Stanley, Sir W. Macgregor encountered daily thunderstorms, originating in the high mountains and bringing rain in the afternoon; but these ceased about the 10th of May. There was occasional rain after this, but the mountain itself, reached on the 11th June, appeared as if no rain had fallen on it for weeks.

On the Fly river, in February, it struck Sir W. Macgregor as strange that there was no sign of a rainy season, all the rain which fell being due to the daily afternoon thunderstorms. He remarked that the temperature fell considerably at night—from 85°–90° to 72°–76°, which he suggests may be caused by the north-west wind blowing from the snow-covered mountains in the Dutch territory.

Mr. Bevan again, on the upper branches of the Aird river, in April, had bright weather till noon, when it clouded over, and thunder occurred at night, followed by rain.

The eastern extremity of New Guinea, with its densely timbered high lands, has always a considerable rainfall, while the adjacent islands have a finer and drier climate, with very little malaria. On the main land, the great sanitary difficulty is fever, which is very prevalent, and its conditions still curiously little understood. It may be very troublesome where weather, soil, and other conditions are favourable to health, and perhaps almost absent under the opposite conditions. The duration and severity of the attacks are alike uncertain. *En revanche*, there are very few other ailments, and apart from fever the country might be called healthy. An epidemic resembling influenza, recalling those prevalent in the South Seas, and attributable there to the visits of European ships, occurred lately at Samarai Island. On the German coast an epidemic of dysentery became a *causa belli*. It was induced by a severe drought, but the people believed it to have been caused by sorcery practised by a neighbouring tribe, and they resented this accordingly.

German Territory.—The German territory of New Guinea differs from our own in certain features. Thus in the north-west, towards the Dutch territory, from about 4° N., the high lands fall gradually away into extensive plains. Near Astrolabe Bay also there is a great plain which, though intersected by ranges in the south and north, extends inland for an unknown distance. The rivers are numerous; those from the more mountainous south being comparatively short and rapid. Those in the northern parts have longer courses and great volumes of water, notably the "Empress Augusta," the mouths of which were long ago noticed by Schouten and Lemaire, Tasman and D'Urville.

Augusta River.—It is one of the three great known rivers of New Guinea (the Fly, and the Amberno in Dutch territory, west of the Empress Augusta, being the others). It has no bar nor delta, and is about 1½ miles wide at its mouth, and one mile wide 35 miles higher up, with a current of 3½ miles an hour. It has been ascended for some 370 miles, and for the first hundred would carry large sea-going steamers. The highest point yet reached is 50 miles distant from the Dutch and 55 from the British boundary, in 4° 15' S. lat., and 141° 50' E. long. From this point mountains were seen bearing west, and west by north, about 1000 metres in height. For over 200 miles it runs through extensive plains, which, to judge from the flood-marks on the trees, must at times be entirely under water; above this point for about 30 miles it has carved its course through hills of mica schist and gneiss, above which an alluvial region is found again.

The country on the right bank is throughout the higher, and at greater or less distances are observed ranges of hills, from which all the known affluents, four in number, of this great river, are derived, and these appear to lead far up into the elevated country on that side. At certain points the natives were numerous, and the villages exceptionally large, marking a relatively advanced population; the houses along the banks are strongly built and raised on great trunks of trees. On the upper river forests of fine timber alternate with downs, and scrub apparently covering a very fertile soil. These large villages are also found inland from Hazfeldthafen, where they form little confederacies, of which the people speak the same language, and have stated meetings for trading or festive purposes.

The absence of reefs may explain a feature not unfrequent along the northern coasts. The mouth, or mouths of a river become silted up by the action of the waves; the waters being thus dammed up form extensive lagoons abounding in fish, where the semi-amphibious people live over the water in pile-supported villages. The barrier between the lagoon and the sea is overgrown with trees, or planted or cultivated, and the surplus waters find their exit to the sea by oozing through it. Although the interior, except at a very few points, is still unexplored, there appears to be a good deal of land available for cultivation, either on narrow strips between the sea and hills, usually raised beyond the level of the waves, or, where the high lands are further from the sea, the low intervening hills are often suited for plantation; and there are besides considerable deltaic tracts at the mouths of rivers.

The Berlin Company is doing excellent work in experimental planting, and some of the plantations have advanced beyond the experimental stage.

New Britain.—In New Britain (Neu Pommern) there is said, however, to be a much larger proportion of available land in open valleys and well-watered plains—a great river, hardly inferior to the Empress Augusta, has been discovered on the south coast, west from Cape Merkus. On the north coast the large islands of our charts, Willaumez, Raoul, and Dufaure, have been found not to be islands at all, but part of the mainland, though the positions there given to them are correct.

Volcanic action, unknown in New Guinea, though extending parallel to its north coast from its south-east extremity for many hundreds of miles, is very violent in New Britain, and in some of the islands between it and New Guinea. In March, 1888, owing to an outburst in Vulcan island, a wave 40 feet high broke over the opposite coast of New Britain, sweeping away a forest tract 1 kilometre in extent, and covering the land up to the mountains with trees, pumice, and débris. Several members of an exploring party were overwhelmed. The natives, though attributing the catastrophe to the quarrying of stones, which had offended the volcano, gallantly attacked the wave with stones and clubs. The wave is thought to have been produced by the fall into the sea of the upper part of the peak of the volcano.

Condition of the People.—Until more is known as to the condition of the people and their ideas and wants, the question of occupation, or purchase of land on any large scale by Europeans, must remain in abeyance. The general impression gained by the official journeys that have been made, is that there are no large areas of land of any value which are not utilised, more or less, at one season or another, by the natives. At the same time it is pretty clear that with the increase of security, and perhaps by the introduction of new sources of food, the natives might get much more out of the land than they do at present; and there must, in places, be available land fitted for European plantations, the presence of which, under proper control, would have an educating and stimulating effect on the people.

It appears to be difficult to induce the natives to try to cultivate any new source of food supply, but the same difficulty occurred in Fiji, when cassava was introduced, and similar prejudices have not been unknown in Ireland. On the other hand, they are alive to experiment. Mr. Cuthbertson found them collecting and planting his candle-ends, with a view to a future supply. It must be remembered too that there has long been a considerable native trade between districts far removed from each other, not merely as between coast and inland tribes, but along the coasts and islands; from before our arrival cargoes of pottery have yearly been shipped from Port Moresby to the westward, to be exchanged for the sago of those parts, and the canoe-builders of the Woodlark Islands are widely employed by distant neighbours. It may fairly be expected, then, that the creation of new desires and wants will stimulate the people to work for themselves, though it is difficult as yet to guess to what extent they would ever work regularly for others. As to the latter point, the

little experience had goes to show that they are by no means as hopeless as was at first supposed. When employed in collecting copra, gum, and bêche-de-mer, and in wood-cutting, they have been found generally willing, and not unintelligent.

Gold.—The question of minerals, and especially gold, has excited much interest. There seems every reason to believe that the highest mountains in the interior are of the same formation as the gold-bearing strata of New South Wales, but though colours of gold have frequently been found in washing the river gravels in their upper courses, it has not yet been found in any quantity. And although these washings may, and probably do, come from the rocks in the interior, it is also possible that they may, in places, be merely the detritus of conglomerates themselves the remains of strata which no longer exist.

In the Louisiade and neighbouring islands some 800 miners have been at work, but they do not seem to have done much more than pay their way. Their presence in such numbers was naturally a source of anxiety to the Government, but to their great credit their relations with the natives were very satisfactory.

The value of gold reported as sent to Cooktown was about 15,500*l.*, but the amount actually sent may have been considerably more. These are small figures and those of the other chief headings of trade are as yet equally insignificant; pearl-shell representing only 1510*l.*, bêche-de-mer 2178*l.*, and coco-nuts 550*l.* But it should be remembered that the two former items are quoted in the Queensland trade returns at about 100,000*l.*, and a good deal of this may be supposed to come from New Guinea waters.

The copra and coco-nut trade will no doubt also develop in a region so well suited for the growth of these trees, where hurricanes are practically unknown; and the timber trade may also have a future. It has been pointed out that the probable entrepôts of commerce on the south coast of New Guinea are not further from the chief ports of Queensland than some districts in that colony are from others. For trading purposes, then, the position of British New Guinea will not compare unfavourably with that of the more remote provinces of Queensland. From the nature of the case, however, the development of the Possession must be slow. The great energy of the administrator and his little staff, his singular tact in dealing with the natives, and his own scientific acquirements, are so many guarantees for steady progress, and it is well to remember that political and strategical reasons, rather than any great economic expectations, were the real purpose of the annexation. The Government is already reproached with not giving a free hand, or, indeed, encouragement, to land speculators and others who would undertake to "open up" the country; but apart from what Government may consider to be their duty as protectors of the natives, it must be remembered that the responsibility for results is on their shoulders, and also that the expenses of a native war would tax the resources of the country, or rather the Colonial subsidies on which the administration depends, beyond the point of endurance.

Nomenclature.—With regard to the appellations given by Sir W. Macgregor and Mr. H. O. Forbes respectively to the summits of Mount Owen Stanley and the neighbouring heights, a controversy has arisen of which we have not heard the last word.

It will be remembered that Mr. Forbes's journey was by two years the earlier; that in the end of October 1887, he arrived, as reported, at the bare flat-topped hill of Ginianumu, whence an easy slope led down to the Warumi valley below him, from the opposite side of which several spurs led directly up to the summit of Owen Stanley, which was plainly in view, and which, he estimated, allowing for the deceptive nature of the atmosphere, to be 8 or 9 miles away, though it appeared much nearer. He cannot, he says, be mistaken as to the identity of the mountain,

being familiar with it, and having sketched it repeatedly from various points of view, its general outline, besides, being very constant in appearance from all points to the southward. From his position at Ginianumu he accordingly took the bearings of six peaks, which he named after persons at home specially associated with New Guinea geography. Sir W. Macgregor, however, approaching the locality first (speaking roughly) at right angles, and afterwards in the opposite direction to Mr. Forbes's route, declares that he cannot identify any of these positions, and he has accordingly expunged them from his map or replaced them by others.

Mr. Forbes thinks the explanation may be that from Sir W. Macgregor's altitude, at the top of the mountain, it would be difficult to make out peaks which were far below him, and besides that, if he was depending only on a prismatic compass (his surveyor not having accompanied him as far as Mount Owen Stanley), he may, not being a professional surveyor, have been led into error as to his own position. I scruple even to criticise, and should certainly not presume to arbitrate between, the statements of two such distinguished and capable observers, and the more so as their maps, at certain important points, are imperfect or unfinished. Thus, in the first place, Sir William speaks of five great spurs, 12,000 feet in height, being thrown out by his "Mount Victoria," one of them at least in the direction of Mr. Forbes's advance; but none of these spurs are indicated on his map, and the space almost immediately beyond his peaks is left blank. On the other hand, some of Mr. Forbes's positions are confessedly imperfect (owing to the loss of some important notes), and his furthest point does not agree with the bearings taken thence of the peaks. This, however, is remediable from the bearings themselves, and although he also admits that his "depicting of the spurs and summits of Mount Owen Stanley is not satisfactory," his intended route to the summit is approximately clear. Comparing, then, the data on both sides, and allowing for the conditions under which they were taken, it does not appear that the discrepancies between the two accounts are by any means hopeless or incomplete. The latitude and longitude of the chief summit given by both explorers is almost identical, and as it is difficult to suppose that Mr. Forbes was deceived as to a physical feature with which he was so familiar, one is led to conclude that his "Huxley Pinnacle" must be one or other of the two highest peaks of Sir William's "Mount Victoria." A closer examination, indeed, suggests further points of agreement. It will be remembered that Sir William's crest consists of about six peaks, the two at the extremities being slightly the highest, while two others lie to the north of a line joining the two extreme peaks. Now Mr. Forbes observed three peaks (of which he names two) to the right, and two to the left, of a depression. The former may not improbably be the two which Sir William describes as being to the north of the line, when Mr. Forbes's two peaks to the left would be Sir William's terminal peaks—or, possibly, Mr. Forbes's Mount Walker may be the great spur which Sir William describes as running up to the central crest.

The mountain system is no doubt complicated. Some sketches are given with Sir W. Macgregor's map, one of which, "Mount Victoria from the south-east peak," appears, allowing for the difference of position, to give considerable support to Mr. Forbes's description.

It is much to be regretted that, before publishing his map and report, Sir W. Macgregor had not before him—as one must conclude he had not—the bearings of the peaks taken by Mr. Forbes, as well as the remarkable silhouette of their outline sent by him, and published for the first time in the R.G.S. 'Proceedings' for September last, the contours of which are so striking that, taken in conjunction with the bearings, they could hardly have failed to be identified.

It is to be hoped that the question may be satisfactorily solved by another

expedition proceeding along Mr. Forbes's route, which he still strongly maintains to be the easiest and most direct route to the summit.

Spanish Honduras. By W. PILCHER.—Mr. Pilcher visited Honduras in December 1889, leaving it the end of February 1890, and during that period travelled on muleback over 1000 miles, chiefly through that part of the country which lies on the Pacific side of the Cordilleras. From Amapala, the Pacific port, to Tegucigalpa, the capital, from thence to Inticulpa, in Olancho, then to Comayagua (the ancient capital), and the famous silver-mines of Opoteca, then to Yuscaran, in El Paraiso, another mining district, back again by another route to Olancho, and finally journeying again from Blanco through the capital to Amapala, and from there to La Union, Salvador, where the Pacific mail steamer was picked up, gives a brief outline of the country traversed. This comprises the well-known rivers Guayape and Jalun, in Olancho, where the gold-washing provides an easy living for the natives; an inspection of the old Spanish mines at Opoteca and Yuscaran, and at the latter place of the mining camps of the Americans and Germans now in full work; and, in addition, takes the traveller through and over the beautiful and fertile valleys and plateaus of this country, where tropical vegetation abounds, and coffee, rice, maize, sugar-cane, bananas, plantains, saccute, guavas, oranges, lemons, and other fruits are continuously produced without fear of frosts or adverse seasons. Herds of cattle and native horses are scattered over the country, and Honduras, with its natural advantages and its proximity to New Orleans (three days' steam from Puerto Cortez, the Atlantic port), presents to the foreign settler good opportunities for the successful employment of his capital in the raising of cattle and the production of the crops and fruits of the country. The paper contains comments upon the Government and present President, General Bogran, the food and climate of the country, and the courtesy and hospitality of its inhabitants, some figures and statements as to cattle raising, the cultivation of coffee, sugar-cane, and tropical fruits, concluding with the remark that the petty political disturbances which now and again occur in these Central American republics, may cause a temporary interference with business, but are in no way dangerous to the lives and property of foreign residents.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Berlin.—October 4th, 1890: Baron VON RICHTHOFEN in the chair.—The Chairman first of all announced [that two members of the Society, Dr. E. von Drygalski and Herr O. Baschin, would next year pay a visit to West Greenland (Disco Bay) for the purpose of studying, simultaneously with a Danish expedition to the east coast of Greenland, the movements of glaciers and the condition of the ice in that region. Their mission would be supported out of the funds of the Karl Ritter bequest.

DR. PETERS' JOURNEY IN THE INTERIOR OF EAST AFRICA.

Dr. K. Peters then read a report upon his exploration of the Tana river. By the expedition of Dr. Peters two noteworthy facts concerning the geography of this region have been determined. The first is that above Hargazo, the supposed tributary from Mount Kenia in the north-west, the so-called Kiloluma, formerly appearing on our maps, has no existence. Its insertion in the maps is probably explained by a misunderstanding on the part of Krapf, who had heard from the Wakamba, that in their wanderings in this region they crossed a river Kiloluma.

But in the language of the Wakamba every noisy impetuous stream or waterfall is called Kiloluma. The natives give the name of Kiloluma more particularly to a series of rapids lying about 17 geographical miles above the supposed embouchure of the Kiloluma, at the point where the road from Ukamba to Ube crosses the Tana. In fact the whole upper course of the Tana which precipitates itself in a succession of cataracts, is known among the natives by the name of Kiloluma. The traveller who marched up stream and thoroughly explored this part of the Tana river, found no trace there of any large tributary. The second important fact determined by the Peters expedition is that the upper course of the river makes a very decided bend to the south-west; this is a new discovery. The Tana in its total course forms a letter S, inasmuch as its sources being in Mount Kenia, the Tana is identical with the Sagana discovered in Mount Kenia by Count Teleki. Its upper and lower courses are almost parallel to each other; both are connected by the curving middle portion running from south-west to north-east. As to the name of the river, Tana is a Suaheli designation. In Kikuja it is called Dsagana, in Ukamba, Dsana, among the upper Wapokoma, Dana. Perhaps Sagana is connected with the Bantu word *sag* meaning "mountainous." Among the Galla of Oda Boru Ruva the stream goes by the name of Galana, which signifies merely "water." The respective limits of the lower, middle, and upper courses of the Tana can be defined with a clearness possible in the case of but few rivers. The former extends from the mouth to Kidori, it is about 36 geographical (German) miles in length. This part of the course is exceptionally tortuous, and presents in some places the most remarkable curves, in consequence of the accumulated alluvial deposits. The middle course, which stretches from Kidori beyond Massa to Hargazo, exhibits less strongly marked bends; the banks have the character of steppes. The middle course is about 32 German miles long; its leading characteristic is the unbroken series of river-forkings and island formations, which commences more particularly at the Galla settlement of Oda Boru Ruva. The river bed is sandy, and the continual variations in the level of the waters cause a constant shifting of the islands, which are very fertile. Above Hargazo commences the upper course with its numerous cataracts and waterfalls, of which Peters counted about a hundred. Of these waterfalls the following are mentioned by the traveller as the most important—Hofmann Fall, Victoria Augusta Fall, Karl Alexander Fall, and the S-shaped Schweinfurth Fall. The appearance presented by the Victoria Augusta Fall is exceptionally beautiful; the spectator looks down upon it from the steep banks which here tower 400 to 500 feet above the stream. Behind Hargazo begins the ascent up the unbroken series of terraces which rise like steps one above the other. These terraces, although very picturesque in appearance, impede very much the advance of a caravan. The Mumoni Mountains, for example, with their steep-terraced slopes, overgrown with dense thorny undergrowth, occasioned great difficulties to the expedition. Camels, horses, donkeys perished, and many people fell sick. The Mumoni Mountains attain an elevation of from 7000 to 8000 feet. The climate is very mild, not suitable indeed, for the cultivation of tropical products on account of the night frosts. Kikuyumbi, which lies lower, has the most delightfully mild climate imaginable, as might be judged from the prosperity of its inhabitants and their comeliness. The decided bend of the stream to the south was the cause of great trouble to the traveller, as he was thereby diverted further and further from his goal, Wadelai. Twice Peters attempted, without success, to construct a bridge across the river at a convenient spot. The uncommonly rapid change in the water-level resulted in the bridge, which was almost completed, being torn away by the quickly rising waters ($4\frac{1}{2}$ feet in $1\frac{1}{4}$ hour). This sudden and rapid change in the level of the waters of

the upper Tana is one of its most remarkable peculiarities; it is due either to the heavy thunder-showers which fall in the mountain regions or to the sudden melting of snow masses, which, under the influence of the sunshine and in clear weather, takes place on the high mountain summits of Kenia, where the head-waters of the Tana lie. Compelled by the circumstances above-mentioned to march further along the southern bank than originally intended, the expedition arrived at last at the point where the river turns northward, after having passed the spot where Krapf probably saw the Tana. A clearly defined peak in this neighbourhood was named by Peters Krapf Hill. The party then crossed, with considerable difficulty, the Thika or Dika, which is a very important tributary, and further on the equally important Marawa river. Although the Tana proper turns in the direction of Mount Kenia—and of this the travellers were able to convince themselves from a view obtained from a summit near Konse, thus confirming Teleki's observations—Kikuyumbi, the country lying among the mountains to the west of Lake Naivasha, must be regarded as the proper head-waters of the Tana, in consequence of the masses of water which it receives from this quarter. The Tana is navigable for boats as far as Hargazo. In its lower and middle course the river flows through sun-scorched steppes sparsely covered with bush, mimosas, acacias, and tamarinds. On the banks the soil is fertile, but only for a little distance just parallel to the stream. A narrow belt of almost impenetrable virgin forest, extending only so far as the underground water reaches, accompanies the banks of the river in its middle course. The native paths leading through these forests to the shore of the river are extremely difficult to discover, so that an expedition marching along the stream outside this strip of forest runs the risk, on account of the impossibility of reaching the river through the dense woods, of perishing from thirst, even within sight of the river. The fauna of the country is of the usual East African type. The river abounds in crocodiles and hippotami. In the uninhabited mountain districts elephants, rhinoceroses, buffaloes and antelopes, as well as lions, leopards and monkeys are numerous. In the sun-scorched steppes, where in the day the temperature reaches 113° F. and at night rarely falls below 86° F., but where, however, the excessive dryness makes the heat endurable, the Wapokomo and the hunting tribe of the Waboni dwell. From Kindori onward, the country is inhabited by Galla tribes, who, however, are hard pressed by the Somali. Beyond Hargazo dwell a Masai tribe, the Wandorobbo, with whom the expedition, much against their inclination, had to fight. By means of the cattle captured here as booty, the expedition was enabled to accomplish a march across the uninhabited Mumoni range, without running the risk of starvation. Following on this Masai tribe come various Bantu tribes, the Wadsagga, Wakamba and Wakikuyu. They speak similar languages and belong apparently to the same race, which, according to existing traditions, at one time dwelt on Kilima-njaro. They are clever in constructing their huts and in mat-making, as well as in smelting iron. They had never before seen a white man. Nevertheless they were uncommonly intrusive and thievish; and it was only by very energetic action that the expedition was able to save itself from being robbed and destroyed; Count Teleki had the same experience. The aristocratic republican constitution of these peoples does not allow of peaceable commercial relations being easily established with them through the medium of influential chiefs. In spite of the beautiful landscape of Kikuyun, with its oak woods and its cool temperature (in the evening, about 8 o'clock, 52°–55° F., in the night 41°–43°), Peters does not believe that the Tana route will prove to be of any practical importance in connection with the opening up of the Baringo region, unless, in the direction north-west of the Tana bend at Hargazo, there should be found a more practicable route through the mountainous districts of the Kaiser Wilhelm II. and Beningsen ranges (which

Peters, viewing them from Oda Boru Ruva, took to be the Kenia Mountains); and this must be taken as doubtful. The uninhabited and foodless savannas, and the almost impassable mountain tracts, present, as the two expeditions of Figott and Smith demonstrated, almost insuperable difficulties for caravans. The routes from Mombasa used by the caravans continue to be preferable. If the waterways of the Tana and the Juba had not been obstructed further in the interior by mountains difficult of access, the Arabs would very probably have taken advantage of them long ago.

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian R.G.S.*)

EUROPE.

Höck, [Dr.] J.—Nährpflanzen Mitteleuropas, ihre Heimat, Einführung in das Gebiet und Verbreitung innerhalb desselben. (Forschungen der deutschen Landes- und Volkskunde . . . herausgegeben von Dr. A. Kirchhoff. Fünfter Band, Heft 1.) Stuttgart, J. Engelhorn, 1890: 8vo.

Macdonell, Arthur A.—Camping Voyages on German Rivers. London, E. Stanford, 1890: 8vo., pp. xvi. and 278. Price 10s. 6d. [Presented by the Publisher.]

Reminiscences of boating excursions on the Werra, Weser, Neckar Rhine, Moselle, Main, Moldau, and the Elbe, and the Danube, with notices of the scenery, people, and historical associations of the river valleys described. A number of trustworthy maps, reproduced from those of the German Ordnance Survey, illustrate the volume, which will serve as a guide-book to the principal rivers of Germany.

Partsch, [Dr.] Joseph.—Kephallenia und Ithaka. Eine Geographische Monographie. 'Petermann's Mitteilungen,' Ergänzungsheft No. 98. 4to., pp. [iv.] and 108. Gotha, Perthes.

This is one of those exhaustive geographical monographs produced only in Germany. It deals with all geographical aspects of the islands of Cephallenia and Ithaca. There are maps of the islands on the scale of 1: 100,000, and plans of old Samos and Kranos.

Scott, Robert, H. [F.R.S.]—The Variability of the Temperature of the British Isles, 1869–1883, inclusive. [From the 'Proceedings of the Royal Society,' vol. 47.] [1890.] 8vo., diagram.

Zacharias, [Dr.] Otto.—Zur Kenntnis der niederen Tierwelt des Riesengebirges nebst vergleichenden Ausblicken. (Forschungen zur deutschen Landes- und Volkskunde . . . herausgegeben von Dr. A. Kirchhoff. Vierter Band, Heft 5.) Stuttgart, J. Engelhorn, 1890: 8vo., illustrations.

ASIA.

Blanford, Henry F. [F.R.S.]—An Elementary Geography of India, Burma, and Ceylon. London, Macmillan & Co., 1890: 8vo., pp. vii. and 191. Price 2s. 6d. [Presented by the Publishers.]

This is a volume of Macmillan's Geographical Series. No one is better qualified than Mr. Blanford to write such a text-book, and it need scarcely be said that the meteorology is particularly well done. Of course, within so small a space, only the most characteristic and important features are referred to; but probably no more complete and satisfactory sketch of Indian geography exists within so limited a compass. It is a great advantage to a book of this kind that the author has himself been able to visit most parts of the country about

which he writes. The illustrations are representative, and well selected. The first 46 pages are devoted to India generally, the first few pages dealing with the influence of India's geography on its people. A second short section treats of the government of India and of its princes; followed by descriptions of each of the provinces, as one of which Ceylon, unintentionally, of course, is made to figure. The concluding sections deal shortly with foreign possessions in India, and with the frontier States of Afghanistan and Nepal.

[India].—East India (Progress and Condition). Statement exhibiting the Moral and Material Progress and Condition of India during the year 1888-9. London, Eyre & Spottiswoode, 1890: folio, pp. 214. Price 1s. 9d.

Humann, Karl, and Puchstein, Otto.—Reisen in Kleinasien und Nord Syrien. Berlin, Dietrich Reimer, 1890: 8vo., pp. 424, with 3 maps, 53 plates, and numerous woodcuts.

Two of the journeys recounted in this volume were made under the directorship of Herr Karl Humann, and at the expense of the Royal Museum of Berlin, to obtain casts of certain remarkable rock sculptures at Yasili Kaya, near Angora; to examine the ruins at Boghaz Koi, not far from that spot which M. Texier had correctly stated to be those of Pteria, mentioned by Herodotus (1.76), and to make casts of the colossal remains around the tumulus of the Kommagenean kings in Nemrud Dagh near the Euphrates.

A third journey of exploration made by Herr Puchstein is also given, and on the information obtained by this traveller, the second of Herr Humann's journeys was undertaken at the instigation of Mommesen of the Berlin Museum.

On both occasions Dr. Kiepert provided the expeditions with maps compiled from all the geographical material of previous travellers, and Herr Humann was able to supply deficiencies in these, and correct inaccuracies with the aid of surveying materials which he took with him, though he had such difficulties with his horse and watch, that he confesses at last to "a certain indifference in these matters."

Herr Humann is well known to archaeologists as the superintendent of those large works of excavation undertaken by the German Government at Pergamon, which have so materially improved the collection of Greek antiquities at Berlin; it was on the conclusion of these works that he started for Angora (Ancyra) in the summer of 1882. The journey extended from Broussa in Bithynia to Samsoun on the Black Sea, and was performed with carts and carriages along the old caravan road to Angora, and the notes taken by Herr Humann on this route were no doubt of great value to the enterprising German company which has just undertaken to extend the Haidar Pasha railway as far as Angora. The expedition was supported by both the Austrian and German Governments, two skilled plaster-casters accompanied it, and the Austrians supplied an able epigraphist. The rock sculptures of Yasili Kaya have been minutely described by several travellers, by Professor Ramsay, Texier, and others. Herr Humann, however, has conferred a boon on archaeology by bringing casts of these curious reliefs—which show more than almost anything else the influence of Assyrian art in Asia Minor—safely home to Berlin, where they can be studied by experts at their leisure.

The ruins of the old town of Pteria were accurately surveyed and photographed by the expedition, which material will form a valuable addition to the accounts given by Perrot and Chipiez, Hirschfeld and Ramsay.

Herr Humann gives an interesting account of the Kizil-bashi, the "red-heads," as the Turks contemptuously call them, whom he met on his route. They practise a religion in secret, they take bread and wine at their ceremonies, and have other traces of Christian influence. They are peculiar for their cleanliness, well-kept villages and fields, well-regulated family life, and the absence of syphilitic diseases, so common amongst the Turks and Armenians. Hence Herr Humann is inclined to disbelieve the stories circulated by the Turks concerning their private life, and to look upon them as decayed Christians, superior in every way to the nationalities around them. "It is certain that they have been longer in the country than the Turks, and probably one would more

readily find amongst these despised Kizil Bashi traces of the ancient Galatians than amongst the Turks and Armenians."

The two other journeys described in this volume, to Nemrud Dagh in the Upper Euphrates valley, are decidedly more interesting and fuller of newer material. Herr Otto Puchstein performed the first in company with Charles Sester, a German engineer, who held the post of chief engineer of the *Vilayet* of Diabekir. Charles Sester is the first modern traveller who visited the tumulus and colossal statues of the Nemrud Dagh in 1880, and under his guidance Herr Puchstein went in 1882. Curiously enough, these wonderful remains are mentioned neither in classical nor modern literature, though they formed the burial place for the Kings of Kommagene of the Seleucide line. It would appear that Antiochus I. of Kommagene (a district carved out of the Alexandrian Empire, north of the upper Euphrates Valley) caused this tumulus to be erected as a family burial place with the colossal statues around it, excellent reproductions of which are given in the volume before us. He employed to construct them the people around him. Without any knowledge of art, "Hellenized barbarians," as Karl Humann calls them, their work is colossal but exceeding coarse, just what one would expect from people who had a faint idea of Greek statuary. They are interesting only for the costumes, and for the unravelling of local history, which up to this has been entirely unknown, and towards which the vast epigraphical material produced in this volume affords interesting material for the historian to work upon.

The journey performed by Herr Puchstein is full of valuable geographical information. His tabulated details of the route, which occupies fifty pages of the work, is admirably executed, and must have been invaluable for the second expedition which Humann undertook to obtain the casts.

Again Kiepert supplied a map, again two plaster-casters accompanied them, and Dr. von Luschn, the celebrated Austrian archæologist, whose work in Lycia was so well carried out, and described in a volume similar to the one before us. They succeeded also in obtaining a valuable Syenite relief for the museum at Berlin. Alexandretta was the starting point chosen. They then proceeded, by way of the Amanus Pass and Aintab into the Euphrates valley. At Samosata, the ancient capital of the Kommagene, they left the river and proceeded northward to the range of mountains which enclose the ruins of the monuments to the Kommagenian kings. At Karakusch and Seronk similar tumuli and remains of statues on columns were sighted, and reproductions are given of them in the plates; but their great work was thoroughly to investigate the colossal statues of the Nemrud Dagh, and give to the world an account of a race of kings who ruled in this district after the days of Alexander, and who only succumbed to the Roman power in the days of Vespasian.—[J. T. B.]

Oliver, Edward Emerson.—*Across the Border; or, Pathân and Biloch.* Illustrated by J. L. Kipling, C.L.E. With a map showing the location of all the tribes and the surrounding countries. London, Chapman & Hall: 8vo., pp. xi. and 344. Price 14s.

The author, who is a Member of the Institution of Civil Engineers, and Under-Secretary, Department of Public Works at Lahore, states that the origin of the present work was in a suggestion that such information as was available regarding the leading border tribes on our north-western Indian frontier, the policy which has of late been adopted towards them, and the topography of the districts they inhabit, would be appreciated by Indian readers, which led to the publication in a Lahore paper of a series of twenty-four articles dealing with the subject. These were followed from time to time by articles contributed to the *Civil and Military Gazette* and the *Pioneer*. Some of the latter have been recast, and the whole brought together in the present volume, the author considering that, owing to the increasing attention now given to Indian affairs, some handy account of the most important frontier people might be acceptable to the general public. Mr. Oliver's long official acquaintance with the subject treated of renders him peculiarly qualified for the work he has undertaken, and a safe guide for any seeking information about the wild country and tribes lying to

the west of our Eastern Empire; while his vigorous and lively style renders the book so interesting and amusing, that none who have once dipped into it are likely to put it down again until they have read to the end; and not the least valuable part of the work is the excellent map accompanying it.

AFRICA.

[**Egypt.**—Société Khédiviale de Géographie. *L'Égypte et la Géographie. Sommaire historique des Travaux Géographiques exécutés en Égypte sous la Dynastie de Mohammed Aly*, par le Dr. Frédéric Bonola, Bey. Le Caire, 1890: 8vo., pp. 118. [Presented by the Author.]

A summary of the geographical work executed in Egypt from 1805 to within a recent period.

[**Slave Trade in Africa.**—*La Traite des Esclaves en Afrique. Renseignements et documents recueillis pour la Conférence de Bruxelles (1840 à 1890)*. Bruxelles, J. Hayez, 1890: folio, pp. xi. and 264, map.

AMERICA.

Bell, Charles N.—Continuation of Henry's Journal, covering Adventures and Experiences in the Fur Trade on the Red River, 1799–1801. (The Historical and Scientific Society of Manitoba. Transactions, Nos. 35 and 37. Season 1888–9.) [Bound up with this No. is Transaction No. 36, consisting of a paper entitled "Lord Selkirk's Deed from the Hudson's Bay Co.," by Mr. James Taylor.] Winnipeg, 1889: 8vo., pp. 21.

Bolivia.—*Diccionario Geografico de la Republica de Bolivia. Tom i. Departamento de la Paz: por Manuel V. Ballivian y Eduardo Idiaquez*. La Paz, 1890: 4to., pp. 164.

The geographical dictionary of Bolivia, of which the first edition has just been received, is announced to be a tentative issue, with a view to the publication of a more correct and complete edition hereafter. It is, however, a useful and creditable work in itself; and is designed to contain descriptions of the provinces and cantons, as well as of the towns, villages, and estates (*haciendas*) in each department. The work is based upon the topographical collections made by Don Juan Ondarza, the zealous and laborious compiler of the map of Bolivia, a copy of which is in the R.G.S. map-room, and of the accompanying geographical work. Ondarza was a native of Chuquisaca, and an officer in the Bolivian Corps of Engineers. He died in 1875, leaving a great mass of valuable geographical material, which will now be utilised by successors who fully appreciate his labours. Ondarza devoted his life to geographical work, and never received the notice, either in his own country or in Europe, that his labours undoubtedly deserved.—[C. R. M.]

— *Exploraciones y noticias hidrograficas de los Rios del norte de Bolivia*, publicados por M. V. Ballivian. La Paz, 1890: 8vo., pp. 69.

This pamphlet comprises several notices of expeditions to explore the almost unknown region between the rivers Beni, Madre de Dios, and Purus, in the extreme north of Bolivia. Some of the notices are translations. They include the narrative of the Brazilian Colonel Labre, which appeared in the R.G.S. 'Proceedings' for August 1889; another paper on the exploration of the Ituxy, read before the Geographical Society of Rio de Janeiro; an interesting account of a journey to the Rio Acre, by a young Bolivian named Victor Mercier; a paper on the province of Carabaya, by our Associate Dr. Raimondi, from the *Ateneo de Lima*; and a paper on the navigability of rivers in the department of La Paz, by Dr. Armentia. The collection is a useful one, and Señor Ballivian has done good geographical service in bringing it together.—[C. R. M.]

— *La Paz de Ayacucho. Relacion historica, descriptiva y commercial*, por Julio Cesar Valdés. La Paz, 1890: 8vo., pp. 33.

— La Meseta de Los Andes. Cuarta Conferencia dada por el Dr. Augustin Asplazu, Presidente de la Sociedad Geografica de La Paz. La Paz, 1890: 8vo., pp. 11. [The above publications have been presented by our Honorary Corresponding Fellow, Don M. V. Ballivian.]

— Colonization del territorio de Otuquis, en el Departamento de Santa Cruz. La Paz, 1890: 8vo., pp. 96.

— Descripcion de la Nueva Provincia de Otuquis en Bolivia. Segunda edicion, corregida y aumentada por Mauricio Bach . . . ano 1842. Reimpresion publicada por el Dr. Antonio Quijarro. Buenos Ayres, 1885: 8vo., pp. 36, map. [Presented by Dr. Antonio Quijarro.]

The publication of the former pamphlet by Don Antonio Quijarro has reference to a proposal by the Paraguayan Development Company to found a port and establish an agricultural colony on the river Otuquis, an important Bolivian tributary of the Paraguay. Señor Quijarro gives an account of previous efforts to open up the valley of the Otuquis, and especially refers to what was said by Mr. Clements Markham on the subject when the paper on the rivers of the Gran Chaco, by Captain Page, was read at the R.G.S. meeting on January 28th, 1889. He also reprints a pamphlet published by Captain Fernandez, of the Argentine Navy, on the navigability of the Otuquis; and an interesting letter, by Captain Page, on the exploration of that river by his father, in 1852, with useful advice respecting the construction of a steamer.

As its title shows, the latter work is a reprint of a description of the province.

These publications denote considerable activity among the explorers and geographers of Bolivia. Señor Ballivian bears an honoured name, well known to students of the literature of South America. With such coadjutors as the Señores Quijarro and Idiaquez good work will no doubt continue to be done, of which these volumes are the very promising and satisfactory commencement.—
[C. R. M.]

[Cape Horn.]—Ministères de la Marine et de l'Instruction Publique. Mission Scientifique du Cap Horn 1882-1883. 5 vols. Paris, Gauthier Villars: 4to. (vol. i. 1888) pp. ix. and 496; (vol. ii. 1885) pp. 40, 284, and 202; (vol. iii. 1886) pp. viii., 356, and 90; (vol. iv. 1887) pp. 249; (vol. v. 1889) pp. 400.

The French Scientific Mission to Cape Horn was executed in the years 1882-83, principally with the object of obtaining meteorological and magnetical observations at this particular part of the globe. Vol. I. contains a history of the Expedition, by the Commander, L. F. Martial, describing in detail the voyage out from Cherbourg, and an account of the explorations in the neighbourhood of Cape Horn; there are also chapters dealing with Ethnography and Hydrography, and the English Evangelical Mission at Ooshooia; this volume also deals largely with Meteorology, and is illustrated with three maps besides a number of well-executed plates. Vol. II. treats of the meteorology, by J. Lephy, with maps and diagrams. Vol. III. consists of two parts: the first deals with Terrestrial Magnetism, by F.-O. Le Cannellier; the second, with Researches on the Chemical Constitution of the Atmosphere, after the experiences of Dr. Hyades, by A. Müntz and E. Aubin, with plates. Vol. IV., Geology, by Dr. Hyades, with maps and plates. Vol. V., Botany, by P. Hariot, P. Petit, J. Muller d'Argovie, E. Bescherelle, C. Massalongo, and A. Franchet, with maps and plates. As will be seen, the present work is an important contribution to our scientific knowledge of this portion of the earth's surface.

Davis, William Morris, [and] Wood, J. Walter.—The Geographic Development of Northern New Jersey. [From the 'Proceedings' of the Boston Society of Natural History, vol. xxiv., 1889.] 8vo., pp. 365 to 423. [Presented by Mr. William Morris Davis.]

Apart from the useful information contained in this essay, it may be taken as a good example of research in physical geography.

- Holmes, William H.**—(Smithsonian Institution, Bureau of Ethnology.) Textile Fabrics of Ancient Peru. Washington, 1889: 8vo., pp. 17, illustrations.
- Kate, [Dr.] H. F. C. Ten (Jr.)**—Reizen en Onderzoekingen in Noord-Amerika. Leiden, E. J. Brill, 1885: 8vo., pp. 464, map and plates. [Presented by the Author.]
- Kate, [Dr.] H. Ten.**—Legends of the Cherokees. [Reprinted from 'Journal of American Folk-Lore,' vol. ii., No. iv.] 8vo. [Presented by the Author.]
- Sur les Cranes de Lagoa-Santa. Paris, Typ. A. Hennuyer, 1885: 8vo., pp. 7. [Presented by the Author.]
- Zuni Fetiches (Separat-Abdruck aus: "Internationales Archiv für Ethnographie," Bd. iii., 1890: 4to., pp. 2, plate. [Presented by the Author.]
- Marquina, Paulino Rodriguez.**—República Argentina. La Provincia de Tucuman. Breves apuntes. Tucuman, 1890: 8vo., pp. 20.
- Payne F. F.**—A Few Notes upon the Eskimo of Cape Prince of Wales, Hudson's Strait. [From the Proceedings of the American Association for the Advancement of Science, 1889.] 8vo.
- Pilling, J. C.**—(Smithsonian Institution, Bureau of Ethnology.) Bibliography of the Muskogean Languages. Washington, 1889: 8vo., pp. v. and 114.
- (Smithsonian Institution, Bureau of Ethnology. J. W. Powell, Director.) Bibliography of the Iroquoian Languages. Washington, 1888: 8vo., pp. vi. and 208.
- Powell, J. W.**—Eighth Annual Report of the United States Geological Survey to the Secretary of the Interior, 1886-87 (in two parts). Washington, 1889, 4to., pp. xix. and 1061. [Presented by the Director of the Survey.]
- The present volume opens with the usual Report of the Director, and Administrative Reports. The accompanying papers include "The Quaternary History of Mono Valley, California," by Israel C. Russell, including its lacustral history, glacial history, and phenomena, and volcanic history; "The Geographical Distribution of Fossil Plants," by Lester F. Ward. Other papers are chiefly of geological interest. The Report is illustrated throughout with a number of maps and illustrations.
- Thomas, C.**—(Smithsonian Institution, Bureau of Ethnology.) The Problem of the Ohio Mounds. Washington, 1889: 8vo., pp. 54, illustrations.
- (Smithsonian Institution, Bureau of Ethnology.) The Circular, Square, and Octagonal Earthworks of Ohio. Washington, 1889: 8vo., pp. 33, illustrations.
- Villamil de Rada, [Dr.] Emeterio.**—La Lengua de Adan y el Hombre de Tiahuanaco. Con una introduccion del Doctor Nicolás Acosta. La Paz, 1888: 8vo., pp. 76, xiv., and 249.

AUSTRALIA.

- East, J. J.**—On the Geological Structure and Physical Features of Central Australia. 'Transactions and Proceedings of the Royal Society of South Australia,' vol. xii., 1888-89, pp. 31 to 53.

ARCTIC.

- Macfarlane, R. R.**—Land and Sea Birds nesting within the Arctic Circle in the Lower Mackenzie River District. (The Historical and Scientific Society of Manitoba. Transaction No. 39. Season 1888-9.) Winnipeg, 1890: 8vo., pp. 35.

GENERAL.

Darwin, Charles.—On the Structure and Distribution of Coral Reefs; also Geological Observations on the Volcanic Islands, and parts of South America, visited during the voyage of H.M.S. *Beagle*. (The Minerva Library of Famous Books, edited by G. T. Bettany, M.A., B.Sc.) London, &c., Ward, Lock, & Co., 1890: 12mo., pp. xx. and 549, maps and illustrations. Price 2s. [Presented by the Publishers.]

This volume consists of a reprint of Darwin's celebrated works mentioned above, with a critical introduction to each, by Professor Judd, which makes the present edition of special value.

Davis, William Morris.—Structure and Origin of Glacial Sand Plains. From 'Bulletin of the Geological Society of America.' Washington, 1890: 8vo., pp. 195 to 202. [Presented by the Author.]

The author seeks to show that it is difficult to find any explanation for American sand plains other than the one generally current, which regards them as delta-like deposits of sand and gravel, washed, in the closing stages of the last glacial epoch, from the irregular front of the melting, stagnant ice-sheet into bodies of water that bathed its edge.

Elderton, William A.—Maps and Map Drawing. Macmillan's Geographical Series. Price 1s.

Though this little book will serve as a useful introduction to higher works on surveying and map projections, much that it contains can hardly be said to be suited for the use of schools. For instance, it is extremely unlikely that the scholar of average ability would gain much by the descriptions given of surveying instruments. The only way in which a useful knowledge of the part they play in a survey can be gained, is from the actual use of the instruments in the field; and those who have given instruction in surveying know that, even with instruments before them, it is often by no means easy to make pupils understand how to use them properly. The most useful part of the book, from an educational point of view, is the chapter on "Memory Maps," which contains some very practical hints. Taken as a whole, 'Maps and Map Drawing' appears to be better suited for the use of teachers, to many of whom it will doubtless prove a handy book of reference.—[J. C.]

Fiorini, M.—Gerardo Mercatore e le sue Carte geografiche. Roma, 1890: 8vo., pp. 88. [Presented by the Author.]

A sketch of the life and contributions to cartography of Gerard Mercator.

Frazer, J. G. [M.A.]—The Golden Bough: a Study in Comparative Religion. London, Macmillan & Co., 1890. Two vols., 8vo. Vol. i., pp. xii. and 409; ii. pp. 407. Price 28s. [Presented by the Publishers.]

These volumes are a monument of minute and well-ordered research on the part of the author. They throw a vast deal of light on primitive religious beliefs and customs, and the wealth of information which Mr. Frazer has brought together from all parts of the world may prove useful even to the geographer.

Green, W. L.—Notice of Prof. Jas. D. Dana's 'Characteristics of Volcanoes.' Honolulu, H.I., 1890: 8vo., pp. 15.

Günther, [Prof. Dr.] Siegmund.—Handbuch der Mathematischen Geographie Mit 155 Abbildungen. Stuttgart, Engelhorn, 1890: 8vo., pp. xvi. and 793. Price 14s. 3d.

This is a volume in the series of Geographical Handbooks which are being published under the editorship of Professor Ratzel. It need hardly be said that Dr. Günther has treated the subject with scientific method and thoroughness, and any student who can easily read German will probably find the book the most satisfactory of its kind. Dr. Günther introduces the subject by a most interesting historical résumé of the conceptions of geography which have prevailed at different periods.

NEW MAPS.

(By J. COLES, *Map Curator*, R.G.S.)

EUROPE.

Andorra.—Map of —, constructed by F. H. Deverell, 1890. Based on the scale of the French Ordnance Survey map (*Carte de l'État-Major*). Scale 1:80,000 or 1·1 geographical miles to an inch. F. S. Weller, lith., London.

The material for the construction of this map has been collected by the author during a series of visits to Andorra, extending over several years. It is drawn on the same scale as the large French Government map (*viz.* 1:80,000), and contains a great deal of new information. All the boundaries of the *parróquias* are shown, roads and mule-tracks are laid down, and the heights of mountains are given in both metres and feet. So little is known of the small State of Andorra that Mr. Deverell's map is a welcome addition to the Map-room collection.

Danmark.—Generalstabens topographiske Karte over —. Scale 1:40,000 or 1·8 inches to a geographical mile. Kalchographeret og graveret ved Generalstabens. Kjöbenhavn, 1889. Sheets, "Allinge," "Skivt," "Skjörping," "Struer." (*Dulau.*)

Deutschen Reiches.—Karte des —. Herausgegeben von der Kartogr. Abteilung der Königl. Preuss. Landes-Aufnahme. Sheets:—414, Zeitz; 422, Liegnitz; 502, Neurberg. Scale 1:100,000 or 1·3 geographical miles to an inch. 1890. Price 1s. 6d. each sheet. (*Dulau.*)

Kephallenia und Ithaka.—Originalkarte der Inseln —. Auf Grund der Englischen Seekarte und eigener Beobachtung entworfen und gezeichnet von Prof. Dr. J. Partsch. Scale 1:100,000 or 1·3 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 98, Tafel 1. Gotha, Justus Perthes. (*Dulau.*)

— Plan der alten Stadt Same. Nach eigenen Aufnahmen im Masstab 1:10,000 or 7·3 inches to a geographical mile.—Plan der alten Stadt Krana. Nach eigenen Aufnahmen im Masstab 1:10,000 or 7·3 inches to a geographical mile. Petermann's 'Geographische Mitteilungen,' Ergänzungsheft No. 98, Tafel 2. Gotha, Justus Perthes. (*Dulau.*)

Lombardia.—Carta geologica della —. Scale 1:250,000 or 3·4 geographical miles to an inch. Esequita del Prof. Cav. Torquato Taramelli. Milano, Ferd. Sacchi e Figli. Price 7s. (*Dulau.*)

Mittel-Europa.—Neue Generalkarte von —, 1:200,000 or 2·7 geographical miles to an inch. Herausgegeben vom k. k. milit.-geograph. Institute. Wien. Lief. 3: (12 sheets) Lundenburg, Troppau, Krakau, Radom, Lublin, Siedice, Turks, Zamosé, Máramaros, Sziget, Luck, Piask, Starokonstantynóro. Lief. 4: (8 sheets) Oświęcim, Debreczen, Munkács, Kowel, Kobrin, Drobiezsyn, Rokitno, Zytomir. Price 1s. 6d. each sheet. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued since the 15th September, 1890.

1-inch—General Maps:—

ENGLAND AND WALES: New Series, with contours. No. 89, Eriqg, Redbourne, Calster, Blyborough, &c. No. 139, Stafford, Stone, Newport, Eccleshall, &c.; No. 185, Northampton, Daventry, Spratton, &c. 1s. each.

2½-inch—Parish Maps:—

ENGLAND AND WALES: Lancashire: CX. 1, 4s.; 2, 3, 4, 5s. each; 7, 9, 4s. each. Yorkshire: CKLV. 1, 4s.; 2, 3s.; 3, 4s.; 4, 5, 3s. each; 6, 4s.; 7, 8, 3s. each; 9, 4s.; 11, 3s.; 13, 14, 15, 16,

4s. each; CLIII. 9, 3s.; 10, 11, 12, 13, 14, 4s. each; CLXXI. 7, 4s.; CCIX. 1, 4s.; 3, 3s.; 5, 7, 10, 12, 4s. each; 15, 5s.; CCXXIII. 1, 2, 3, 4, 5, 6, 10, 11, 13, 4s. each; 14, 16, 5s. each; 8, 4s.; CCXXIV. 1, 3s.; 2, 3, 7, 9, 4s. each; 13, 5s.

Town Plans—10-foot scale:—

ENGLAND AND WALES: Heckmondwike, CCXXXII. 9, 25, 5s.; CCXXXIII. 10, 16, 21, 23, 24, 5s. each; CCXXXII. 14, 2, 3, 4, 8, 9, 5s. each (coloured). Huddersfield, CCXLVI. 15, 20, 4s. (coloured). Knaresborough, CLIV. 12, 1, 6, 4s. each; 7, 5s.; 13, 4s.; 17, 5s. (coloured). Leeds, CCIII. 13, 24, 2s. 6d. Liverpool, XCIX. 9, 7, 12, 5s. each; 13, 4s.; 16, 3s.; 17, 5s.; 22, 3s.; 23, 24, 5s. each; XCIX. 10, 21, 4s.; XCIX. 13, 2, 3s.; 3, 4, 5, 5s. each; 10, 4s.; 15, 5s.; 18, 3s.; 19, 20, 5s. each; 22, 24, 3s. each; 25, 5s.; XCIX. 14, 1, 6, 4s. each; 11, 12, 13, 4s. each; 16, 17, 5s. each; 18, 19, 3s. each; 20, 4s.; 21, 3s.; 22, 5s.; 23, 4s.; 24, 2s. 6d.; XCIX. 15, 16, 21, 5s. each (coloured). Manchester and Salford, CIV. 2, 4, 5, 7, 8, 9, 16, CIV. 6, 1, 6, 11, 2s. 6d. each. Sheffield, CCXCIV. 4, 19, 24, 5s. each; CCXCIV. 7, 7, 8, 12, 5s. each; 15, 8s. (coloured); CCXCIV. 8, 4, 6, 8s. each; 8, 5s.; 11, 8s.; CCXCV. 1, 21, 5s. (coloured). Southport, LXXV. 9, 10, 8s.; 14, 5s.; LXXV. 13, 18, 20, 5s. each; LXXV. 14, 6, 5s. (coloured). Ulverston, XVI. 3, 10, 4s.; 15, 5s. (coloured). Wigan, XCIII. 4, 17, 22, 3s. each; XCIII. 7, 9, 4s.; 10, 14, 3s. each; 19, 4s.; 20, 8s.; 24, 25, 5s. each; XCIII. 8, 3, 4s.; 6, 7, 8, 5s. each; 11, 12, 5s.; 13, 5s.; 16, 17, 8s. each; 18, 19, 5s. each; 21, 8s.; 22, 5s.; 23, 24, 4s. each; XCIII. 11, 5, 10, 5s. each; XCIII. 12, 1, 5s.; 2, 4s.; 3, 4, 5s. each; 6, 7, 3s. each; 8, 5s. (coloured).

(Stanford, Agent.)

AFRICA.

Binger, Captain L. G.—Carte du Haut-Niger au Golfe de Guinée par le Pays de Kong et le Mossi, levée et dressée de 1887 à 1889 par L. G. Binger, Cap^{te} d'Inf^{te} de Marine, par ordre de M. Étienne, Sous-Secrétaire d'État des Colonies. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Service géographique des Colonies. Paris. 4 sheets. (Dulau.)

This map contains a large amount of detail, with reference to this part of Africa, that is not to be found elsewhere. The routes followed by Captain Binger are shown in red, those of other travellers being also given. The map is coloured in two shades of pink, the darker shade indicating the area of the French protectorate, the lighter including the countries situated within the zone of the French Sphere of Influence. On inset maps are shown the lower course of the Comoé or Akba, from a compass survey made by Captain Binger in 1889; and the lagoons of Grand Bassam and Assinie from surveys of Captain Binger and other most recent material. A table of positions fixed by observations is also given.

The map is clearly drawn, and the work it contains fills up several blanks on the map of this part of Africa.

Deutsch-Ostafrika.—Handkarte von —, Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Von Kettler. Weimar, Geographical Institute. Price 1s. (Dulau.)

Peters' Route in East Africa.—Vorläufige Uebersicht von Dr. Karl Peters' Reise in Ostafrika im Jahre 1889–90. Scale 1 : 4,000,000 or 55·5 geographical miles to an inch. Gesellschaft für Erdkunde zu Berlin. Sitzung vom 4. Oktober 1890. (Dulau.)

Teleki's Explorations in East Africa.—Bergprofil Sammlung während Graf S. Teleki's Afrika Expedition 1887–88, aufgenommen von Linienschiffsleutnant Ludw. Ritt. v. Höhnel. Als Manuscript gedruckt im k. u. k. milit. geogr. Institute in Wien. 1890. (Dulau.)

The manner in which the results of Count Teleki's survey are recorded in this field-book, may well serve as a model for all explorers. The book consists of thirty large pages, each of which contain very clearly drawn panoramas; the bearing of each prominent peak is written above the peak itself, notes being given of the date, and the place from which the bearings were taken. The map which accompanies the field-book is beautifully drawn, the topographical features of the country being shown by contours. The area embraced extends from latitude 5° 45' S. to 5° 45' N., its northern limits in longitude being from 34° 30' E. to 37° 20' E. and its southern limits from 35° 50' E. to 38° 45' E.; it thus includes all the country between the coast at Pangani, and the northern end of Lake Rudolf. The route followed is shown by a black line,

while the portion of the country shown in the panoramas, as well as the point from which the sketch was made, are indicated by a series of red lines and segments of circles, each of which has a number corresponding with the number of the panorama in the field-book.

The whole system adopted is worthy of the highest praise, and exhibits a method of recording observations, which if generally followed by explorers, would greatly tend to accuracy in the maps which have to be produced from their notes.

AUSTRALIA.

Süd-Australien.—Karte der Gegend zwischen Lake Eyre und den Musgrave Ranges in ——. Hauptsächlich nach der Originalkarte und dem Berichte des Henry Y. L. Brown, F.R.S. Scale 1 : 2,500,000 or 34·2 geographical miles to an inch. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 18. Gotha, Justus Perthes, 1890. (*Dulau.*)

CHARTS.

North Atlantic Ocean.—Pilot Chart of the North Atlantic Ocean, October 1890. Published monthly at the Hydrographic Office, Navy Department, Washington, D.C. Richardson Clover, Lieut. U.S.N., Acting Hydrographer.

ATLASES.

Hachette et Cie.—Atlas de Géographie Moderne, édité par ——. Ouvrage contenant 64 cartes en couleur, accompagnées d'un texte géographique, statistique et ethnographique, et d'un grand nombre de cartes de détail, figures, diagrammes, etc. Par F. Schrader, F. Prudent et E. Anthoine. Paris, Hachette et Cie., 1890. 21e Livraison. Price 10*l.* (*Dulau.*)

Part 21 of this atlas contains maps of France, some of her colonies, and Indo-China. On sheet 11 there are two excellent maps of France, one orographical and the other geological, the latter being accompanied by geological sections of the Jura and Mont Blanc. The colours by which the different formations are indicated are well chosen, and the registering is perfect. Sheet 19 contains maps of French Indo-China, Madagascar, Réunion, the French possessions in the Congo District and Senegal, and the French Soudan. Sheet 42 is a general map of Indo-China. In the letterpress which accompanies the maps, a general summary of information with regard to the physical and political geography is given. The writers in this part of the atlas are MM. Margerie and Jacotet, their notes being illustrated by numerous diagrams and small maps.

With the publication of this part, the atlas is complete. It contains 64 good maps, and a large amount of printed information, written by well-known geographers, an explanation of the terms and abbreviations used, and a copious alphabetical index. The publishers may be complimented on the regularity with which they have issued the monthly parts, and on the complete and useful atlas they have placed before the public at the very reasonable price of 1*l.*

Longmans' New Five-Shilling Atlas, for use in Schools, being a Selection of Maps from Longmans' New Atlas. Edited by Geo. G. Chisholm, M.A., B.Sc. London, Longmans, Green, & Co., 1890. Price 5*s.*

This atlas is designed principally for the use of schools, and contains 32 maps, among which are the political maps published in "Longmans' New Atlas" in 1889, and which were noticed at some length in the 'Proceedings' for May of that year.

The physical features of each country, and the political divisions, are shown on the same map, the differences of elevation are indicated by a system of orographic colouring, in which the areas below a thousand feet above sea-level are distinguished throughout the atlas by a shade of light green. The British Isles form an exception to this rule, here three different areas are bounded by

contour-lines of elevation. On all the maps the sea is tinted in, at least, two colours, to show the area less than, as well as that which exceeds, a depth of 100 fathoms. On the maps of the World, Europe, and the West Indies, a series of contours is given.

The scale on which the maps are drawn is in many cases uniform, but where this is not the case it is a simple fraction of that used in the other maps. All the continents, except Europe, are on the scale of 1:40,000,000, Europe and Australia are on 1:20,000,000, all the larger countries are on 1:4,000,000, while the smaller ones, for which separate maps are given, are drawn on double the scale of the larger ones. The value of this system is that it enables the student to form an accurate idea of the comparative areas of different countries, and at the same time facilitates the comparison of linear distances as taken from different maps, their scales being simple fractions, or multiples one of the other.

A novel feature introduced into this atlas by Mr. Chisholm is the manner in which he has attempted to indicate the utility of rivers for the purposes of navigation, by marking them with symbols, five of which have been used for this purpose: a steamer indicating the head of navigation for sea-going vessels; an anchor and an "S" the locality beyond which river steamers cannot go; an anchor for smaller vessels or boats; while a bar drawn across the river shows that the presence of a rapid impedes navigation; and the same mark with "F" by its side shows where a fall occurs, or where some obstacle effectually stops navigation. The maps are so small that the full benefit of this excellent system is not obtained, owing to the difficulty there is in distinguishing the necessarily small symbols.

The boundaries of countries and subdivisions are shown by a line of red, but those of detached portions of provinces, &c., which are too small to be separately named, are left uncoloured, and included in the surrounding area. Care has been taken not to overcrowd the maps with names, and those given are printed in fairly large type. In following out this plan, the names of many places of secondary importance have been left out, but this is much better than overcrowding, while to remedy this the names so omitted are given in the index with their latitude and longitude, so that their places on the map can be found; the identification of those places has in many cases been made still easier by their position being marked with a cross wherever practicable.

Taken as a whole this atlas is a decided success, is superior to any of its class yet published in this country, and is well suited for the use of schools.

— School Atlas, Physical and Political. Consisting of 35 maps besides insets. Engraved and lithographed by F. S. Weller, F.R.G.S. London, Longmans, Green, & Co., 1890. Price 2s. 6d.

This atlas has been specially prepared to meet the demand for improved teaching of geography. The maps are clearly drawn, and contain all the names mentioned in Longmans' School Geography. They are coloured to show both physical features, and political divisions; a complete index with the latitude and longitude of each place on the maps is given, and for its price it is a very useful little atlas.

— Junior School Atlas, Physical and Political. Consisting of 17 maps besides insets. Engraved and lithographed by F. S. Weller, F.R.G.S. London, Longmans, Green, & Co., 1890. Price 1s.

PHOTOGRAPHS.

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.



MATABELE LAND

ENVIRONS OF GUBULUWAYO

Shewing Kraals and Reefs.

SCALE OF ENGLISH MILES



- Reefs —————
- ⊕ Important Military Kraals.
- ⊙ Smaller Military Kraals

ATOPO RANGE

resource which are so characteristic of the good Swahili. After this he did excellent work for the Universities' Mission in Usambara. Then he joined Count Teleki's expedition, and with this daring Hungarian explorer he made that remarkable journey through Masailand which resulted in the discovery of Lake Samburu. After this, at my recommendation, he was chosen to be the headman of the expedition led into Masailand by the late Honourable Guy Dawnay, whose unfortunate death by a buffalo, all who have known him will never cease to deplore. After his master's death Kiongwe, with great pluck and cunning, managed to recover from the Masai, who had robbed the dead body, the watch and rings which Mr. Dawnay wore at the time of his death. For this and other services rendered in connection with this sad event, the relations of the late Mr. Dawnay have presented Kiongwe with a very handsome watch and chain as a mark of their esteem. After a short rest Kiongwe joined me again on this last expedition, and has remained in my service ever since. I cannot sufficiently praise his honesty, pluck, and devotion, and although I know few Swahili men who are quite so admirable all round, still the records of the expeditions of Burton, Speke, Grant, Stanley, Thomson, and other African explorers, show that Kiongwe is by no means an isolated type of that fine Swahili race which has sprung up on the east coast of Africa. Surely, if we treat them properly, we ought to find potent allies and ready friendly helpers in these men in our new African enterprises? And now that we have practically taken them under our protection, in assuming the protectorate of Zanzibar, we ought to remember that we have duties imposed upon us by this new relation. We ought to espouse the cause and interests of the Zanzibaris, and not allow an irregular coolie traffic to spring up by which they are sometimes conveyed away from their homes by unscrupulous persons, who deport them to far distant parts without guaranteeing their return or paying them the wages which are strictly due.

Mr. Daniel Rankin having called attention to the navigability of the Chinde mouth of the Zambezi, it was thought advisable that I should attempt to enter the Zambezi in this way, and not by the Quilimane route, which involves a land transit of several miles before bringing you to the banks of the Zambezi. Accordingly I started from Moçambique in H.M.S. *Stork*, which was drawing 18 feet of water, and without the least *contretemps*, or hitch, or accident, we crossed the Chinde bar (whereon we found 19 feet of water at high tide), steamed up the Chinde creek, and thus entered the main Zambezi. The gunboat—certainly the biggest vessel that has yet navigated the Zambezi—came to an anchor at a point about 40 miles from the sea; and leaving the *Stork* here—for it was thought unadvisable to take her beyond the tidal influence—her commander, Captain Balfour, two of his officers, myself, my assistant, Mr. John Nicoll, and my Swahili followers, embarked in a little flotilla of boats from the *Stork*, and thus made our way for several

days up the Zambezi, and then up the Shire, where we met the African Lakes Company's steamer, the *James Stevenson*, which was waiting for me at a point where Mount Morambala rears its precipitous walls 4000 feet above the Shire. Here my pleasant companions, the officers of the *Stork*, and the jolly bluejackets who had come with us, and whose exuberant enjoyment of their picnic did one good to see, left me to return to their ship. Here, too, I learnt with some surprise that Major Serpa Pinto, who had been slowly making his way up the Zambezi with a large expedition, the object of which we had been officially assured at Lisbon was the Upper Zambezi and the Loangwa valley, had suddenly deflected his course, and had started up the Shire with a considerable force of men. Sure enough, after two or three days' journey in the *James Stevenson* up the river, we arrived at Major Serpa Pinto's camp, where he was surrounded by a staff of white officers, and over 700 Zulu soldiers. At his request I left the steamer and had an interview with him. We talked geography much more than politics, and the interview was to me a very pleasant one, and certainly did not prepare me for the disagreeable events which happened afterwards.

Soon after quitting Serpa Pinto's camp I reached the confluence of the Ruo with the Shire, and here passed the Portuguese boundary, a day or two more bringing us to Katunga, the port of Blantyre, where the navigability of the Lower Shire ceases. The river journey from the mouth of the Chinde to Katunga had been a most agreeable one, and as far as the *James Stevenson* part of it was concerned, as comfortable as, and much more interesting than, a steamboat journey on most European rivers. Moreover, this journey had shown conclusively that a continuous water connection existed between London and Blantyre Port, with only one change of vessel necessary at the mouth of the Zambezi; and this, too, at a period of the year (August) when the rivers were considerably fallen. The Zambezi-Shire can be navigated at all seasons of the year as far as Blantyre Port by steamers not drawing more than 18 inches.

Having taken you with me in imagination from the mouth of the Zambezi to the confines of British Nyassaland, I may now briefly review the character and appearance of the country through which we are supposed to have passed. The Chinde mouth of the Zambezi is a more promising entrance to that river than any other of the known branches of the delta, not only from the greater depth of water on its bar, and the fine large harbour which lies inside the narrow entrance, but because the land at the Chinde mouth is fairly free from mangrove swamp, and presents firm, hard, slightly elevated ground covered with coarse grass and forest of a pleasing and varied character. In fact, I should say the land at the mouth of the Chinde facing the Indian Ocean was much better adapted for European settlement than the ancient Portuguese colony of Quilimane.

After passing through the spacious island-dotted lagoon of Nãñombe, which forms the island harbour I previously mentioned, you enter the wiggly-waggly Chinde creek, where there is a considerable depth of water—from three to seven fathoms—except just at its junction with the main Zambezi. Here there is a little patch of sand-bank over which there is not more than two fathoms of water at low tide. But this of course is quite sufficient for the largest ship that could ever hope to enter the Zambezi, especially as the rise of tide on the Chinde is never less than 8 feet. The banks of the Chinde are not of the same firm, dry, elevated character as the coast land which surrounds the estuary. The Chinde, in fact, winds through a dreary monotonous mangrove marsh during the lower half of its course.

Along the upper portion of the creek plantations of a poor, ill-tended appearance border the muddy river, interspersed with rather ramshackle-looking villages built of reeds. The people who inhabit the banks are the tenants of Colonel Paiva d'Andrade, through whose "prazo" or concession the Chinde flows. I am told, however, that at a little distance from the banks of the river there is the richest possible soil, and some exceptionally prosperous plantations belonging to Colonel d'Andrade exist, in which very interesting horticultural experiments are being made. The Colonel Paiva d'Andrade to whom I allude is one of the foremost of Portuguese explorers, and is well known to many here present to-night as a charming and cultured man. He has probably done more than any other Portuguese in this century to increase our knowledge of the Portuguese East African possessions.

Along the lower Zambezi, above the delta, there are very few signs of cultivation or human settlement. The south bank is depopulated by the raids of wandering Zulu tribes coming from the Gaza or Matabele countries. A few scattered villages are found on the north bank, which appear to be mainly inhabited by colonies of hippopotamus-hunters, a curious caste of hunting "gipsies," who stray all over South-Central Africa, killing hippopotamuses with great skill and daring, and trafficking with the native people in the hides and flesh and teeth of the animals they kill. It is not, indeed, until we begin to approach the vicinity of the confluence of the Shire with the Zambezi that plantations or villages of importance make their appearance. There are one or two half-decaying settlements at Mazaro, near an old dried-up canal which once permanently connected the Zambezi and the Kwakwa river with Quilimane, but it is not until we reach the African Lakes Company's Station of Vicente that we become alive to the fact of the existence of civilisation on the Zambezi.

The navigation of the Zambezi from its mouth to Vicente is by no means an easy matter to those unacquainted with the intricate windings of the river's navigable channel. The great stream, which is on an average three or four miles broad, is studded with islands and beset with

sandbanks. Vast stretches of the river are covered by scarcely more than six inches of water. To the eye of a man accustomed to the study of great rivers the existence of these shallows is at once apparent by the mirror-like calm of the water that covers them, and the warm, pinkish tone of the sandy bottom which subtly permeates the blue reflections of the sky. On the other hand the course of the deep channel is marked by the swirling water, the tiny whirlpools, and the sharply cut sides of the bank, which, instead of tapering off into the stream, look as if they had been recently sliced with a large knife. There is a crying need for what at present does not exist, or if it does is not known to the outside world—a good, accurate and detailed chart of the course of the Lower Zambezi. Although the course of the deep channel varies and alters as it does in all great rivers, it does not generally change so quickly but that a little careful supervision might easily keep such a chart up to date.

Vicente, the African Lakes Company's station on the north bank of the Lower Zambezi, is about three miles from the Portuguese town called Mopea, which is situated at the farthest point of navigability on the river Kwakwa. The ordinary route hitherto followed from the coast to the Shire and Upper Zambezi is to land at Quilimane, to proceed up the Kwakwa in a small boat to Mopea, if possible, and thence to walk or be carried across the three miles of flat and swamp which separate Mopea from the left bank of the Zambezi. This journey is a peculiarly uncomfortable and tedious one, as the narrow, winding reaches of the Upper Kwakwa can only be navigated by small boats propelled by native paddlers. The upward journey from Quilimane to Vicente often occupies seven days, as against the two or three days which it would ordinarily require to travel by steamer from the Chinde mouth to Vicente up the main Zambezi.

From Vicente you cross over to Tshupanga on the opposite bank, where Mrs. Livingstone is buried, and from there you make straight across the Zambezi once more for the entrance to the Shire, threading your way with some care through a perfect archipelago of islands, and keeping in sight as a guide and a landmark the imposing mass of Mount Morambala, which may be sighted far and wide across the marshes of the Zambezi as a beautiful sign of the healthy mountainous country of the Shire valley.

The left bank of the Lower Shire between Morambala and the junction of the Zambezi is one of the few strips of Portuguese Zambezia which shows any signs of occupation and commercial enterprise. Along this portion of the river banks there are established two telegraph stations of the new line which runs from Quilimane to within a short distance of the river Ruo. There are two Dutch trading factories and several settlements of half-caste Portuguese and one or two Polish planters and hunters, who appear to be doing pretty well commercially

by the products of the chase. They shoot large numbers of elephants, lions, leopards, and big game; and at the time I visited them had, in their two-storied houses, the most magnificent collection of lion, leopard, and chetah skins which I have ever seen gathered together in one place.

Continuing the ascent of the Shire, we skirt the strikingly picturesque range of the Pinda Mountains, all jagged peaks and sugar-loaves, on the east, and the Matunda Mountains on the west, while in the far, far distance northwards there rise the vast dim outlines of higher and higher peaks, culminating in Mount Tshiperoni (or "Clarendon," as it was named by Livingstone). The scenery on this stretch of the Shire is really very fine. In the foreground there are the serpentine windings of the broad river through the great Morambala marsh, which is here and there dotted by little lakelets of clear blue water, but for the most part covered with wide stretches of tall reeds. These reeds bear large heads of creamy-white flower-tufts, almost as big as those of the pampas grass, and as the wind blows across the marsh it sways the reeds into wave-like undulations, wherein the great white heads of blossom appear like fluctuating foam cresting the billows of shining green leaf-blades beneath. Rising above this white-flecked sea of glistening grass are the abrupt ranges of fantastically-shaped hills and mountains, which girdle in the Shire valley with great semicircles of blue mountain wall. Occasionally a glaucous-green *Borassus fan-palm* rises on a column-like stem from an island in the river or a dry patch in the marsh. These landscapes are drawn in large traits, and their harmonies are simple and not complicated by the admixture of any human habitation or cultivation. It is not until one is within a relatively short distance of the Ruo that the banks of the Shire begin to be inhabited again, and the marsh yields to thin forest and plantations of maize, tobacco, millet, and pumpkins.

A short distance above the Ruo one enters the Elephant marsh, a district of great grassy flats, flooded occasionally when the Shire overflows its banks, but ordinarily a dry level stretch of prairie dotted with pools of water.

At the close of the dry season, when the tall grass has been burnt down, and there is little or no cover for the game to hide in, it is really a remarkable spectacle, as seen from the deck of a steamer, to watch the great herds of big animals wandering over these savannahs in search of the young verdure springing up amid the charred stubble of the old grass. With an opera-glass you may distinguish water-buck, gnu, buffalo, eland, pallah, reed-buck, and zebra, and occasionally some dark blue-grey blobs, much larger than the other specks and forms which are in their vicinity, turn out to be elephants. Occasionally a lion has been known to come down to the river and stare at the steamer, and on one or two occasions these beasts have actually been shot from the deck in

passing. Both in the Elephant and Morambala marshes, and in the Upper Shire, the hippopotamuses are a real source of danger and inconvenience to any boats of ordinary size which are not propelled by steam. The hippopotamuses are particularly dangerous at night, but even during the day they will deliberately chase and endeavour to upset boats and canoes which enter their domain; and in the development of the Shire navigation it is essential that the hippopotamuses should be mercilessly exterminated.

Above the Elephant marsh the banks of the Shire again become inhabited. Since passing the Ruo you have entered the country dominated by the Makololo chiefs, who claim to possess land on both banks of the Shire, even to the south of its confluence with the Ruo, but as they are here rather as hunters and traders than as residents, the Ruo very properly marks their southern boundary.

In the valley of the Shire, the so-called Makololo country, there are not, I suppose, more than twenty or thirty persons (and those principally chiefs) who are of real Makololo origin. When Livingstone made his first great journey from the interior of Cape Colony to the Central Zambezi, he obtained from the friendly chiefs at the confluence of the Tshobe and Zambezi a small number of faithful followers belonging to the Makololo tribe of the widespread Betshuana people (the language of the Makololo is merely a dialect of the Se-tshuana): these Makololo accompanied Livingstone to Angola, and thence back again to the Zambezi. He finally left a remnant of them in the care of the Portuguese officials at Tete whilst he revisited England, and, at the close of the Zambezi expedition of 1859-64, these Makololo followers established themselves in the Shire Valley, where, by their superior bravery and greater determination of character, they soon came to be regarded by the timid Mañanja people as chiefs and rulers in the land. They justified their position to a certain extent by repelling the attacks of the Wa-yao or A-jawa slave raiders who, until the arrival of the Makololo, had absolutely devastated the Shire Valley. The Makololo themselves made serfs and vassals out of the Mañanja people, but they let them live in peace, and never sold them as slaves; indeed, the Makololo seemed to have resolutely held aloof from the slave trade. Later on, by their warlike nature and the consolidation of their power, they brought on themselves a certain amount of notoriety, as being the resolute and successful opponents of the extension of Portuguese rule up the Shire Valley.

The *James Stevenson* had landed me at Katunga—otherwise Blantyre Port—and here I remained several days while my active colleague, Mr. John Buchanan, summoned the leading chiefs of the Makololo to meet me in order that I might hear what they had to say as regards their wish for British protection. My business here completed, I started off to ride up the hills to Blantyre.

The road hither from Katunga proceeds for the first two or three miles along a hot plain nearly parallel with the river, and then somewhat abruptly ascends into the mountains. At the first sudden ascent to the high ground the road is badly engineered and well-nigh impracticable for wheeled traffic, but further on and higher up the gradients are easier, and more care has been bestowed on the construction of the road. As you ascend into the Shire Highlands you enter a region of scrubby woodland, of a kind so characteristic of large areas of Africa; where the absence of excessive moisture has rendered possible the annual bush fires which have gradually reduced so much of the African forest to a condition of stunted scrub wherein the trees scarcely exceed an average height of 20 feet. There is something very paltry in this woodland, with its gnarled and crooked trunks and its thin shadeless foliage. Your progress through the country is hampered and your vision obscured by the multitude of small trees, and yet you derive no benefit from the interposition of their foliage between you and the sun.

Winding higher and higher up the mountain side, along the narrow red road, the atmosphere became moister and moister and the banks of the cuttings, and the soil between the trees, more graciously covered with greener ferns and mosses. In crossing the brooks, too, which at times break the continuity of the road, I had glimpses of something like tropical vegetation, and admired the handsome clumps of bamboo which fill up many of the ravines in the Shire Highlands. Suddenly emerging from the forest into a clearing, I met a pink-faced baby being wheeled along in a perambulator by a black nursemaid, and knew then that I had arrived on the outskirts of civilisation. A few minutes more I was alighting at the residence of Mr. Moir, the manager of the African Lake Company's station at Mandala.

"Mandala" means "spectacles," and was the nickname given by the natives to Mr. John Moir. When he built a house the name was transferred to the building, and so on to the little settlement which grew up around it, and which is now practically one with Blantyre, the well-known colony of the Church of Scotland Mission. The two towns are about a mile apart, with a well-made road uniting them, and running between a magnificent avenue of tall trees. There is also the little settlement of Mudi, belonging to Messrs. Buchanan, Bros., which lies midway between Blantyre and Mandala. I will not here devote much space to the description of Blantyre, which has frequently been illustrated by the writings of missionaries and travellers. It will suffice to say that I found it fully come up to my expectations as a pleasing English arcadia, set in the middle of harsh African savagery. It is a place of roses and geraniums, pink-cheeked English children, large-uddered cattle and laying hens, riding horses, and lawn tennis. You may pick raspberries and strawberries in Mr. Moir's garden, enjoy all sorts of English vegetables, and, but for the black inhabitants, really cheat

yourself into the belief that you are in some agricultural village in the Scotch Lowlands.

In the congenial climate and comfortable civilisation of this well-ordered settlement, I paused for a while to prepare for my mission to the Arabs, by sending on letters ahead to inform them of my coming, and to persuade them to a truce in the fighting that was going on; and then, having completed my preparations, I again mounted one of Mr. Moir's horses, and rode down to Matope on the Upper Shire, where the river once more becomes navigable above the Murchison rapids. At Matope there were many exasperating delays owing to the difficulty of obtaining porters, for I intended for various reasons to travel by land along the right bank of the Upper Shire to Lake Nyassa, so that I might become more thoroughly acquainted with the country and the people. At that time, unfortunately, these lands were convulsed with civil wars among the Yao chieftains, and the timid Blantyre porters were scared away by the prospect of being involved in the fighting that was going on. I fortunately had as a nucleus of brave hard-working men the 15 Swahilis whom I had brought from Zanzibar and Mozambique, and with the addition of Atonga porters lent me by Mr. Moir, and the supplementary help afforded by transferring part of my baggage to one of the Lake Company's boats and sending it up the river under the charge of Mr. Nicoll, I managed to make a start, although that journey along the banks of the Upper Shire proved the most difficult, dangerous, and heartbreaking piece of work which I had to perform in the whole course of the expedition.

The country through which the Upper Shire passes is a very desirable land, a broad, slightly undulating plain, magnificently fertile and well watered, a land eminently suited for the growth of coffee, cotton, sugarcane, tobacco, and other tropical produce. The inhabitants are half Wa-Yao and half A-nyanja, the former being the ruling caste. The Wa-Yao are a truculent, quarrelsome, drunken set of people, drunken notwithstanding the Mahommedanism they affect as their belief. Indeed, I was forcibly struck with the fact that, in spite of the precautions taken by the African Lakes Company and the missionaries, by which all European forms of alcohol are rigidly excluded from the Shire Highlands and Nyassaland, this district was the most drunken part of Africa I ever travelled in. I never saw before in Africa—certainly not in the Oil Rivers or the Cameroons, where horrified philanthropists will tell you that thousands of gallons of rum and gin are imported annually—such an extent of daily habitual drunkenness as I witnessed among the people inhabiting the shores of Nyassa, the banks of the Shire, and the Shire Highlands. In every part of the world, man *will* make for himself an intoxicant of some kind, whether it be from the milk of mares, from honey, from the sap of palms, the juice of countless fruits and roots, and almost every kind of cultivated grain; consequently it does not make so

much difference as some people imagine whether or not European forms of alcohol are kept from being placed within the reach of uncivilised races; for savages of almost every grade, if determined to have an intoxicant, will speedily find means to manufacture one from the natural products of their own country. Therefore, in the Shire Valley, the people who are carefully kept in ignorance of the allurements of rum and cheap British wines, brew themselves a heady beer from maize, and in some places distil a strong spirit from the sap of the *Borassus* and *Raphia* palms. The commonest cause (and excuse) of raids and murders in these countries is that the perpetrators were drunk.

Near the place where the Shire leaves the southern Gulf of Nyassa resides, and intermittently rules, the well-known Yao chief, Mponda. The father of this man Mponda was a great friend of Livingstone. He allied himself with the Swahili slave traders from the Zanzibar coast, and by their help created a powerful kingdom, which comprises the southern shores of Lake Nyassa and the valley of the Upper Shire. After his death, however, some few years ago, the succession of Mponda, his son by a slave wife, was not recognised by his more legitimately-born brothers, who thought they had a better right to succeed their father, and consequently Mponda's country has lately been the scene of a perpetually-raging civil war, in which everybody gets defeated by turns, but no party remains finally dominant. Mponda has, however, put his territory under British protection, and his rivals have done the same with the lands that they have claimed, and matters now seem to be gradually settling down into peacefulness.

A little distance above Mponda's town the Shire broadens, and the great expanse of Nyassa comes into view. There is a bank of sand stretching right across the entrance to the river, on which there is not much more than five feet of water in the dry season, although on either side of this bank, especially on the lake side, the depth rapidly increases to several fathoms. This obstacle could, no doubt, be easily dredged away; as, however, the steamers at present on the lake do not draw more than 4 feet 6 inches, they are not much affected by the existence of this sand-bank on their visit to Mponda's.

A day or two after I had reached this chieftain's town, the Universities' Mission steamer, the *Charles Janson*, arrived, and I found that she had been most kindly placed at my disposal by the members of that mission for transporting my party and myself about Lake Nyassa. I owe my warmest acknowledgment to the Universities' Mission for this timely help. Not only was the *Charles Janson* a very swift and comfortable boat, but she was at that time a more acceptable intermediary in the eyes of the Arabs than any vessel belonging to the African Lakes Company, for the Universities' Mission on Lake Nyassa had not been involved in any way in this conflict, and, moreover, the members of this mission, from their closer connection with the Zanzibar and Swahili

people, and their knowledge of the Swahili language, had come to be regarded by the Arabs as persons of great respectability and polite attainments. On board the *Charles Janson* I first visited the peninsula of Cape Maclear, the south-west bight of Lake Nyassa, and the settlement of Livingstonia (which I found in a fairly thriving condition, and very different from the gloomy picture drawn by the late Montagu Kerr), and then proceeded half-way up the lake to visit Bishop Smythies on the island of Likoma, where the Universities' Mission on Lake Nyassa has its head-quarters. Want of time prevents my describing to you the Universities' Mission's important establishment on Likoma, or the thriving Free Church Mission at Bandawe on the opposite coast, where resides the justly-celebrated Dr. Laws, so, without further dallying on the way, I will take you hurriedly across the lake to its south-west shore, to visit one of the leading Arabs of Nyassa, Sultan Jumbe of Marimba, who resides at the large town of Kota-Kota. This man, at the time of my arrival, was considered as the *doyen* of the Nyassa Arabs; he was, moreover, the acknowledged representative or agent of the Sultan of Zanzibar on this lake. To him I bore letters of introduction from the Sultan of Zanzibar, and from him I hoped to obtain effectual assistance in bringing the Arab war to an end, a war in which Jumbe had up to that time observed a watchful neutrality. This man (who was originally a native of Pangani, on the coast, and who is of mixed Arab and negro blood), is the third or fourth in the succession of Swahili merchant princes who, as quasi-viceeroys of the Sultan of Zanzibar, gradually made themselves masters of the country of Marimba, and, to a certain extent, broke through the continuous stretch of Zulu dominion on the plateaux beyond Nyassa, and extended their hold on the country as far west as the river Loangwa. Jumbe's town, Kota-Kota, is the chief starting-place of the Arab caravans which proceed to the Bisa country and to Garenganze, in the middle of South-Central Africa. Jumbe, possessing two or three *daus*, is able to ferry these ivory caravans across Lake Nyassa, and consequently he has to be conciliated and consulted by the Arab traders and settlers on the lake. His great sources of wealth, however, lie in the quantities of ivory brought in by his hunters, and the magnificent crops of rice which his country produces—rice which is famed far and wide in Nyassaland, and of which he sells quantities to the passing caravans. Jumbe's subjects are mainly Wa-tshewa people, a branch of the A-nyanja. To a certain extent they are his serfs; but they appear to enjoy a great deal of independence, and they are not by any means ruled tyrannically.

The town of Kota-Kota—or Ngota-Ngota, as it is usually called—is a huge straggling settlement extending over about three square miles along the north bank of a lake-like inlet of Nyassa, which forms a decidedly good harbour protected from all winds. In spite of Jumbe's wealth and enterprise, however, you may see by my drawings that the

architecture of the dwellings in his town is not of a very high order; in fact, they hardly differ from the negro habitations in the surrounding country. The residences of Jumbe himself and one or two of his leading men are a little more elaborate, but perhaps more uncomfortable to live in, than the average negro hut. They are built with thick clay walls, and their interior apartments are scarcely lighted at all by windows, so that they really constitute a series of dark, cold, damp dungeons, feebly lit up night and day by one or two hanging oil-lamps. The darkness and damp unfortunately favour the existence of swarms of filthy insects—enormous cockroaches, repulsive crickets, large and very venomous bugs, fleas, lice, centipedes, and scorpions; you can therefore imagine that one's life as Jumbe's guest, inhabiting one of these dwellings, is not very agreeable.

The result of my negotiations with Jumbe was altogether satisfactory. It was agreed, to save time and further bloodshed, that I should hurry on to Karonga, the seat of the war, at the north end of Nyassa, with one of Jumbe's councillors and letters from Jumbe to the belligerent Arabs, and that Jumbe should equip a force of four hundred soldiers and follow me as quickly as possible, so that in case my proposals for peace were not accepted, Jumbe's reinforcements might possibly enable us to capture the Arab strongholds, and so end the war. I was again rapidly conveyed by the swift steamer *Charles Janson* from Kota-Kota to Karonga, the African Lakes Company's chief station at the north end of Nyassa, which, being a somewhat important place, as the past and present headquarters of British trade in Nyassaland, I will venture to describe somewhat in detail.

On the shore-line a furious white surf seethes and breaks, and forms itself into quite formidable little rollers, through which you have to pass on your way from the steamer to the beach. Karonga has nothing approaching to a port; it is simply an open roadstead, and is exposed to the full force of the storms which are continually churning up the troubled waters of Nyassa. The only redeeming feature of this place from a maritime point of view is the fact that the anchorage is good holding ground; the bottom of the lake is here a stiff clay, and, in spite of the furious south-eastern gales, the boats and steamers ride safely at anchor. On landing at Karonga you pass under a gateway, ornamented with the skulls and horns of buffaloes, and then enter a large oblong inclosure, surrounded on three sides by a deep moat and thick earthworks, pierced here and there with loop-holes for guns. Karonga, in fact, is a large fort, and, in its present condition, dates from the commencement of the war between the Lakes Company and the Nyassa Arabs—say, three years ago. Inside these clay walls are the houses and stores of the Lakes Company. They are mainly built of clay, plastered on to a framework of withes, with thatched roofs and wide verandahs. Each house is, of course, one-storied, and is divided into one, two, or three rooms, with reed partitions in between.

There is not much attempt at comfort. A few rudely made tables, chairs, stools, and benches constitute the chief furniture. In the common dining-room—a house of reeds—the dining-table, at the time of my visit, consisted of a wickerwork structure on trestles, with a long slab of clay plastered on to the top, and during the meals portions of this would break away; in fact, instead of absently crumbling bread during my dinner, as I should do in a reflective mood at home, I used, in the same absent-minded way at Karonga, to pick off portions of the dining-table whenever the conversation languished.

During the long struggle with the Arabs the little garrison at Karonga had wisely accumulated an enormous stock of native provisions—such as Indian corn, millet, manioc, yams, sweet potatoes, and so on—in order to prevent any possibility of being starved out by the Arabs during the protracted absences of their steamer. This provision had enabled them to conduct the war with vigour, as they could feed not only their own followers, but the many native refugees who had been driven from their homes by Arab raiders. But unfortunately this accumulation of food had also attracted to Karonga an enormous number of rats, who feasted on this rich store of corn, and multiplied astonishingly in numbers. These swarms of rats in their turn attracted a large number of snakes. There were also in addition, and no doubt from the same causes, great quantities of offensive-looking cockroaches, centipedes, and biting ants; so that altogether Karonga, at the time of my visits, was not an agreeable place to reside in.

To these discomforts, however, the employés of the African Lakes Company cheerfully submitted. Since peace has been made with the Arabs they have set themselves to work to bring about a more comfortable state of affairs. One great advantage there was in the arrangements at Karonga, namely, the dairy-farming which those enterprising Scotchmen had developed. They kept a very large number of milch cows, and there were such quantities of milk supplied daily to the station, that I might say without exaggeration you could have had a milk bath had you wished it.

Outside this fairly spacious fort is a very large rambling native town, only some two years old, and built for the purpose of housing two or three hundred native porters and soldiers of the Lakes Company. Within this subsidiary village the cattle and donkeys belonging to the Company are kept in large stables. At the back of Karonga—European and native—a beautiful park-land stretches away to the base of the distant mountains, yellow with corn crops, green with banana plantations, and dotted here and there with magnificent shady trees. On the other hand, looking across the lake from Karonga, you see the lofty Livingstone Mountains, rising up a jagged wall of 8000 feet above the purple-blue waters of Nyassa, their ravines a dull green with forest, and their scarped and sculptured sides painted in red and violet, stone-grey,

ochre-yellow, and grey-blue on the misty summits, with occasional white flecks of waterfalls, and bluish-white puffs of smoke from the smouldering bush-fires.

For a period of two years prior to my arrival at Karonga in the autumn of 1889, the African Lakes Company had been at war with a determined band of Swahili Arabs who had settled in the fertile Konde plain in the neighbourhood of Karonga. The quarrel began in an attempt on the part of these Arabs to conquer the country, and the natural opposition on the part of the Lakes Company to this scheme. In the commencement of the conflict Consuls Hawes and O'Neill attempted to bring about a peaceful settlement, but failed, owing to the refusal of the Arabs to accept reasonable terms. Then Captain Lugard and other volunteers endeavoured to organise the Lakes Company's forces and drive the Arabs from the country. They would probably have succeeded in effecting this object but for the opposition on the part of the Portuguese authorities on the coast to the renewal of their supplies of arms and ammunition.

At the request of Sir Charles Euan-Smith, the Sultan of Zanzibar had despatched an envoy to Karonga to offer his mediation with the Arabs, but the envoy on his arrival at Karonga had been won over to the Arab side by threats or bribery, and had disappeared. At the time of my arrival matters were in this condition. Captain Lugard, Messrs. John and Frederick Moir, and those others who might be called the extraordinary defenders of Karonga, had been compelled to leave the place, owing to the serious wounds they had received in the struggle, and the sickness which had supervened, and Karonga was left in the hands of its original occupants, Mr. Monteith-Fotheringham (the Company's agent) and his companions, Mr. Kydd, Mr. Burton, and Dr. Cross, a medical missionary. Mr. Nicoll, another of the original defenders, was travelling with me as my assistant. A kind of discouragement had come over the Lakes Company; it was throttled in its action by the Portuguese authorities of the Mozambique province, having declined to allow the passage of any more warlike stores whatever for the Company's use. At the same time, some of the Company's advisers at home, who should have known better, were sending out the most foolish exhortations to its officials to undertake a general war with the Arabs in Nyassaland, and to drive them from the lake, and this at a time when the Company could not master one little cluster of Arab settlements, nor capture one Arab stockade.

Nevertheless, in spite of cold discouragement from some, and the unwise, ill-considered incitements of others who were living comfortably at home, and had not the least conception of what a ferocious war with the Arabs was like, the little garrison at Karonga pursued a very wise middle course when left to its own resources after the departure of the volunteers. They completely destroyed all the Arab crops and sources

of food supply, and so unceasingly harassed them with ambushes and sharpshooters, that the Arabs were really confined in their strongholds, and were being brought very low by gradual starvation. At the same time it was hard to say which party would be the first to give in. The British were very near getting to their last cartridge, and the Arabs were eating rats, leather, and roots, besides being scourged by a terrible outbreak of small-pox.

Just about this critical period I arrived at Karonga and immediately commenced negotiations. At first I was somewhat hampered by the difficulty of getting at the Arabs to see them and confer with them personally, for they, fearing treachery on our part, would not come to see me at Karonga, and the garrison at Karonga, equally suspicious of the Arabs' intentions, disliked the idea of my placing myself in their hands.

To march to the Arab camp with a strong escort might only bring on war again, while the same risk was attached to allowing the Arabs to come with their armed forces up to the walls of Karonga. However, after a delay of two or three days in vain parleying, I lost patience, and early one morning, accompanied by my assistant, Mr. Nicoll, and a few porters, I walked half-way to the Arab camp, having despatched Jumbé's headman in advance to invite the Arabs to a meeting. Ascertaining by their spies that I really was not at the head of an army, they donned their best dresses and came out to meet me unarmed. Directly this occurred I felt that the chief difficulty was over now that I had got in touch with them. We then and there settled the main principles of a treaty of peace, and the next day this treaty was drawn up in Swahili and English, and signed at this same half-way spot in the forest with much pomp and ceremony. After this we visited each other's towns, exchanged presents, and ever since, to the best of my knowledge, there has been no breach of the peace.

I was now free to start for Tanganyika, where there were British interests to be inquired into, and, if necessary, to be secured. We were also somewhat anxious as to the fate of the London Missionary Society's agents on the lake, who, owing to the Arab war on Nyassa and the insurrection against the Germans on the Zanzibar coast, had been cut off for some time from communication with the outer world.

I first of all visited the interesting and beautiful country surrounding the north end of Lake Nyassa. Here there are no fewer than nine perennial rivers, some of them of considerable volume, which descend from the lofty mountain ranges of Buntali, Wukukwe, and Ukinga, and enter the lake between Karonga and Parumbira Bay, the moisture which percolates from them through the soil giving the Konde plain an appearance of perpetual spring. The land at the north end of the lake is a veritable African Arcadia. You may walk for miles and miles through banana plantations; then you may emerge on wide-stretching

fields of maize and millet and cassava. All the oozy water-meadows are planted with rice: but, above all, the great wealth of the country is in cattle, which, elsewhere by no means common in Nyassa-land, thrive remarkably in the Konde district, and consequently milk and beef are cheap and abundant. The inhabitants of this happy land are a contented, pleasant-dispositioned folk, who knew no trouble until the Arabs sought to subdue them a few years ago.

The Wa-ñkonde carry out their Arcadian simplicity of life and manners into the matter of clothing, which it may be generally said they absolutely lack, for except a coil of brass or copper wire which the men wear about their middle, and a tiny little patch of bead-worked leather, which would be insufficiently large as a kettle-holder, and which the women don as their only scrap of clothing, with these trifling exceptions the Wa-ñkonde go absolutely naked—not, of course, knowing they are naked (and consequently unashamed), until they come more in contact with Europeans, who, as usual, crudely and vulgarly awake them to a sense of indecency, so that at the present time, when approaching Europeans, the Wa-ñkonde strip off a bit of banana leaf and twist it into their waist-belts as a kind of apron. But away from European influence, in the heart of their banana groves, or in their tree-shaded, clean-swept towns, they loll about in graceful attitudes, or stroll in their fields with the easy gait of their untrammelled limbs, and being a very well-proportioned people, look like so many bronze statues, which it would be prudish and *banal* to deck with a fig-leaf. Their skin, I might mention, is well polished daily by being rubbed with cream, the abundance of milk from their herds being so great as to permit of such a luxurious unguent.

From this desirable land of Konde, with its agreeable people and prolific cattle, its fertile plains and never-failing streams, we pass up a steep ascent of the most picturesque mountains (camping on the way at a remarkable spring of hot water, surrounded by oil-palms and very West-African looking vegetation), to the still more beautiful country of Buntali, which perhaps, all things considered, is the loveliest part of this favoured district. With its red soil, its rounded hills covered with short green turf, its many rills and rivulets, its cool misty climate and rank vegetation, Buntali is an African Devonshire perched up at an average height of 5000 feet above the trough of Lake Nyassa, and certainly fitted by its natural advantages to be a healthy home for European settlers, the more so as its native population is very scanty. From Buntali we descended again into the Songwe valley, also a most delectable land, literally abounding in milk and honey; and following more or less closely the course of the river Songwe, as it offered apparently an easier access to the Tanganyika plateau than the Stevenson road lying further to the south, we arrived at a pretty little village nestling in luxuriant forest, and called Msañkwa.

Just before reaching this part we had come up with Dr. Cross, the well-known medical missionary, to whom I have already referred, and who, as an agent for the Free Church of Scotland Mission, has resided for some five years at the north end of Lake Nyassa. Dr. Cross had learnt from native boys in his service that Lake Rukwa was much nearer to Lake Nyassa than had hitherto been supposed, and when we arrived together at Msañkwa this information was confirmed by the people there, some of whom offered to guide us to the lake. As they stated that Lake Rukwa was only three days distant due north from their town, and that the road lay through that portion of Unyika which I wished to visit, I willingly started with Dr. Cross to discover the hitherto unknown eastern extremity of that lake.

The western end of Lake Rukwa was first seen by Thomson from the Fipa Mountains in 1881, and the actual shore of this end of the lake was reached later on by a German named Kaiser; but of the extent of this piece of water nothing was known.

At the close of one long day's journey from Msañkwa we reached the large stockaded town of an important chief named Zowa, in Northern Unyika. Procuring guides here, we travelled across the remaining portion of the beautiful Unyika tableland, and then abruptly entered a mountainous country of harsher character, covered with thin forest, but with a parched rocky soil. Gradually ascending to a height of over 6000 feet, we suddenly, from the crest of the Wungu Mountains, looked down on what I thought at first was a very broad sheet of water, surrounded on three sides by high ranges of mountains. But by degrees, with the aid of a field-glass, I discovered that what appeared to be a spacious lake in reality consisted of a narrow contorted strip of water on the one side, and between us and the water a wide extent of absolutely flat plain, so uniformly covered with blue-grey forest, that from those heights above it was hard to distinguish it by its colouring from the real lake. When I had taken a number of angles from our camp on the mountain crest, we began a most arduous descent from the heights into the plain below. As we descended—the "we" here standing for my assistant, Mr. Nicoll, Dr. Cross, and myself, and my party of 160 carriers—our impressions and forebodings became of a somewhat dismal character. Everything around us bore witness to the dearth of water. On the other side of the mountain range we had left a country in the full beauty of spring, intensely green with the gentle showers of the commencing rainy season, but here on the slope facing Rukwa, the farther we descended the more arid the country became. At the base of the mountains we crossed a three-mile stretch of level plateau, covered with the dismal grey growth of innumerable thorn-trees, so gnarled and contorted in shape, and provided with such cruelly ingenious hooks and barbs and stiletto-like thorns, that they might have been the enchanted forest round some wizard's lair.

This plateau came to a sudden and abrupt termination, and from its edge we made a precipitous descent along a blood-red path into a blood-red ravine, the sides of which were fantastically planted and festooned with clumps of purple-green aloes, and those weird candelabra euphorbias with grey spectral stems, the segmented stalks of which looked like the tails of innumerable scorpions. Down through the dark gloomy depths of this cleft of the earth we floundered, slipped, and fell into the gorge of a dry river, cut deeply in a winding channel between precipitous red walls, the sides of which were scoured and polished and striated as if by glacial action. There were scattered stagnant pools of water in the red, red rocks and sand, and water oozed from places in the river-bed when our porters dug below the surface. The trees clinging to the sides of the ravine were emerald green, with a metallic-tinted harsh verdure. Evidently this dried-up stream had once been an important river, and a powerful torrent, and nothing is more remarkable in the vicinity of Rukwa than to observe the traces of a once abundant rain supply, which, from some unexplained cause, has—so the natives say—suddenly ceased during the last two or three years, as though the country had been literally blasted by some terrible curse.

Crossing the dry bed of this river we entered on another level stretch of country gently sloping northwards, its surface uniformly clad with a forest of grey thorn trees, but with the ground at their bases bespangled in a strange contrast with gorgeous flowers, which were almost unaccompanied by leaves, just the vividly-coloured petals rising from the hard grey soil.

These consisted chiefly of purple, yellow, and white anemones, arborescent lilies, with white star-like flowers springing from a grey branching stem, and great heads of pink crinum resembling the "kafir lily" of South Africa.

We passed an occasional dry water course, choked with grey-green life-in-death vegetation, and then at length reached a broader dried-up stream-valley, with shadier trees and a stockaded village, the first we had met with in the land. Here we encountered a very suspicious reception. The chief of the village, strange to say, was a young Swahili, originally from Zanzibar, who called himself a son—but was certainly no relative—of the Sultan of Wuñgu, or the "Mwinyi-Wuñgu," as he was called. It filled me with no little surprise to find that in this shut-in, out-of-the-way, valley of Rukwa, never before visited by a European, there was actually a man residing, who not only spoke correctly and fluently the Swahili of Zanzibar, but could cite by name persons of note who had resided there, and talk about Sir John Kirk and General Mathews, and, more than this, who could actually speak a few words of English. I naturally hoped to find in him a warm friend and helper, but I cannot say that he appeared particularly pleased at our arrival, or actuated by any other desire but to wring as many presents from us as he could, and persuade us to leave the country.

We now began to be distressed for want of water. At this young Swahiliman's village a very little water could be obtained from a deep well dug in the dry stream-valley. From this a cool, sweet, but muddy water was with difficulty obtained, and I had to pay very dearly for just enough to moisten the throats of my 160 thirsty followers. It became a matter of pressing necessity that we should either move on or move back to a more abundant water supply, but we were kept waiting all the morning at this village until the messengers, who had apprised the Sultan of our coming, returned from his residence with his permission to us to proceed farther into his country.

As soon as this was obtained, and we had got guides to take us to the next watering-place, I left the inhospitable village at one o'clock in the afternoon, and, in spite of the warnings of its inhabitants that we should certainly die of sunstroke, we struck northward towards the lake. As soon as we got out of the broad, shaded stream-valley where the village was situated, we entered the frying, blazing heat of the parched plain, and found ourselves in a white, light, bright hell of dazzling sunshine. The shadeless acacias with their cruel thorns, the dry yellow grass, and the yellow withered Borassus palms in no way mitigated the pitiless glare of the vertical sun, while a raging wind, hot as the breath of a furnace, swept over the plain and burnt the skin of our faces, so that we felt as if we wore tight masks. Every quarter-of-an-hour the wretched caravan had perforce to stop and pant under the thin film of shade which might descend from the skeleton branches of a dead tree. At length, after frequent halts and protestations from the sun-stricken men that they could go no farther, we saw ahead of us an emerald-green line in the grey wilderness, which marked the presence of water. This turned out to be a welling, brackish pool thronged with bulrushes and reeds, a kind of circular spring of overflowing water apparently connected with the lake by a long lane of rush-choked marsh, very distinct from the arid plains of baked mud. We camped here, where the scenery was a little less ghastly in its dead ugliness. The acacias exhibited a little green foliage among their thorns, and they were frequented by thousands of cooing doves, while the scanty bushes on the ground served as cover for many francolin and guinea-fowl. Game, in the shape of antelopes and buffaloes, was evidently abundant, and no doubt was attracted to the vicinity of this brackish pool by the flakes of salt which remained on the soil where the water had evaporated; and the game in its turn was followed by hyenas, lions, and vultures. The hyenas laughed and the lions roared outside our camp fires, and the next day I noticed many scattered fragments of bones and skulls in the vicinity, which were the relics of previous feasts on the part of these carnivora.

I was anxious to proceed direct to the lake from here, as we were only about three or four miles distant, but the Wuñgu people would not

allow us to do so until we had first seen their Sultan, so we travelled in a north-easterly direction, always through this scorching, glaring wilderness, till we reached the bank of the Soŋwe river. Here I camped so that the men might be close to fresh water, but it appeared to us that even the water of the Soŋwe was brackish, though it was a running river. It seemed to have no effect in quenching one's thirst, and contained some irritating property which occasioned diarrhoea, and even dysentery. Leaving my men at the Soŋwe, I went with Mr. Nicoll and Dr. Cross to visit Mwinyi-Wuŋgu, who lived about a mile from its banks in a stockaded town. I can hardly describe the heat of the atmosphere in walking thither; it was like passing through fire. When we got into the town, we eagerly crept under the shade of the overhanging eaves of the houses, which extended so near the ground, for the sake of coolness, that one had to get down on all fours to get under them.

Mwinyi-Wuŋgu is a young chief, with a weak, cruel face. The lobes of his ears, like those of the Masai, are bored through with a hole which has gradually extended them into two large loops of skin. He was becomingly draped in a handsome cloth, and wore ivory bracelets and a great number of brass rings on his fingers. We found him surrounded by a court of servile, cringing followers, who were more or less dressed in the Swahili fashion. He greeted us with a silly, simpering smile, but scarcely replied to our salutations, and immediately resumed playing a game of "bao" (a sort of native backgammon), in which he had been engaged prior to our arrival. Ominously enough, he was playing with bullets for counters. I tendered him a very handsome present, as presents are locally appraised, but he scarcely deigned to acknowledge the offering, and after a rather stupid interval of silence, we again saluted him and withdrew to our camp. He gave me no return present, but messengers shortly afterwards came from him, stating that he would allow us to proceed the next day to the lake shore, and furnish us with guides. However, after consulting with Mr. Nicoll, I made up my mind that I would stay no longer in this country, but hurry back to the Unyika plateau as soon as possible.

The frightful heat of the lake valley and the brackish water were beginning to make all my porters ill; the country also was a land of famine. There were no crops growing there, and the natives lived on the meat of buffaloes, crocodiles, and hippopotamuses, which they killed in the lake or on the lake shores, for they are most expert marksmen (they varied this meat diet with Indian corn and beans, which they obtained from natives of the surrounding countries in exchange for dry strips of cured meat), but they would not, or could not, provide the least atom of food for the use of the caravan. Our donkeys and goats were dying for want of verdure, and, moreover, the natives were so doubtful in their attitude, so well armed with good guns, and enjoyed

such a bad reputation among the surrounding tribes as bold robbers, that it seemed to me to remain longer in the country would only tempt them to an attack, which every day our men were less capable of resisting.

In spite of my wish, therefore, to acquire more geographical information about this remarkable salt lake, I thought it my duty towards the expedition and the real ends I had in view to hurry out of Mwinyi-Wuñgu's country without any further delay. Dr. Cross, however, not having the same cares and responsibilities, decided to stay there a few days longer with his six porters, to visit the lake shore, and then return to Nyassa. He did succeed in getting to the edge of the lake, and he found its waters to be of a brown colour, ammoniacal, and very salt. He met with, however, such a disagreeable rudeness from the natives that he was obliged to hurry away from the country before they could fully decide what to do with him; but his sufferings from heat and thirst were so great that he nearly died on the road.

Having bade good-bye to Mwinyi-Wuñgu, and being by him refused permission to leave the country, I did leave, nevertheless, at three in the morning, as soon as there was sufficient moonlight to enable us to grope our way through the thorn-forest. This was a weird march through this silent, stricken land. We seemed like a party of ghosts moving through a dead world, for, in order to elude any pursuit of Mwinyi-Wuñgu's warriors, I had ordered the caravan to maintain absolute silence. Occasionally, however, the spell was rudely broken by a loud bray from one of our donkeys, but I trusted that this would not attract the attention of the listening natives, as it might be mistaken for the cry of some wild beast. We had no path, but with the aid of my compass I struck a direct line through the thin forest for the river gorge where we had first entered this ill-omened land, and we arrived there without any untoward incident just as the sun was beginning to be oppressively hot. Scarcely stopping to slake their thirst with the red water that lay in this grim ravine, my men hurried up the escarpment and clampered, panting but resolute, up the steep mountains, and we scarcely paused for rest and food until we were once more back on the beautiful green plateau of Unyika.

The general characteristics of the high tableland which lies between Tanganyika and Nyassa, are so uniform in the various countries of Wurambia, Wuwiwa, Wunyiha, Wunyamwañga, and Mambwe, that instead of describing these countries in detail, I will sketch their principal features in common.

The edge of the great plateau, where the river Tshambezi—the farthest eastern source of the Congo—takes its rise, is marked by a curiously uniform wall of mountain range, the higher peaks of which probably reached to altitudes of 6000 to 7000 feet. Westward of this are great fertile sloping prairies, through which innumerable streamlets flow to the south-west, to join eventually the river Tshambezi. On the

east of this long mountain wall is a stretch of level valley, singularly flat in surface compared to the mountainous country on either side, through which two rivers, their sources divided by a low watershed, flow in opposite directions, the Soṅwe towards Lake Nyassa, and the Ńkana to the river Saisi and the salt Lake Rukwa. Again, on the east of this valley lie more mountains and the table-land of Unyika, or Wunyihā, as it is locally called. The Soṅwe-Ńkana valley possesses soil of extraordinary fertility, which is well irrigated by these perennial streams.

The table-lands on either side, the average elevation of which may be taken at 5000 feet, are of a park-like character, with stretches of green prairie, clumps of fine trees, and occasional patches of woodland. Being very thinly inhabited, well watered, and perpetually green with sweet herbage, they are ranged over by large herds of game. When the country is civilised they will undoubtedly prove well adapted for the rearing of cattle, horses, and asses. The indigenous population of these lands would all be cattle-breeders if they could, because they fully know how well oxen will thrive in these lands; but again, as in so many other parts of Africa, it is the black man who is the black man's worst enemy. There are three negro tribes which share the opprobrium of being the devastators of this region, which is naturally fitted to become one of the richest and most prosperous parts of Africa. These are the ruthlessly cruel Wa-wemba, a populous nation, living in the lands between the Tshambezi and Lake Bangweolo; the Wa-tuta, who are another section of wandering Zulus, like the Aṅgoni of Nyassaland, and who still exist in the vicinity of south-east Tanganyika; and the A-wuṅgu warriors from the south end of Lake Rukwa, with their Wa-nyamwezi allies. Of these the wickedest and most dreaded are the Wa-wemba, who have at different times very nearly brought about a complete depopulation of the Tshambezi plateau. The Arab raids sink into insignificance before the ferocious ravages of the Wa-wemba, who are perpetually destroying the towns and plantations of their unfortunate neighbours, carrying off the women and children as slaves, and killing all the able-bodied men. I have followed in the Wa-wemba's tracks, and have seen all human life and cultivation stamped out for a distance of 50 miles along the road, where only a short time before the most flourishing villages existed, surrounded by thriving crops, and enriched with abundant supplies of stored grain.

The only hopeful feature in our relation with the Wa-wemba is that, up to the present time, they have an exaggerated dread of and respect for white men, and carry this so far that they never interfere with the letter-carriers and porters ~~whom~~ the African Lakes Company and missionaries may send backwards and forwards on the plateau, provided they can show a letter in a cleft stick, or wear a European jacket or trousers, or exhibit any other indubitable sign of their connection with

the white men. The natives also in the vicinity of the London Missionary Society's stations near Tanganyika find themselves safe from the attacks of the Wa-wemba.

Although want of time prevented me from making a journey to the residence of Ketimkuru, the Wa-wemba king, I had reason to believe, from a message transmitted to me from him through an Ulungu chief to the south of Tanganyika, that I should have been well received, and would have found it not very difficult to enter into a pact with him to cease raiding the native tribes under our protection.

When we had regained the town of Zowa in Unyika, on our return from Lake Rukwa, I found there was considerable difficulty about striking any path which should lead us in a direct line towards Tanganyika. Each village was at war with its neighbours, and the arrival of strangers was at first taken for the approach of enemies. Under these conditions we were unable to procure the services of reliable guides. The men whom we induced by big presents to show us the way either led us into the trackless bush and forthwith deserted, or left us face to face with yelling multitudes of warriors, all eager for attack and plunder. How we managed to pass through this country, which had never before been traversed by a white man, without having to fight our way, I can hardly understand. Again and again the natives would start up from an ambush in the forest and scare our porters into an abject state of terror, or at some camping-place they would surround us in more formal battle array. They were mystified by our presence in the land, and our object in passing through where no white man had hitherto found his way, and their cupidity was excited by the apparent wealth of my caravan. And yet, by dint of a little patience, and of the good-tempered negotiations of Kiongwe, and perhaps the facility with which Mr. Nicoll and myself had become able to talk the dialect understood by these people, we managed not only to get through this tiresome bit of country without the least breach of the peace or any heavy payments, but we actually left friends behind us; and once we had shown these suspicious, quarrelsome people that we were really decent, quiet, but resolute folk, and had neither come to harry nor enslave them, nor yet were of a temper to suffer ill-treatment meekly; we were furnished with extraordinary quantities of food, shown where water could be found, and supplied with information as to our route.

However, my anxieties were greatly relieved when we once more reached the banks of the Nkana river and encamped at the town of Msihi, which is the capital of Tshikano-molira, one of the pleasantest, frankest, most hospitable African chiefs I have ever dealt with. He is the sovereign of all Wunyamwaŋga, and is now under British protection, and flies a very large red ensign from the apex of his peaked hut. All along this Nkana valley you have a sublime spectacle before you in the great edge of the Tshambezi plateau rising above the flat valley, a sheer

precipitous mountain wall of 5000 to 7000 feet in height, which, as might be imagined, is scaled with difficulty. Furnished with guides by Tshikano-molira, we scrambled up to the top of the plateau by a lofty pass 6000 feet in altitude, where the sheer descent of the mountain wall had been broken up or modified by the action of torrents. A little distance further to the north the Saisi river broke through the edge of the plateau in a deep gorge and joined the Nkana, the united streams flowing into Lake Rukwa.

From the brink of this tableland we had a superb view over the geography of the surrounding countries. Then, turning our steps again to the north-west, we journeyed tranquilly for days along the windings of the Saisi, and so through the beautiful Mambwe country to the base of those mountains which screen the southern end of Lake Tanganyika. From the Mambwe country most of my porters had been derived, and this land, whose inhabitants are naturally of a warlike turn, has furnished the African Lakes Company with the greater part of their native allies in the war with the Arabs.

The A-mambwe are singularly well-disposed towards the white man, or rather, towards that variety of him that they at present know best, the Briton. Their affection for our nationality was observed and commented on by such an impartial observer as the French traveller Captain Trivier, who had traversed their country with an escort furnished him by the Lakes Company, a little while before I passed that way myself. When I met Captain Trivier at Karonga, before starting for Tanganyika, he had prepared me for the marked way in which the people of Mambwe and Uluṅgu had been "Britannicised," more by the presence among them of the London Missionary Society's agents than by the Lakes Company. What struck Captain Trivier most forcibly was, that wherever he went through those lands, the natives invariably greeted him with "Goody morning," a salutation originally learnt from the missionaries, but which has now come into common use among many of the people who have not yet seen a white man. Still, however well they behaved towards us, these A-mambwe are exceedingly cruel to one another, and their fair country, blessed with such a perfect climate, and such a fertile soil, is ravaged and laid waste by civil war. They have especially a passion for head-hunting, and think it adds greatly to the beauty and importance of their stockaded towns, if their approaches and outskirts are decorated by human heads stuck on posts.

If a great man dies, or any special cause of rejoicing, or need for the propitiation of evil spirits occurs, they endeavour to obtain the heads of victims from neighbouring towns, or at the worst cut off the heads of some of their less valuable slaves, and stick them on the summit of poles and posts. Sometimes, with a grim humour, an imitation bust or body is made of straw and attached to the bare pole, so that the upturned head seems like the ghastly blossom of a strange, weird plant. One of the

leading chiefs of the Mambwe country, named Kera, had heard of my travelling and my treaty-making in the land, and determined to give me a reception which should at once impress me with his magnificence and power. So he killed twelve people, and stuck their heads on posts planted in regular order, in such a way that they formed a kind of avenue leading up to the chief entrance to his town.

Not being able to keep tryst with him very punctually, owing to circumstances over which I had no control, I arrived at Kera's a fortnight later than was expected, and, consequently, when I marched up this grim avenue the heads which he intended to be so fresh were considerably decayed, and had been much spoiled by the attacks of vultures. Nevertheless, at the end of his avenue Kera was seated, beaming with complacency, feeling he had done the thing well. By his side was an enormous basket-work receptacle about two feet high, filled with the most delicious fresh milk, and there were also heaped-up stores of manioc, sweet potatoes, ground-nuts, and Indian corn. We found Kera one of the most hospitable of the many friendly chiefs we met with in this country, and quite willing to listen to reason when kindly spoken to. He was greatly disappointed on learning that we had a poor opinion of head-hunting, and that our own monarch never posted freshly-cut heads at the gates of her palace when she received a foreign envoy.

The ordinary route to Tanganyika which I had now picked up in the Mambwe country, leads you up through the most beautiful gorge of Fwambo to and through the mountain ranges which look down on the south end of Tanganyika. The gorge of Fwambo is an exquisite bit of scenery. A beautiful stream dashes down in many cataracts and rapids through a deep but not very narrow gorge between precipitous mountain sides, and this gorge is filled with magnificent forest of a truly West-African character—an ideal tropical forest with its immense umbrageous trees, its graceful oil-palms, its parasitic orchids, and trailing, swinging creepers. At the commencement of the upper part of the gorge the London Missionary Society have a large station, where we were welcomed by Mr. and Mrs. Jones, Dr. Mather, and Mr. Wright. It seemed to me, after my many days in the wilderness, delightfully incongruous to come suddenly on this oasis of civilisation. As usual I was received with all possible kindness, and continued my journey to Tanganyika encouraged by what I had seen at Fwambo, and feeling that it was quite worth the while of our Government and its agents to take some little trouble about such people as these missionaries, who are really and truly, quietly and unostentatiously, laying the foundations of civilisation in the midst of what at first appears to be hopeless savagery. What Captain and Mrs. Hore, Mr. and Mrs. Jones, and Mr. and Mrs. Swann have done and are doing on the Tanganyika plateau, was accomplished with as little certainty of a bright future by the Living-

stones and Moffats in Betschuana-land. Now, where Livingstone and Moffat worked, European-built towns have arisen, and telegraphs and parcels-post are in operation, and a line of railway is shortly to be opened. And so, in the same way, and I believe in less time, will the work of these brave pioneers on Tanganyika develop into a settled civilisation.

Niamkōlo is the name of the London Missionary Society's chief station on the south-east end of Lake Tanganyika. It is not a very alluring site; the ground is as cruelly rocky and cutting to the feet as the soil of Likoma, and the surrounding trees have a stunted, skimpy look, no doubt from the poor ground on which they grow. But the mission selected this spot in the belief that it offered the best harbour on the south end of Tanganyika. The harbour or roadstead of Niamkōlo is sheltered by two islands and an islet, which, to a certain extent, break the force of the billows of the outer lake, but I did not think it a particularly good port, inasmuch as the swell is often dangerously heavy on the beach. Indeed, just before my arrival the mission steamer (the *Good News*) had met with a serious accident. She was lifted up from her anchorage by a sudden swell coming in from the outside, and landed on the rocks in shallow water. They ultimately got her off when the lake rose during the rainy season, but in the meantime had lost the use of her for several months. Consequently, not having the steamer at my disposal, I had to make my journeys about the Lake in a sailing-boat belonging to the mission, named the *Morning Star*. Fortunately, Mr. Alfred Swann, who might be called the London Missionary Society's Admiral on Lake Tanganyika, inasmuch as he has charge of all their fleet of boats and steamers, was able to accompany me on my journey about the south end of the lake, and we had such fortunate winds, and Mr. Swann sailed the *Morning Star* with such skill, that we scarcely had cause to regret the steamer.

I first visited a chief called Tafuna, who lives near the south-east corner of Tanganyika, at the mouth of the river Kawa. He rules over all Eastern Ulungu (the country all round the south end of Tanganyika is called Ulungu, and its inhabitants, the A-lungu, are closely related in descent and language to the A-mambwe). Tafuna very quickly made friends with me, and I then sailed south-westwards across the lake to the river Lofu, which I ascended for about fifteen miles to the prosperous district of Liendwe. Here I took up my abode with Kabunda, the most influential Arab at the south end of Tanganyika, who received Mr. Swann and myself with truly Arab hospitality. Kabunda is more a Balutshi than an Arab, but hails from Maskat. He used to be of rather evil renown as a slave-trader, and, from what I heard of him from the African Lakes Company's people at the north end of Lake Nyassa, I was led to believe he was a ruthless ravager of the regions round the south end of Tanganyika; but the London Society's agents at Niamkōlo, who were his neighbours, and were in a better position to know what he had done,

certainly gave him a much better character, and seemed to regard him as a somewhat superior man to the average trading Arab. He had quarrelled and fought a good many times with native chiefs in the past, but whatever wrongs had been committed were now repaired and forgotten, and Kabunda was looked up to by the Ulungu chiefs as their most potent protector against the raids of the Wa-wemba. As he has married a daughter of nearly every important chief of Ulungu, his influence in the country is very strong, and the native chiefs would do nothing without his advice. He threw the whole weight of his authority into the furtherance of my projects, and thus enabled me to come to friendly terms with the powerful Itawa Arabs, and the native chief of Itawa, Muriro; as also with Tshungu, the supreme chief of Ulungu, and Tshitimbwa, his subordinate.

Liendwe, in the valley of Lofu river, is a singularly fertile district and the great source of food supply for southern Tanganyika.

After my visit to Itawa, where the venerable chief Muriro gave me a most flattering reception, I returned to Niamkolo, and from there proceeded to inspect the beautiful valley of the Kituta river, and that south-eastern gulf of Tanganyika known as Rhodes Bay. This, I decided, offered the best site for a station, and on the whole the safest harbour on Tanganyika; and here, accordingly, the African Lakes Company has decided to fix its headquarters on the lake, and is now constructing a new station there, which is to be called "Abercorn."

The water of Tanganyika, though not so absolutely good as that of Nyassa, is, nevertheless, wholesome and drinkable. It is *not* brackish, but it possesses a slight, indefinable taste, which at first sets one rather against it; nevertheless, persons who have been any length of time on the lake get used to the water and like it. The south end of the lake, from the accounts and appearances of the missionaries residing there, would seem to enjoy a healthy climate.

In all, the London Missionary Society has eight agents in the vicinity of Tanganyika, four of whom are married and have their wives with them, so that there are twelve Europeans altogether. Of these, nine are settled on or near the south end of the lake, and three are unfortunately isolated at Tabora, in Unyanyembe to the east of Tanganyika. As soon as the present troubles with the Arabs subside, it is intended, I believe, to withdraw these three missionaries from Unyanyembe to the south end of Tanganyika.

Having satisfactorily concluded my business on Lake Tanganyika, and being able to congratulate myself on the speed with which it had been carried out through the great friendliness of the Arabs and natives, and the co-operation of the missionaries, I set my face towards Nyassa, and taking a more southern route across the Tshambei plateau, by which I was enabled to inspect the Stevenson road, I reached Karonga in ten days, this being the quickest journey from lake to lake on record.

After another visit to the countries round the northern end of Lake Nyassa, I embarked on board the African Lake Company's fine new steamer *Domira*, and revisited various places on the west coast of the Lake, finally arriving at Mponda's at the entrance to the Shire. Here I found Mponda ready and anxious to place his kingdom under British protection, he being fearful that he might meet with the same fate as the Makololo chiefs who had encountered the Portuguese. I told him he need fear nothing if he would only behave himself, and endeavour to live peaceably with his neighbours. At the time I was addressing him the poles of his stockade were decorated with many freshly severed heads, which were the trophies of one of his recent battles.

Without further incident I proceeded on my way down the Shire, reached Blantyre, and from there travelled on to Quilimane, via Vicente and the Kwakwa river. From Quilimane I proceeded in the mail steamer to Mozambique, which latter place I reached within six weeks from the time of leaving Tanganyika. While on the south end of Tanganyika I received letters forwarded by the African Lakes Company, which were exactly and only three months old from the date of leaving London; had I myself wished to repair without delay to England, I could have reached London in ten weeks from the time of leaving Tanganyika. These facts should show that, even with the present imperfections in the African Lakes Company's arrangements of steamers and land carriage, imperfections which are rapidly being remedied, the Zambezi-Shire-Nyassa route is unquestionably the quickest and easiest way into the heart of Africa.

After the paper,

The Right Hon. Sir JAMES FERGUSON, Bart., at the invitation of the President, rose and said:— I can assure you that until my old friend the President arose, I had no idea that any remarks were expected from me, and in the House of Commons the Under-Secretary for Foreign Affairs always has notice of question, but I am sure that no one can have failed to have recognised the most interesting character of the statement to which we have listened. It did not need the record of Mr. Johnston's recent journey to mark him as an intrepid traveller and a sympathetic friend of the African peoples. It would appear that wherever he goes he makes friends, and impresses on the natives the most favourable view of the British character. He has already received a recognition of some of his services, and a mark of the favour of his sovereign in the honour lately conferred upon him. I trust he has a long and useful career before him in the service of his country.

Now public attention has been a great deal directed of late to the region of which Mr. Johnston has given us some account, and you cannot fail to recognise how great are the possibilities of the region, in which Europeans can reside in perfect health, and which is so richly endowed by nature. It is no wonder that the attention of the great nations of Europe has been largely directed to this region with all its possibilities for trade and hopes of colonisation. It is happy, I think, that we have so nearly accomplished the division of our spheres of influence that we may hope to have them for colonisation and trade, without our rivalry leading to jealousy and bringing us into risks of war; but I trust we shall be rivals in bringing the blessings of Christianity and civilisation to those unhappy people, and not to spread among

them those seeds of mischief which have too often attended our early steps in colonisation and settlement.

Some reference should be made to the great Company which is now so actively spreading its influence in those regions, and from the character of those at the head of the Company, and the regulations under which they act, I am sure we may hope that their operations will be characterised by those motives and intentions which are best calculated to secure the people of that country against the dangers to which I have referred, and to do credit to the trade and government of which they are the pioneers. Now, ladies and gentlemen, I am sure others will have something to say on the interesting subject of the paper to which we have listened, but I cannot but express for myself the great pleasure with which I have listened to Mr. Johnston's interesting statement.

Archdeacon MAPLES: Mr. President, ladies, and gentlemen, I must say that in listening to my friend Mr. Johnston to-night, I could hardly realise that it is a year ago since I was shaking hands with him and saying good-bye at the station of Karonga, and when I shut my eyes I could almost say I was listening to his voice there. I remember when he came to us last year that I went down in company with others, I am afraid rather dowdily dressed, to meet him, and could not help looking round for the hansom cab from which it seemed he must have stepped. I may say, speaking for the missionaries on both these lakes (I don't know if any of them are here to-night), that the missionaries there appreciate to the full such a visit. I remember I was very much put about as to what kind of dinner or meal to put before him; but, as some time ago I came to the determination, when in doubt, to slay a muscovy duck, the first thing I did was to go into the backyard hurriedly and cause two or three ducks to be slain for his benefit; but when he sat down he himself provided a banquet, and treated us to a feast of reason and a flow of soul, and during the whole time of his visit there I am sure we missionaries were refreshed in listening to his conversation and the news he brought from the outer world. Missionaries, as you know, get to be a dull lot in Central Africa, where there are no large libraries and no daily newspapers, and our talk and views get narrow; but the visit of such a man as Mr. Johnston seems to put new life into us, and I hope, when he comes out again and visits us once more I may be there to welcome him.

I should like to make a few notes on his paper, and especially on one subject which he dealt with at its beginning. He spoke to us of Ali Kiongwe in very high and appreciative terms, and in several other papers he has publicly dealt with the Swahili and Arabs, in a similar way, and I think he is the first man who has publicly spoken of the Arabs and Swahili in a more temperate manner than we have been accustomed to, and I am glad to say that as a missionary I agree with him down to the ground, although I feel somewhat ashamed that missionaries have been slow to record the good qualities that are in these Arabs, who are found everywhere in Central Africa. I can remember that ten years ago I really owed my life to the intervention of a kindly Arab who stood my friend at a time of great difficulty, in which I was involved with a native chief in the interior; and I think it is the experience of most missionaries who have lived long in the country that there is a very great deal to be said for the Arabs, although I am as strong as most men against the slave trade and everything connected with it, and I am very thankful that Mr. Johnston has called attention to this fact, which is owing to his sympathetic feelings with the natives. It is the very fact that we missionaries know so well that Mr. Johnston has these sympathetic feelings with the natives that we are inclined to give him the heartiest welcome when he comes amongst us. Of course, in a paper like that he has read to us to-night a great number of subjects occur on which one would like to speak, but I feel I have no right to detain you any longer; but I hope on another

occasion to be able to turn to this interesting country, Nyassaland, in which there is a great deal that will be new to people, and which will have a great bearing on the future of England with regard to Africa.

Mr. GEORGE CAWSTON (Director of The British South Africa Company): I had no idea until I came within this building that I was to have the honour of addressing you to-night; that honour comes to me through being a director of the British South Africa Company—the greatest civiliser of the decade. I remember some eighteen months ago, the time to which Mr. Johnston has alluded, when the representatives of the African Lakes Company were beleaguered at Karongo. Many letters appeared in the *Times* advocating an expedition to be sent to relieve them. The matter was discussed freely with Mr. Johnston, and we offered to send an expedition for that purpose, but Mr. Johnston himself said, "Wait; let me go first, I think there is no doubt that with a little management, these Arabs can be made friends." Shortly after Mr. Johnston arrived there, I received a letter from him, in which he said, "The Arab who was besteging the African Lakes Company is now my greatest friend." Gentlemen, consider what would have been the result of the proposed expedition, composed of many Englishmen, who would surely have come into contact with the Portuguese. Many lives would have been lost, and much money would have been spent to secure what Mr. Johnston has secured for nothing. This is a geographical meeting, therefore one ought to confine oneself to geographical subjects. One subject is mentioned in the papers this morning, upon which I think every member of the Geographical Society can congratulate himself, that the Portuguese have at last declared the Zambezi a free river. This result has been due to the persistent declaration of Lord Salisbury that that alone should form the basis of any arrangement with Portugal. This is a great advance in the civilisation of Africa.

The Company of which I have the honour to be a director has sent out another expedition, of which, a year hence, I hope we shall receive more particulars in this room. Mr. Joseph Thomson, whose name has been so honourably connected with Africa, and who is known to many present, started at the beginning of this year for Blantyre, and was instructed to go due west from Blantyre, and to make treaties with all the chiefs between Blantyre and the Barotze country. In the *Times* of yesterday you will have seen a telegram from him, dated 6th August—i. e. three months ago; he was then in the neighbourhood of Lake Bangweolo, on his way westward, hoping to arrive at the Victoria Falls, and be back in Blantyre at the end of the year. We expect the greatest results from that mission. Mr. Thomson is traversing a country a part of which has not yet been explored by any civilised man, namely, that part between the Loangwa and the Kafu. This district has only been crossed by two men, who have expressed the opinion that it is a healthy country, suitable to Europeans; and I can state that, when the treaty has been negotiated with Portugal, my Company is prepared to spend the requisite money to take over the administration of the whole of this territory.

I have no right to speak at this meeting upon any subject south of the Zambezi, as the address has been confined to the north of that river; but there is one point upon which I should like to speak, that is with regard to the ruins of Zimbabwe, which have been mentioned several times in the papers in connection with the expedition which has been sent into Mashonaland. It is proposed that some thoroughly competent archæologist shall go out from this country to examine these ruins, and, on the part of my Company, we are prepared, in conjunction with this Society and the British Association, to subscribe the necessary expenses for that purpose. In the meantime we have taken the greatest precautions that no one shall touch the ruins until the arrival of the archæologist to which I have referred.

Mr. Johnston is going back to that country, and a year hence civilisation will have advanced, and I hope that then, we may be able to show you some definite

plan for relieving the population of Great Britain by promoting a scheme of emigration to healthy countries where European children can thrive.

Rev. HORACE WALLER: I can cordially agree with what has been already so well said to-night, and add my own profound admiration to that which prevails around me after hearing Mr. Johnston's paper and seeing these beautiful photographs and sketches—the photos, partly made I believe by Captain Hawes, and subsequently enlarged so beautifully by Mr. Johnston. It seems to me that Central Africa has been fortunate in having a sort of Ruskin in Mr. Johnston, an artist both with pen and brush. But to come down to business, from the great pleasure of enlarging on the merits of Mr. Johnston's paper. It is quite certain from what we have heard from Mr. Johnston to-night as well as from the representative of Her Majesty's Government, that the British are still to enlarge their interests in this country. Now, it is one thing to have Mr. Johnston come home to us here and give us all his impressions of the country, and the details of everything that is taking place there; but it is another thing to have to depend afterwards on very occasional letters. I may tell you that a great number of letters have been absolutely made away with on their passage down to the coast and to England. I admit all is fair in warfare, and if the Portuguese can get news of everything that is passing in the country, again I say it is fair, for in the past the Portuguese have been at war with us. But now I hope this state of things will stop, and then perhaps some of the missing letters may come to the front from their cleft sticks and the Portuguese tents. We must recollect that if this country is to be a success, we must have steamers to call at Quilimane and take people in and out, to say nothing of merchandise and mails. Now the present position is this: our means of communication are simply withering and shrinking, and from what I know of what is passing, it is totally impossible for the British India Company to continue the ruinous loss which they are at present making in keeping up the service on this coast. At the same time, foreigners are quite alive to the situation. France is subsidising her steam-boat service very highly indeed—far more than the British Government. Germany is doing the same, completely bidding and buying us out of the market; and we have a gigantic American scheme of subsidising hanging over us; meanwhile the British Government is apparently behindhand in the race, and this is not a state of things to be proud of. I do not know that our postal service with Central Africa has ever been in a more disgraceful state than at the present moment, and if our Government does not help it somewhat, we shall in the end be dependent on a French, Portuguese, or German service, and have to go hat in hand to ask if they have anything in their post-bags for us.

The PRESIDENT: We are indeed fortunate in being able to begin a new session with so extremely interesting and so admirably illustrated a paper as that to which we have listened. Mr. Johnston has frequently addressed the Society before, but never, I think, to greater purpose than he has done to-night. I am quite certain that I shall speak the sentiment of every one present when I offer him, in the name of the Geographical Society, our most cordial thanks for the entertainment and the instruction which he has afforded us.

Mr. JOHNSTON: I will not detain you, as you have been listening with such patience to my very long address. I thank you cordially for the vote of thanks you have awarded me. One little matter I must settle before I sit down. I may assure my friend, Mr. Waller, that the Portuguese were not responsible for the loss of the letters; it was discovered that many of the missing letters were not due to the too great interest of the Portuguese, but to those pugnacious hippos to which I have alluded. The letters are brought down in the canoes, a photo of which I give you, and until the hippos are exterminated I am afraid the letters will disappear.

A Journey from Lake Nyassa to the Great Loangwa and Upper Zambezi Rivers.

By ALFRED SHARPE.*

Map, p. 776.

ON March 15th, 1890, I started from Leopard Bay, Lake Nyassa, in latitude 13° 45', on a journey to the Loangwa and Zambezi rivers.

March is unfortunately the worst month in the whole year for travelling in this part of Africa; the rain at that time is incessant, the grass at its full height, and swamps and rivers full of water.

Immediately on leaving the lake shore, I entered a swamp which reaches to the foot of the mountains, some 18 miles back from the lake. I was in this swamp for two days, the water reaching up to our knees in most places, and it was not until the third day, on reaching the hills, that we once more got our feet on dry land. On March 18th I reached Chiwere's, having ascended 1550 feet from the level of the lake. The people here, calling themselves Angoni, are a mixture of Zulu and Achewa, but very little Zulu is now left. Chiwere is a powerful chief. His country, which is of considerable extent, lies at from 3000 to 4000 feet above sea level, is healthy, and has good soil and a pleasant climate. The eastern portion is well wooded throughout, but to the west of Chiwere's own kraal, the gullies only are timbered, the general character of the country being open rolling downs, covered with grass. Villages are numerous, and cattle and sheep are seen on all the western portion. Two missionaries of the Dutch Reformed Church, Messrs. Murray and Vlok, have lately settled near Chiwere's, and find him well disposed towards Europeans, and anxious for their settlement in his country.

After leaving Chiwere's I passed through open hilly country for two days. On the third day I descended some 600 feet to the vast plain which stretches west to Mpeseni's country, and in a northerly direction over 120 miles to Mombera's country. This plain lies at an elevation of some 3000 feet, is thickly wooded, and only very sparsely inhabited. Water is somewhat scarce, and not much game is met with. During the rains, however, elephants seem to be fairly plentiful. A few miserable stockaded or mud-walled villages of Achewa or Achipeta people, who live in constant fear of war from all quarters, are scattered through the bush at distances of 15 to 30 miles apart. At two villages which I passed, the elephants had been eating the young corn growing in the gardens, and in one case within a hundred yards of the mud wall surrounding the village.

I reached the Bua river at a distance of eight days' journey from Lake Nyassa (some 90 miles as the crow flies) and found it in full flood. It was here running from south to north in a broad shallow marshy valley, and we had to wade through a quarter of a mile of water, reaching in some places to our shoulders. Owing to the quantity of flood water,

* Communicated by Otley L. Perry, Esq., F.R.G.S., F.R.HIST.S.

it was difficult to distinguish the true banks of the river, but I fancy it is only a small stream in the dry season. There is, however, running water in the Bua all the year round, and elephants and game collect about its banks during the dry months.

After crossing the Bua, going west, there is a gradual and gentle rise until the foot of the mountain range is reached, which forms the eastern boundary of Mpeseni's inhabited country: the stretch between the Bua and the mountains being uninhabited.

Climbing over this range which rises some 800 feet above the plains, I then descended slightly to the Bua river once more, which is here running south, and in a small stream. I here crossed Livingstone's track. The country about the Upper Bua is only sparsely wooded, and, after we had crossed the river, was entirely open, and dotted over with villages of the Angoni. I reached Mpeseni's own kraal some 30 miles west of the Upper Bua. While at Mpeseni's, I was deserted by half my lake porters, and was compelled to leave many of my loads behind.

Mpeseni's is a splendid district, the general level of the country lying at from 3500 to 4500 feet above sea-level. It is undulating, with low hills, and here and there small rocky peaks. From here flow streams to Lake Nyassa, to the Loangwa, and to the Zambezi. It has rich soil which continues right up to the tops of the low hills; heavy crops are grown in the bottom lands, and large herds of cattle and flocks of sheep are seen in all directions. The hills, which are in all the inhabited parts of Mpeseni's country, are low and not steep, rising gradually from the valley bottoms, and covered with rich chocolate-coloured soil. Two short days south-east of Mpeseni's, at Missala, alluvial gold is found, of which I saw specimens. All this high-lying country is undoubtedly capable of colonisation by Europeans; the climate is charming, and appears to be healthy.

Mpeseni, and a few of his headmen, are pure Zulus from the south; there is, however, now a great mixture of blood, and most even of the headmen have Achewa or Asenga blood in them. They are superior in every way to the Achewa, are great orators, and intelligent, but very superstitious and suspicious. During the yearly war season they are constantly harrying the surrounding weaker tribes, and catching slaves. Mpeseni himself does a brisk trade in slaves, selling to the Arabs.

Leaving Mpeseni's on April 6th, I travelled for four days a little north of west through uninhabited country to the village of Msoro, the road descending more or less all the way. The only river crossed was the Litembwe, which, rising in the same hills as the Bua, flows north-west and north to the Lukusha. We crossed the Litembwe some 15 miles north-east of Mpeseni's kraal. It was 12 yards wide, with a fine stream of clear water, which flows all the year round.

A few miles before reaching Msoro, we descended a steep fall of 800 feet, into the valley of the Ripandi river, which flows past Msoro,

nearly north, to the Loangwa. Its width is twenty yards, with a sandy bed and low banks, and it is said to dry up entirely in the rainless months. The valley, which is 2000 feet above sea-level, is some three miles wide, has good alluvial soil, and, round about Msoro, is covered with large fields of grain. The inhabitants call themselves Akunda (*not* Achikunda), are subject to Mpeseni, and are a remnant of the original occupants of this part of the country. In appearance, language, and customs, they seem to be identical with the Achewa.

Leaving the Ripandi, and travelling rather south of west, two days through broken country brought us to the village of Chasaiva on the Sangazi river. This flows north-west to the Loangwa, and is a small stream some ten yards wide, with very little water in it. The valley itself has good alluvial soil, but the surrounding hills are poor, broken and stony, and covered with thorns. From Chasaiva I travelled south-west, almost parallel with the Loangwa river; but at a distance of some thirty miles from it. After reaching the village of Chirupe, and rounding a mass of rocky mountains to our right hand, we turned towards the Loangwa river, and, passing through Chisimbwe, reached the river at the point opposite the village of Muliro in S. lat. $13^{\circ} 45'$ on April 18th, the height by aneroid being 1450 feet. I found the river some 130 to 150 yards wide, a swift stream of muddy water; its banks are 15 feet high, soil sandy, and the river keeps a fairly straight course. The immediate valley of the Loangwa is here 8 or 10 miles wide. A high range of mountains runs parallel with the river, some 10 miles distant on the north-west side, and broken hills, four to six miles distant, on the south-east side. The range on the north-west is called by the natives "Mohinga," but this is only the word for a high "range" of mountains, and is applied indiscriminately throughout this part of East Africa.

From the time we reached Msoro, in the Ripandi valley, we had travelled through an entirely different country from that lying to the east. Just before reaching Msoro there is a steep descent of 800 feet from the highlands lying to the east, the country from Mpeseni's to the west always descending a little. From Msoro to Chisimbwe the altitude was seldom over 2000 feet, the country broken and stony, covered with scanty forest, and, with the exception of the village of Chirupe, uninhabited. Tsetse fly is abundant about Msoro, and west of that place to the Loangwa; consequently no cattle are seen.

Nyassa carriers are useless for a journey of any length. On my arrival at the Loangwa two-thirds of my men were incapacitated by illness; the last few stages had been very slow, and it was useless for me to attempt taking the men on. I therefore decided to leave most of my carriers and goods at Muliro's village and attempt the descent of the Loangwa to the Zambezi by canoe, although natives do not travel up or down the river in canoes, as the current is too swift for any going

down stream to return. Accounts were conflicting as to whether canoes could descend or not. After some trouble I secured three small canoes, and stowing four men in each, and myself and a few provisions in the largest, made a start from Muliro's on April 20th.

The river was here running south-west, and kept this as its mean course for our first two days, during which we made good progress, being in the canoes for nine hours each day. The stream ran at some five miles per hour, and was free from rapids or sandbanks. The immediate banks of the river are covered with thick forest, and game is abundant owing to its being entirely undisturbed. Almost every reach of the river brought us in sight of some kind of game, buffalo, koodoo, waterbuck, zebra, eland, sable, antelope, &c. Monkeys were numerous; I also saw several lions.

On April 22nd we passed the village of Pakalimapua on the left bank. On the 23rd the river entered broken rocky mountains, contracted from 130 to 40 yards in width, and went racing through deep gorges at eight or nine miles an hour: rapids were frequent, and our progress was slow, as I had continually to discharge the canoes and send them down the rapids with only one or two men in each. During the afternoon we lost one canoe in the rapids, and on the following day, in shooting a very bad one, all the canoes were lost, and we had to make our way on foot down the rocky banks of the river, reaching luckily the small village of Chirakanga the same evening. This is one of the only two inhabited spots throughout the 200 miles I descended the Loangwa river, the original inhabitants, Asenga, having been almost exterminated throughout the Loangwa valley by the Zumbo half-castes under Matakenya.

Down to Pakalimapua, the mean course of the river had been south-west. From there to Chirakanga our course was south, and continued in this direction as far as the junction of the Lusenfwa river.

At Chirakanga the natives said there were no more bad rapids below, and that canoes could reach the Zambezi. Finding a large canoe here, which the Chirakanga people used for crossing the river, I bought it from the headman, managed to pack my twelve men in it, and started again to descend the river on April 25th.

We passed the junction of the Lusenfwa river on April 26th. The Lusenfwa is a large river joining the Loangwa on its right bank; it is said to be navigable for canoes for two days' journey up. At its junction it is flowing from the north-west, and its valley extends in that direction as far as one can see up it from the junction. The Lusenfwa, where it joins the Loangwa, is some 300 yards wide, being spread out into several shallow channels, with reed-covered sandbanks between. The water from the Lusenfwa is quite clear, and for a mile or two scarcely mixes with the muddy water of the Loangwa. After the junction, the Loangwa turns to the south-east; the mountains on the left bank trend

away to the east, and the river spreads out into many channels with islands between; the mountains on the right bank continue, however, for some twenty miles below the junction of the Lusenfwa.

The lower portion of the Loangwa, from its junction with the Zambezi, up to a point 15 miles below Chirakanga, might be navigated during four months of the year by a shallow draught steamer drawing not over 16 inches.

From Chirakanga up to the top of the rapids (a distance of some 40 miles by the river) could not be ascended by any craft, but from the rapids upwards to Muliro's a small shallow draught steamer might work during the four months of rain. Rubber is plentiful throughout the valley of the Loangwa, but not collected by any one. Beeswax might also be obtained. Ivory is finished.

When within 25 miles of Zumbo,* I left the Loangwa, having hidden my canoe in some reeds, and travelled overland south-west, through Chasor and Chyoa, striking the Zambezi in two days, 30 miles above Zumbo, at the village of Varamanje. The Zambezi here is a magnificent stream, some 400 yards wide, deep, and running at about three miles per hour. There are now no inhabitants on the Zambezi above Varamanje until after the junction of the Kafwe (or Kafukwe) river is passed, all having here been killed off, or driven away by the Zumbo half-castes. I ascended the river for a day's journey but could get no food, as the country is desolate and uninhabited: no canoes are now seen on the river, nor any signs of human life.

On May 2nd I left the Zambezi and retraced my steps to the Loangwa which I crossed a few miles lower down than where I had previously left it. The people here refused to ferry us across, and I had to send up men to bring down the canoe I had hidden: luckily they found it safe. My men were badly in want of food, but every one refused to sell to us.

Having crossed the Loangwa, I went east, directly away from it, in search of a road which I had heard of from Zumbo up the Loangwa valley. I soon struck this, and our course was then for three days a little north of north-west until we reached the Loangwa again at the village of Chirowe. The country passed through was hilly and very stony, but with numerous small valleys having good soil and a luxuriant vegetation: running water is, however, rather scarce. From Chirowe the path took us rather north of north-east through pleasant country full of running rivulets of good water. Population is very scanty, though the frequent remains of ruined villages showed that very recently this must have been a well-populated country. About the ruined villages and on the road we constantly saw human skulls and bones, all that the Zumbo half-castes have left of the original Asenga inhabitants.

* By Article III. of the (unratified) Convention (of August 20, 1890) between Great Britain and Portugal, "The settlement of Zumbo with a radius on the northern bank (of the Zambezi) of 10 English miles remains under the dominion of Portugal," but with this exception, the (Great) Loangwa valley lies entirely in British territory.—[O. L. P.]

On May 10th I reached the village of Chisimbwe, where I joined on to my former route, and on the following day arrived at Muliro's and rejoined my caravan. During my absence some of my men had made a short journey to the north-west. They reached the Mchinga range, climbed it, and descended to the valley of the Lukusasi river. This river, although only some 30 miles directly distant from the Loangwa, flows parallel with it for some distance, and eventually runs into the Lusenfwa.

On May 13th I finally left the Loangwa, and again passing through Chisimbwe, took a new and more northerly route via Chisenga and Lundu to Chasaiya, through the district called Pakaundi. The country was of much the same character as that travelled through on my outward journey. I was informed at Muliro's, and at the villages of Chisenga and Lundu, that giraffes are to be found in Pakaundi, though they do not exist in any other country for hundreds of miles round. At Chasaiya a man was brought to me who said he had shot a giraffe, and described it accurately to me; the name they give them is "Inyamarakiti." I saw none myself.

From Chasaiya, where I crossed my outward route, I took a shorter route to Mpeseni's by avoiding Msoro and keeping to the south of my old track. Buffalo are very numerous in this country, but other kinds of game are scarce. I passed through no inhabited country, and reached Mpeseni's on May 21st.

On 23rd May I left Mpeseni's and took a north-easterly direction to Muasi's at Kasungu, intending to strike Lake Nyasa at Karali considerably north of Leopard Bay from where I set out on this journey to the Loangwa. I have already referred to the streams which flow east, west, and south from these Mpeseni Highlands. Twenty-five miles north-east of Mpeseni's kraal, we crossed the head streams of the Luarezi river, which runs east to the Bua river. On existing maps of this part of East Africa, streams are shown on the line of my journey to Kasungu, as flowing to the Bua and to the Lukusha, but none exist in the positions in which they are mapped. Going north-east from the Luarezi, no running water of any description is met with for a distance of 65 miles, until the Loangwa river is reached. This Loangwa flows into Lake Nyassa, and, is of course entirely distinct from the river of the same name which flows into the Zambezi river.

From Mpeseni's to Muasi's is four days' journey; the country lies in long waves or undulations, and is covered with small forest, with the exception of the hollows, which are devoid of timber, and have water close to the surface; in the rains these hollows become "oozes."

On May 28th I entered Muasi's inhabited country, and left all timber behind, the districts round Muasi's villages having been long since denuded of trees. The south-westernmost villages are all surrounded with mud walls and ditches as a protection against Mpeseni's warriors.

Mokanda, one of the original inhabitants of the country, now occupied

by Mpeseni, took refuge with Muasi many years ago, and his village was one of the first I reached on my way to Muasi's.

I had already, during 1888 and 1889, paid several visits to Muasi, and was received by him as an old friend. He is the successor to the Muasi whom Livingstone saw here. Kasungu is the name of the high conical peak which overlooks Muasi's own village, but the district all round the mountain is generally known by that name. Kasungu is situated in a vast treeless plain: the villages themselves have a few shrubs and trees growing among the houses, but with the exception of these there is not a tree to be seen for miles: the nearest running water is the Loangwa (the Nyassa Loangwa); water for drinking is obtained from holes near the villages, and is dirty and bad. Wood, both for fuel and for building purposes is procured from the (Nyassa) Loangwa, and the women have many a weary day's work bringing heavy loads of firewood this long distance. The plain is dotted over here and there with conical peaks rising to a considerable height, and topped with masses of rock. The Kasungu Peak (above referred to) rises some 1000 feet above the plain, and is visible far in all directions. The country round about abounds in iron ore, which in some places is worked by the natives in the usual primitive African fashion. They build clay furnaces some nine feet high, bottle-shaped: the ore and charcoal are put in from the top in layers, near the bottom short earthenware pipes are inserted all round to let in the draught: the iron, together with the slag, runs down to the bottom and when cold is broken out.

Kasungu is the centre of a considerable ivory trade, and is visited by caravans from Nyassa and from the coast. The ivory must come from places far distant, as no elephants are left now in Muasi's country. There is, I think, little doubt that at no distant date elephants will be extinct in all the Nyassa districts.

Leaving Kasungu on May 31st, I went north-east, intending to strike Lake Nyassa at the village of Karali, some 80 miles south of Bandawe. A march of 15 miles brought us to the (Nyassa) Loangwa river, which I have already referred to. There are many Loangwa rivers in East Africa. This one, taking its rise on the watershed between Lake Nyassa and the (Great) Loangwa, flows north-east to Nyassa, reaching the lake some 50 miles south of Bandawe. It is a considerable stream during the rains, but in the dry season becomes a succession of dry rocky pools. Its bed is 50 yards wide, but is only filled during floods,

The journey from Kasungu to Karali takes from five to six days, and during the whole distance no habitations are met with. A few years ago elephants were plentiful in this stretch of country, but are now practically extinct. For three days after leaving the Loangwa the country is covered with stunted forest, and water is scarce; the trees are heavily draped with orchilla weed, and the journey is uninteresting, as one can nowhere see over a hundred yards in any direction. Game is scarce

and carried provisions have to be entirely relied upon. Quick travelling can however be done, as the ground is free from long grass.

On the fifth day from Kasungu we got out of this stunted bush country (which lies at a general elevation of from 3000 to 3500 feet) and, ascending gradually, entered what is known in Nyassaland as the "Vipsha" (or Zipaha) country. This name is applied to the high-lying open grass hill country west of Nyassa. Throughout nearly the whole length of the west side of the lake, there is a steep mountain range thickly wooded and abounding in permanent streams of excellent water. Towards the northern end of the lake, as far as Mount Waller, its range descends abruptly down to the shore, but further south it recedes to the west, leaving plains or low hilly country for a few miles back from the lake. After reaching the top of this range, going west, the open hilly grass country is reached (the Vipsha). Travelling through the Vipsha is pleasant work during the dry months; there is always a south-easterly breeze blowing, and one can march throughout the day without finding the heat unpleasant. The Vipsha lies at from 4000 to 5000 feet above sea-level. The nights are very cold, and I have seen hoar frost in this country. Game is plentiful.

On June 5th I descended 2700 feet to the Karali plains, and on the same day reached the village of Karali on the Lake shore.

The latitudes shown in the sketch map accompanying this paper are correct, as far as Muliro's. From Muliro's down the Great Loangwa river I had no sextant with me (as I durst not carry it in the rickety canoes). Throughout the journey down the (Great) Loangwa, I took the course of the river every 10 or 12 miles, and made up the sketch map from the notes I took. The longitudes are approximate (as I had no chronometer with me.*

* The foregoing paper is in continuation of that published in the 'Proceedings' of March 1890, recording Mr. Sharpe's journey between the Shiré and the (Great) Loangwa. In a private letter just received (and dated Mandala, July 15th, 1890), Mr. Sharpe says, "I am just starting on another journey northwards to the Mambwe country (near Lake Tanganyika), viâ the north end of Lake Nyassa. From the Mambwe country I go west, crossing the Luapula river (between Lakes Moero and Bangweolo) to Katanga (Mondli's country) and Garenganze. Perhaps I may get as far west as the Lualaba (Kamorondo) river, and then, turning southwards, return by the southern shores of Lake Bangweolo to Lake Nyassa. In this case I hardly expect to be back before January or February 1891." A reference to the map of Africa just published in the November 'Proceedings' shows that the territory west of the Luapula, as well as the valley of the Kamorondo, belong to the Congo Free State. In Mr. George Cawston's "Treaty" map of Africa, we find Katanga (about 130 miles west of Lake Bangweolo) marked in the Highlands of Garenganze which form the southernmost boundary of the Congo Free State, and send forth the headwaters of the Congo to the north, and of the Kafwe, Kabompo, and other westerly affluents of the Zambezi to the south. The Mambwe country mentioned in Mr. Sharpe's letter is part of the district bounded on the north by the Stevenson Road and Lake Tanganyika, on the east by Lake Nyassa, and on the west by the Luapula river, and is shown, in the R.G.S. map (above referred to) to be within the British "sphere of influence."—[OTTLEY L. PERRY.]

GEOGRAPHICAL NOTES.

Mr. Joseph Thomson.—Favourable news has been received of the progress of Mr. Thomson on the mission in which he is at present engaged, namely, the exploration of the country between Lake Nyassa and the confines of the Congo Free State and Portuguese West African territory. A telegram communicated to us by the Eastern Telegraph Company reports that the indomitable traveller, with his companion Mr. Grant (son of Colonel J. A. Grant), was, on the 6th of August, in perfect health, travelling towards the capital of the Garenganze country, whence they would travel southward to the Victoria Falls of the Zambezi and eastward to Blantyre, hoping to reach that place about the end of the year.

M. Thoroddsen in Iceland.—M. Thoroddsen, the well-known explorer of Iceland, has returned to Reykjavik from his summer excursion into the district between Borgarfjord in the south and Gilsfjord in the north. The topography of the country as shown on existing maps was found to be fairly accurate. The geological results of the journey are more novel. The volcano situated at the extreme point of the peninsula of Snaefellenes was visited. It is especially interesting from the fact that clear indications have been found that this volcano commenced its eruptive activity long before the glacial epoch, and although no outbreak is known to have occurred within historical time, it is tolerably certain that its activity continued to comparatively modern times. The volcanoes of the district traversed have not the same direction as those in the south of Iceland, viz. from south-west to north-east, but range themselves in a semicircle round Faxa Bay, which is a distinctly volcanic depression. M. Thoroddsen's expedition was largely supported by Baron Dickson.

The Swedish Expedition to Spitzbergen.—The expedition to Spitzbergen under the leadership of G. Nordenskiöld and Baron A. Klinkowström has returned in safety to Tromsø. The party landed first of all at Horn Sound, whence G. Nordenskiöld made his way on snowshoes overland to Bel Sound; but the deep snow prevented geological work. The longest stay (18th July to 10th August) was made at Ice Fjord. The furthest point north reached was Lagö, east of Hinlopen Straits. The passage was still quite blocked with ice, and there being but small chance of being able to penetrate to the Seven Islands, the return voyage was commenced. On their way back the travellers made hydrographical explorations on the Norwegian islands.

The Chilian Andes.—The little known region along the eastern slopes of the Cordilleras between the Rios Diamante and Negro, was

explored some three years ago by Dr. Kurtz, Professor of Botany at the University of Cordoba, and Dr. Bodenbender, of Cordoba.* The latter contributes to Part 10 of Petermann's 'Mitteilungen' some of the results of the joint expedition. As regards the geology of the country, the appearance of many sandstones and conglomerates of very doubtful age on the borders and within the Andes is noted as an interesting fact, and the traveller was led to the conclusion that there are here three distinct horizontal formations. To the oldest belong the sandstones and conglomerate banks of the upper Rio Grande valley; upon them rest the sandstones, with gypsum, which, overlaid by jurassic strata containing fossils, are found all along the eastern slopes of the Andes from Mendoza to the Rio Limay; then there are the sandstones and conglomerates overlaid with quartz porphyries of the Sierra de S. Rafael and Cerro Nevado. The examination of the specimens obtained from these fossil strata will doubtless throw light upon the question whether any of these sandstones belong, as some have supposed, to the tertiary period. South of the junction of the Rio Catanhil with the Rio Collon follows a more recent formation, consisting of marly clay and chalk, which the traveller regards as the equivalent of the pampas formation, the very recent basalts, which cover the marly clay, being of the same age as those which overlie the pampas of the Rio Diamante. The general relief of the country traversed has been determined by faults to which most of the river valleys owe their origin. These faults, the general direction of which is north-west to south-east, may, it is suggested, continue through the Cordilleras, and would thus determine the course of the Chilian rivers; they are more strongly developed in the south, and probably extend to the Straits of Magellan, and have some connection with the lake system discovered by Moyano in the Patagonian Cordilleras. The country is characterised by a wealth of lakes, and by the obliteration of the watershed where the Cordilleras diminish in height. Several valleys and lakes have been formed by the disintegration of the gypsum blocks, which appear within the sub-jurassic and jurassic strata. The prevailing surface formation is the lofty jurassic plain, surmounted by basaltic peaks, the disintegrated materials of which have spread over the jurassic strata.—The following observations upon the climate were made by the expedition. The prevailing winds come from the west or north-west, and south or south-west; the north-west winds are generally very violent, the south-west winds bring cold in the winter and heavy thunderstorms (seldom with hail) in the summer. The lowest temperature was reached in July and August, when the thermometer recorded 18° Fahr. at S. Rafael; in January it rose to 104°. Snow falls in all parts, but soon melts: snow with rain is more frequent. Constant rains are only experienced in the south. The strong contrast, both geologically and hydrographically, between the

* 'Proceedings R.G.S.,' 1888, p. 168.

northern and southern portions of the country is also noticed in the climate and agricultural value of the soil. The charming lake region of the south, with its wealth of water and timber (beeches, cypresses, araucarias, &c.), and excellent marly soil, stands in sharp contrast to the mountain ranges of the north, with their lack of vegetation, narrow valleys where rubbish heaps and rushing water prevent the accumulation of good alluvium, and their lofty plains covered only with grass. The country is being slowly developed by the Government. The war-like Indian tribes have been driven southwards into the Patagonian Cordilleras. The great want of the country is means of communication, good roads and bridges, but especially railways. Commercially, the greater part of the country belongs to Chili. Trade, which is principally in cattle, hides, and ostrich feathers, is concentrated in a few towns, the most important of which is Ñorquin on the Rio Agrio, which, in situation and in prospect for the future, is superior to Chus-Malal, the seat of government.

The Culminating Point of the North American Continent.—Under this title Professor Angelo Heilprin has reprinted from the 'Proceedings' of the Philadelphia Academy of Natural Sciences a paper dealing mainly with barometric observations among the high volcanoes of Mexico. These were obtained to a large extent by an expedition organised under the auspices of the Philadelphia Academy, partly for the determination of the physical features of the giant volcanoes of the south, with special reference to a study of the vertical distribution of animal and vegetable forms. Professor Heilprin discusses in detail the observations as to the four loftiest summits of Mexico, and comes to the following determinations as to their heights:—Peak of Orizaba, 18,205 feet; Popocatepetl, 17,523 feet; Ixtaccihuatl, 16,960 feet; Nevado de Toluca, 14,954 feet. The restoration of the Peak of Orizaba to the first place among Mexican mountains, and its increased altitude, Professor Heilprin states, opens up the interesting question as to what constitutes the culminating point of the North American continent. He analyses the data on which the palm has been accorded to Mount St. Elias owing to the height of 19,464 feet given to it by Dall. He points out that this determination was made "at sea," 127 miles distant. In view of the reduction of height made by the recent Alaska expedition, Professor Heilprin's concluding words are worthy of attention. "In view of the broad divergence existing in these later measurements, and the fact that all earlier determinations give less than 18,000 feet for the height of Mount St. Elias, geographers will probably consider the question of absolute height as still an open one. That the mountain closely approximates the giants of the Mexican plateau is almost certain, but it seems equally probable that its true position is after, and not before, the peak of Orizaba," which would thus be the culminating peak of the North American continent.

Geographical Exhibition in New York.—Under the auspices of the Geographical Section of the Brooklyn Institute, of which Mr. Cyrus C. Adams is Director, an educational geographical exhibition is being organised, to be held in the rooms of the Institute. It will be opened in January, and is mainly on the lines of the R.G.S. Exhibition of five years ago, though, as might be expected, it is likely to be much more complete. Mr. Adams has obtained promises of contributions from the leading European geographical publishers, and also of course from those of America. In connection therewith, the Institute is making an inquiry into the position of geographical education in the United States.

▼ **The International Geographical Congress.**—The next meeting of this Congress will be held at Berne from the 10th to the 15th of August, 1891. The Geographical Society of Berne has undertaken to superintend the arrangements, M. C. H. Mann acting as Secretary of the Organising Committee. The meeting will be coincident with the *fêtes* commemorative of the seventh centenary of the foundation of the city of Berne. Those taking part in the Congress may use their own language; addresses in German, English, and Italian will be translated on the spot into French. The sections which will form the subjects of deliberation at the Congress are:—(1) Technical Geography; (2) Physical Geography; (3) Commercial Geography; (4) Explorations and Travels, including Colonisation and Missions; (5) Geographical Education and the popularisation of geography. The subscription for the Congress is 20 francs.

A New Geographical Magazine.—On the 1st of January next a new monthly geographical magazine will be published in New York, by Messrs. Goldthwaite, under the editorship of Mr. Cyrus C. Adams, Director of the Geographical Section of the Brooklyn Institute.

Progress of Geographical Education.—The delegates of the Oxford University Extension report a further increase in the number of Geographical and Physiographical lectures in provincial centres arranged for the present winter season. In the winter of 1889–90 seven courses of six lectures each were delivered on Physiography, and four courses of similar length on Geography. For the winter of 1890–91 four courses of twelve lectures each and seven courses of six lectures have been arranged on Physiography, and three courses of twelve and one of six lectures have been arranged on Geography. The Lecturer, as before, is Mr. H. J. Mackinder, M.A., Reader in Geography at Oxford.

Obituary.

Sir Richard Francis Burton, K.C.M.G.—The death of Richard Burton, at the age of 69 years, on October 20th, at Trieste, was announced in the last number of the 'Proceedings.' He has been before the world as an explorer and author for over forty years. His work has been so varied and important that it is not possible in a brief obituary notice to do it justice; we can only recall some of the principal episodes in an intensely busy life.

Richard Francis Burton was born on the 19th of March, 1821, at Barham House, Herts, the eldest of three children. His grandfather (descended from the Burtons of Shap in Westmoreland) was the rector of Tuam, and his father, Joseph Netterville Burton, was a lieutenant-colonel in the 36th Regiment. His grandmother was a Macgregor. His mother was Martha Baker, second daughter of Richard Baker, in whose house Richard was born. Burton's parents, especially the father, were erratic. The family went abroad a few months after Richard was born, and settled for a time at Tours. But they were soon on the move again; and with the exception of short intervals, they, with their children, were almost constantly wandering about in France, Italy, and Germany. This, no doubt, afforded Richard opportunities of exercising his undoubted genius for picking up languages, a genius which was certainly nourished by the polyglott surroundings of his youth. Such routine education as Burton was able to obtain was mostly from schools and private tutors on the Continent, except for about a year when he was boarded at a very unsatisfactory school at Richmond, Surrey. This life of constant travel went on till 1840, when Richard took up residence at Trinity College, Oxford.

Burton's father intended him for a professional career, the Church by preference, but the son had leanings in quite another direction. His Oxford career was what might have been expected from a man of his unconventional tendencies and erratic youth. He took much more readily to fencing than to classics, and preferred Arabic to Greek and Latin. He joined heartily in the "high jinks" which were in vogue at that period in Oxford, but became so tired of the life there that in 1841 he deliberately got himself rusticated. He was determined to enter the Army, and by preference to obtain an appointment in India, with a view to which he set himself to learn Hindustani. An appointment was obtained from the East India Company without much difficulty, and Burton sailed in June 1842, to begin a career of ceaseless activity, which may be said to have ended only with his death. He was appointed to the 14th Regiment Bombay N.I., arriving at Bombay, October 28th, and shortly after joining his regiment in Gujerat.

It is not necessary here to follow in detail Burton's Indian career. His proficiency in Hindustani led to his being appointed "regimental interpreter." Burton went with his regiment in 1844 to Karachi, and his residence in Sind produced some years later his first important work, 'Scinde, or the Unhappy Valley' (1851), although in the same year appeared his 'Goa and the Blue Mountains,' the result of a six months' holiday. These works had been preceded by official reports on Sind to the Government of Bombay, and by some linguistic papers. While at Karachi he mastered the Gujerati and Marathi languages. Burton's linguistic capacity and attainments are among his most notable characteristics, and it would be difficult to say how many languages he could speak in the end. In the work of exploration it was of the greatest advantage to him, and enabled him to make his way in hazardous circumstances when otherwise he might have failed. He was equally diligent and equally successful in mastering the beliefs and practices of Hinduism and Mahommedanism; few men indeed were more familiar with all

the nooks and corners of Eastern lore in its widest sense. Travelling and surveying through Sind, a six months' trip to Goa and the Blue Mountains 1846-47, the acquisition of Persian and other languages, and the usual round of regimental duties, filled up the time till 1849, when Burton, afflicted with ophthalmia and disappointed of promotion, returned to England.

Even at this early period of his career Burton had succeeded in giving offence to his official superiors. After spending three years at home, busy in various directions, he, in 1853, undertook the first of several hazardous journeys, destined to add largely to geographical knowledge. On April 3rd of that year he left London disguised as a Persian Mirza, determined to make his way to the holy city of Mecca. Burton's familiarity with Arabic and other Eastern languages, and his mastery of the practices of Moslemism, gave him an enormous advantage in attempting to carry out so hazardous an enterprise; at Suez he changed his nationality and assumed the disguise of a Pathan. He took every possible precaution to escape detection; whether or not his disguise was penetrated, he was never interfered with, and as is well known, succeeded in completely carrying out his purpose by reaching both Medina and Mecca. The story of his adventurous and fruitful journey he told in three volumes, "Pilgrimage to Meccah and El-Medinah," published in 1855. In the end of 1853 Burton returned to his duties in India; but the wandering fever had taken full possession of him, and henceforth there was no rest for his feet. It is right to say that the mission to Arabia was undertaken to a large extent under the auspices of our Society, which contributed a sum towards Burton's expenses.

Burton's next journey was even more hazardous than his pilgrimage to Mecca. The importance of the Somali coast with reference to Aden and India had been recognised for many years. In 1849 an attempt was made on behalf of our Society to induce the East India Company to support an expedition; but while willing to lend aid, the directors would undertake no responsibility. However, the expedition was offered to Dr. Carter, of Bombay, but his plans fell through. Burton then offered himself, with the intention of penetrating by way of Harrar and Gananah to Zanzibar. This expedition, like his previous one, was actively supported by our Society. With him were joined Lieut. Herne, Lieut. Stroyan, and Lieut. Speke. Each had his own particular duties to perform, Burton's mission being to reach Harrar. He landed at Zeila in the end of October 1854, in the character of an Arab merchant. After staying here twenty-six days he set out for Harrar, thus undertaking a journey involving risks quite as great as those attending the pilgrimage to Mecca. Harrar was reached in safety on January 4th, 1855; Burton met with a gracious reception, and stayed till January 13th. He was the first Englishman who had ever entered the famous city, and his narrative of his journey was therefore a distinct addition to geographical knowledge, abounding, like all his works, with the richest details concerning the people and the country traversed.

Burton returned to Aden with a view of arranging for a new expedition to the Upper Nile viâ Harrar. His preparations were so expeditiously made that he landed at Berbera on April 7th, 1855, at the head of a party of 42 men of various races. He encamped with his three companions, Speke, Stroyan, and Herne. Unfortunately disaster overtook the expedition, which never left Berbera. In the night of the 29th April it was attacked by a crowd of Somalis. The four white men defended themselves bravely in the darkness. Stroyan was killed, but the other three managed to reach the shore, where, fortunately, a vessel was moored, Burton and Speke severely wounded. Without any further attempt at penetrating into the interior, the expedition returned to Aden. In the following year Burton

published the narrative of the expedition in his 'First Footsteps in East Africa.' He addressed a letter to the Secretary of the Royal Geographical Society, strongly urging the importance of Berbera and the Somali Coast for British interests in the Red Sea. The letter was naturally forwarded to the Government of India; the only reply being a severe snubbing to Burton.

Burton returned to England, and, after reading an account of his journey to the Royal Geographical Society, he hastened to Constantinople to offer his services in the Crimean War. He went on to the Crimea and joined the irregular cavalry, then known as "Beatson's Horse," who were stationed at the Dardanelles. Burton volunteered to relieve Kars, but this and other daring projects never came to a head, and he returned to England "determined to follow none but the career of an explorer, a pathfinder." At that time the subject of African exploration was naturally occupying much of the attention of our Society. The fame of Livingstone's first great expedition across the continent, his discovery of the course of the Zambezi, the reports he heard of great lakes in the interior, and great rivers rising in the "Great Sponge," flowing northwards, had aroused wide-spread interest. Erhardt had also heard of a great-"inland sea" in the far interior from Zanzibar, and it was everywhere felt that the time had come for a determined attempt to solve the mystery of the Nile sources, and fill up the great blank that existed in Central Africa, extending from the Zambezi to the Central Soudan. D'Anville had swept the map clear of all the features which were crowded into its centre by the geographers of the sixteenth and seventeenth centuries. No authority could be found for the lakes and rivers and mountains and great cities which jostled each other in the heart of Africa; and the hydrography exhibited was of the most complicated and impossible character. It is not necessary to discuss the origin of these features. Their existence in old maps does not in the least detract from the value of the discoveries of Burton and other modern explorers.

Burton placed himself in communication with our Society. His proposal was to organise "an expedition primarily for the purpose of ascertaining the limits of the 'Sea of Ujiji, or Unyamwesi Lake,' and secondarily to determine the exportable produce of the interior and the ethnography of its tribes." On the map of Livingstone's first journey, published in 1857, the lake will be found indicated under the name of Tanganika. Krapf and Rebmann and others had been some little distance into the interior; but up to the date of Burton's journey no European had succeeded in penetrating into the heart of Africa by the route from the coast to the interior, now so well trodden, familiar, and safe. At the time it was a journey into the utterly unknown; the expedition was as hazardous as any that could have been undertaken in Africa. The Government, on the recommendation of our Council, made a grant of 1000*l.* towards the expenses of the expedition, which however was far from defraying the whole cost. The Society drew out the programme of the expedition, the chief points of which were as follows:—

"The great object of the expedition is to penetrate inland from Kilwa or some other place on the East Coast of Africa, and make the best of your way to the reputed Lake Nyassa.* . . . Having obtained all the information you require in this quarter, you are to proceed northward toward the range of mountains marked upon our maps as containing the probable source of the "Bahr el Abiad," which it will be your next great object to discover; . . . or you may return by the route by which you advanced or otherwise, always having regard to the means at your disposal."

* At this date (Oct. 1, 1856), only one immense lake was shown on the map, the so-called Mission map, then before the Committee. One of the names of this was Lake Nyassa.

Burton obtained two years' leave of absence from the East India Company, and was again accompanied by Lieut. Speke. Burton sailed from Bombay, to which he had returned, on December 2nd, 1856, and landed at Zanzibar some eighteen days later. He spent some time at Zanzibar and in visiting Mombasa, Pangani, and other places on the neighbouring coast, penetrating for some little distance into Usambara. The results of this preliminary journey, with map, were given in the 'Journal R.G.S.,' vol. xxviii. p. 188, and also in further detail in his 'Zanzibar, City, Island, and Coast,' published in 1872. It was not till June 16th, 1857, that the expedition left Zanzibar to carry out its main work. As might be expected, Burton met with unusual difficulties in organising this pioneer expedition into the heart of Africa, from Zanzibar; he received material help from Colonel Hamerton, the British representative at Zanzibar, who had done so much to establish English influence there, and to bring about improvements in the treatment of foreigners generally. It was not till the 29th of June that a final start was made from Kaole to the south of Bagamoyo. Both Burton and Speke suffered from illness almost from the beginning, which was aggravated by the want of proper medicines and the troubles they had with their men. The expedition took a south-westerly direction by the Kingani river through Central Khutu, reaching the great trade centre of Zungomero in about a month.

In this hotbed of pestilence Burton and Speke had to wait a fortnight for some porters that had been promised. A start was made again on August 7th, the two leaders and many of the men being greatly enfeebled. They all improved, however, as they got into the upland country, and the route was changed to the north-west towards Ugogo, which was reached on September 19th. On the 8th of November, after 134 days' travel from the coast, the expedition entered Tabora (Kazeh) in Unyanyembe, the distance traversed being 600 miles. The Arabs gave Burton and Speke the most courteous and cordial reception. From one of these Arabs, Snay bin Amir, who had been traversing Central Africa for fifteen years, Burton obtained a great deal of information concerning Lake Tanganyika and the region around.

A week was spent here, during which the exhausted explorers had time to recover themselves for the final march towards their goal. But they had many troubles to put up with, mainly with their own people and from lack of porters. Wanyek in Uvinza was only reached on the last day of January 1858, both Burton and Speke being almost prostrate. The Malagaraze river was crossed at Ugago on February 2nd.

At last, on February 13th, the caravan "breasted a steep and stony hill sparsely clad with thorny trees. . . . We halted for a few moments upon the summit. 'What is that streak of light which lies below?' I inquired of Sidi Bombay. 'I am of opinion,' quoth Bombay, 'that that is *the* water.' I gazed in dismay. . . . Somewhat prematurely, I began to lament my folly in having risked life and lost health for so poor a prize. . . . Advancing, however, a few yards, the whole scene suddenly burst upon my view, filling me with admiration, wonder, and *delight*. Nothing indeed could be more picturesque than the first view of Tanganyika Lake, as it lay in the lap of the mountains, basking in the gorgeous tropical sun."

Thus, then, was the first of the great lakes of Central Africa discovered, after a trying and hazardous march from the coast of eight months, over a route which, thanks to Burton and those who followed him, can now be accomplished in a few weeks. The lake was struck at Kavelé, and on the 14th the expedition sailed up in a large vessel to Ujiji, where it took up its quarters. After a few days Burton, who was himself too ill, and for the time nearly blind, sent Speke out to reconnoitre the north end of the lake. Speke was only able to reach the north-west shore at Mirambula, and in a subsequent voyage the two explorers only got

as far as Uvira ; so that the problem as to a river which was reported to issue from the north end of the lake had to remain unsolved. Disappointed in obtaining expected supplies of all kinds the expedition remained at Ujiji till May 24th, and then began its march to the coast. It had been intended to return by Lake Nyassa and Kilwa, but that project had to be given up.

On June 17th the expedition again entered Tabora. Burton was almost prostrate, and decided to remain here for some time to recover and write up his observations and the information he had obtained from the Arabs as to the countries to the north. Here he detached Speke, for the purpose of taking a run to the north to the Nyanza, a lake which was reported to exist some fifteen or sixteen marches in that direction. Into the unhappy estrangement which arose between the two explorers, and which Speke's discovery of the Victoria Nyanza greatly aggravated, we do not feel called upon to enter here, nor to pronounce judgment.

In these pages we have to deal solely with the geographical work of Burton, and the discovery of these two great lakes in the one expedition, gives it the highest rank in African exploration. Burton, who organised the expedition, and led it to the discovery of the Great Central lake of Africa, will be ranked alongside of Livingstone and Stanley ; taking into consideration the date and the circumstances, the discovery of Lake Tanganyika may fairly be compared with Stanley's journey down the Congo.

Burton, during Speke's absence, prepared his reports for the Royal Geographical Society, and it may be said that he took every opportunity during the expedition to send home reports as to its progress. Speke returned on August 29th, feeling assured that the great lake he had discovered was the source of the White Nile. Burton, it must be said, did not for many years afterwards place much value on Speke's discovery, and maintained* that Victoria Nyanza was not a continuous lake but only a "lake region." The quarrel between these two men is greatly to be deplored, all the more as the qualities of each supplemented those of the other ; each did admirable work in his own way.

The expedition arrived at Zanzibar on March 4th, 1859, and Burton left on the 22nd for Aden, which again he left for England on April 28th, Speke having preceded him and given an account of their joint discoveries at a meeting of our Society on the 9th May.† Captain Burton's official narrative, which is a masterly report of the results of the expedition, a perfect mine of information on every aspect of the country traversed, was published in vol. xxix. of our Journal, filling the whole volume of 460 pages. The trying conditions under which the notes were made upon which it was founded, make this great work all the more admirable. Burton's popular narrative appeared in two vols. in the same year under the title of 'The Lake Region of Equatorial Africa.' Burton himself was no surveyor, and the purely topographical work was due to the observations of Speke.

A journey across the American continent by Utah to San Francisco, afforded Burton an opportunity of investigating Mormonism and observing the condition of things in the western United States, long before they were opened up by railways. In his 'City of the Saints' (1861) he treated the subject of Mormonism after his own candid fashion, and gave a picture of the country through which he passed, which is even now valuable.

In the beginning of 1861 Burton was married to Isabel Arundell, who throughout his subsequent life has been her husband's faithful companion, devoting herself heart and soul to his interests. Lady Burton's services to her husband cannot be

* 'Proceedings R.G.S.,' vol. xvi. p. 129.

† In the discussion on a paper by Mr. J. M'Queen, 'Proceedings R.G.S.,' vol. iii. p. 210.

overestimated. It was only after much begging that Burton was appointed consul at Fernando Po, "the Foreign Office grave." This consulate embraced the neighbouring coast of the mainland, and Burton at once embraced the opportunity of carrying on the work of exploration on this side of Africa. He had hardly been a week at his post, when (October 9th, 1861) an opportunity presented itself to him of visiting Abeokuta. Later in the same year he crossed to the Cameroons, the mountains of which he ascended in company with Mr. Saker, careful observations being taken and much knowledge obtained as to the physical and sanitary conditions of this interesting region. The results of these two excursions were published in 1863 in 'Abeokuta and the Cameroons Mountains.' In that year Burton made a run to England, and returned with a commission to visit Dahomey as bearer of assurances of friendship from England, and at the same time to protest against the slave-trade and the so-called "customs."

Burton carried out his mission in the end of 1863. His treatment was very trying, but he had abundant opportunities of acquiring a knowledge of the people, politics, and strange "customs" of a country, about which much misconception existed. ('A Mission to Gelelé, King of Dahome,' 2 vols., 1864.) Before this, however, in 1863, Burton had made a journey of several months' duration in the Gabun region, the Fan country, and up the Congo to Yellala Falls. He was able to add considerably to existing, and, in some respects erroneous, information as to the gorilla and the real nature of the reputed cannibalism of the Fans. The journey up the Congo was the most valuable contribution to a knowledge of the river between the journeys of Tuckey and Stanley, and Burton's map of the Lower Congo will stand comparison with later maps of the river. The results of his journey were not published till 1873, when 'Gorilla Land, or the Cataracts of the Congo,' appeared. Other noteworthy results of Burton's residence in West Africa are, 'Wit and Wisdom from West Africa,' 1865, and the 'Lands of Cazembe,' published by the Royal Geographical Society, 1873.

The success of Burton's mission to Dahomey brought him promotion in the form of a consulate at Santos, Brazil, where he and Mrs. Burton took up their residence in 1865. As usual Burton spent much of his time in making himself familiar with his new surroundings. Twice (1868 and 1869) he visited Paraguay commissioned by the Foreign Office, and his work on Paraguay, published 1870, contains much curious and recondite information. 'The Highlands of Brazil,' published in 1869, embodies the results of some of his other journeyings, which, indeed, extended over a considerable part of the South American Continent. His notes to 'The Captivity of Hans Stade,' published by the Hakluyt Society, 1874, may be regarded as another fruit of the South American residence. Burton's work in South America included a thorough exploration of his own province, the gold and diamond mines of Minas Geraes, a canoe journey down the San Francisco, 1500 miles, visits to the Argentine Republic and Paraguay; he crossed the Pampas and the Andes to Chile and Peru and visited all the Pacific coast, returning by the Straits of Magellan, Buenos Ayres, and Rio.

In 1868 Burton was appointed to the consulate at Damascus, where he took up his residence in October 1869. During his short period of residence in Syria he was not idle, as may be seen in the two volumes of 'Unexplored Syria,' by himself and the late C. F. Tyrwhitt Drake. Burton by his over-zeal once more rendered himself obnoxious to his official superiors, and in 1871 Damascus was reduced to a vice-consulate, and Burton recalled. Naturally, he felt keenly what he regarded as the greatest injustice, but he said little. In 1872 a visit to Iceland produced a book ('Ultima Thule') which is a mine of information on the country. In the same year Burton was appointed to the consulship of Trieste, a post which he held till his death.

Two visits to Midian, 1876-78, led to observations and investigations which throw much light both on the past and present of that interesting region, as may be seen in 'The Gold-mines of Midian,' 1878, and 'The Land of Midian Revisited,' 1879. A visit to India in 1876 produced 'Sind Revisited.' Burton's only other distant expedition was to the Gold Coast in 1881-2, in company with Commander Cameron, the results being told in 'To the Gold Coast for Gold,' 1883. After his return, Burton's health began to give way to some extent, and no wonder, considering the hardships he had endured, the scanty recognition of his great services, and the unabated activity of his life; the only reward for all his services was a K.C.M.G., conferred in 1887. But he never ceased from work. In archaeological researches in the country around his consulate, in curious and scholarly investigations, in translations and annotations of foreign classics or narratives of travels, he was constantly occupied. Among these may be mentioned 'Gerber's Province of Minas Geraes' in vol. xlv. of the Journal of the Royal Geographical Society; 'Vikram and the Vampire, Hindu Tales,' 1870; 'Etruscan Bologna,' 1876; translation of Camoens, 1880; 'The Book of the Sword,' 1884, and 'The Arabian Nights,' 1885-6. Much of his ethnological work will be found published in the 'Journal of the Anthropological Institute.'

Notwithstanding his continually failing health, Burton had always a crowd of work in hand, and much remained unfinished at his death. To the publications of this Society his contributions were numerous; besides those already mentioned, there appeared:—in 'Journal,' vol. xxiv., 'Journey to Medina, with route from Yambu'; 'A Journey from El-Medina to Mecca' (vol. xxv.); 'Narrative of a trip to Harar' (vol. xxv.); 'Exploration of the Elephant Mountains in West Equatorial Africa' (vol. xxxiii.); 'On Lake Tanganyika, Ptolemy's Western Lake-Reservoir of the Nile' (vol. xxxv.), which contained his criticisms on Captain Speke's claim for Victoria Nyanza as a single large lake and the source of the Nile,* a paper reprinted, with a preface and criticisms on Speke by J. M'Queen, in a separate volume in 1864; 'Exploration of the Tullûl el Safâ, the Volcanic Region east of Damascus' (vol. xlii. p. 49); 'Reconnaissance of the Anti-Libanus' (vol. xlii. p. 408); 'Memoir explaining the new map of Midian made by the Egyptian Staff-officers' (vol. xlix.); 'Explorations in East Africa,' 'Proceedings' (1859) vol. iii. p. 348; 'Ascent of the Ogun or Abbeokuta River,' 'Proceedings' (1862) vol. vi. p. 62; 'Ascent of the Cameroons Mountain,' 'Proceedings' (1862) vol. vi. p. 238; 'On the Ukara, or the Ukerewe Lake of Equatorial Africa,' 'Proceedings' (1871) vol. xvi. p. 129. In 1859 he was awarded the Founder's Medal.

Burton was a man of the most versatile tastes and pursuits. He was, as we have seen, a consummate linguist, and unsurpassed in his knowledge of Arabic literature and traditions, and in sympathy with oriental thought. Few men have been so persistent both as students and as wanderers, and have made larger contributions to the literature of travel than he. In all his works he was constantly drawing on his vast stores of reconдите learning, so that often the reading of his books is no easy task. He was a keen and accurate observer, indefatigable in taking notes, and a forcible and original writer, though it must be admitted that he sometimes permitted prejudice to distort his views. He had the faculty of forming and conveying a clear conception of the salient features of a country, and although no specialist in science himself, he was quite alive to the value of observations and collections that might prove useful to science. He was a man of the greatest intensity of character and fearlessness in thought, speech, and action; too antago-

* The discussion on this controversial paper, in which Dr. Livingstone, among other authorities, took part, is given in 'Proceedings' (1864) vol. ix. p. 8.

nistic, perhaps, to conventionalities when he believed them to be hypocritical. It was inevitable that such a man would make enemies, and often startle, if not shock, the feelings of well-meaning persons; but he had many staunch and worthy friends. Burton's permanent fame as an explorer will rest on his journey to Lake Tanganyika, which takes rank among the greatest deeds in the history of African discovery; he pioneered the way into the heart of Africa.

Antonio Raimondi.*—We received on the 1st of November a telegram from Lima, announcing the death of Dr. Antonio Raimondi, the great Italian explorer, whose indefatigable labours in Peru, during a long course of years, have shed such lustre on his adopted country. He was an Honorary Corresponding Member of our Society, and communicated several valuable papers to our 'Proceedings'; yet his admirable scientific work did not receive the full recognition that was certainly its due.

Antonio Raimondi was born at Milan, of a good family, some sixty-five years ago. In his youth he was fired with enthusiasm for geographical exploration by reading the works of Cook, Bourgainville, Humboldt, and Dumont d'Urville. But it was chance that fixed the choice of a region as the scene of his own scientific labours. He used to pass much time in the botanical garden at Milan, and it was the contemplation of a huge specimen of *Cactus Peruvianus* that first turned his thoughts to the land of the Incas. The idea of visiting that interesting region gradually ripened into a fixed resolve, and, after studying all the works that had previously been written on Peru to which he had access, he left his native country, and landed at Callao in 1850.

The scientific predecessors of Raimondi did most valuable work in Peru, but they all confined their researches to more or less limited areas. Raimondi was the first to explore every part of Peru thoroughly and systematically, devoting a lifetime to the task. By such devotion alone could he have achieved such completeness in his work. Nearly forty years ago he made his first journey across the Andes from Lima, and penetrated into the forests of Chanchamayu. In 1853 and 1854 he traversed the whole extent of the province of Tarapaca, from Pisagua to the Loa, and studied the deposits of nitrate and borax. From 1855 to 1857 he was in the provinces of Huanuco and Huamalies, the scenes of the botanical labours of the Spanish botanists Ruiz and Pavon. He paid his first visit to Cuzco, the ancient capital of the Incas, in 1858, and penetrated into the forests of Santa Ana to the eastward. In the following years he was exploring the northern part of Peru, from Piura to Truxillo, visiting the scenes of Humboldt's researches in the valley of the Marañon, and navigating the other Peruvian tributaries of the Amazon. In 1862 and 1863 Raimondi was exploring the coast valleys from Lima to Arica, and the basin of Lake Titicaca: and in 1864 he penetrated into the wild forests of Carabaya, discovering the true courses of the rivers Ayapata and San Gavan. His valuable memoir on these discoveries was published in our Journal for 1867 (vol. xxxvii. p. 116). In 1865 he again made Cuzco his headquarters, while he explored the forests of Paucartambo and Marcapata and the little known provinces in the upper valleys of the Apurimac. In 1866 he made another geographical discovery of great interest, by fixing the position of the confluence of the rivers Mantaro and Apurimac. His paper on the subject, illustrated by a map, appeared in our Journal for 1868 (vol. xxxviii. p. 413). Raimondi carefully studied the mineralogy and geology of the department of Ancachs during 1867; and, through the enlightened liberality of Mr. Henry Meiggs, this portion of his labours was early utilised. The volume on the mineral riches of Ancachs, containing

* By Mr. Clements R. Markham.

650 quarto pages and a large-scale map engraved by Wyon, was published at Lima in 1873. The map brings out one of the most remarkable features in the Andes, namely, the Callejon de Huaylas, a lateral valley with lofty mountains on either side, down which the river of Santa flows until it forces its way through a magnificent gorge and reaches the coast. There is a striking analogy between the course of the Santa in the Andes, and that of the Upper Brahmaputra in the Himalaya. The final exploring journey of Raimondi led him through the Amazonian provinces to the frontier of Brazil.

There is scarcely another example of so thorough an examination of a vast region such as Peru by a single individual. Its completion gave Antonio Raimondi a high position, not only as a geographer, but as a naturalist and geologist. This preliminary portion of his vast undertaking occupied twenty years of incessant and arduous work. It would have taken even a longer time to complete his literary and scientific studies, and to arrange and classify his immense collections. When our Associate, Don Manuel Pardo, was President of Peru, it was resolved that the great work of Raimondi should be published at the expense of the nation. By a decree of June 1873 complete effect was given to this resolution, and all the details of publication were arranged with enlightened liberality.

The first volume of Raimondi's great work, entitled "Parte Preliminar," was published at Lima in 1874, and dedicated to the youth of Peru. It is the key to the whole plan, describing the methods used for investigations in the various branches of science, the instruments that were employed, and narrating the journeys of the author over the length and breadth of the land during twenty years. The second volume of 'El Peru' appeared in 1876. It is devoted to a history of the geography of Peru, detailing the labours of explorers and geographers from the time of Pizarro to the voyages of missionaries down the tributaries of the Amazon in the last decade of the last century. In the third volume, which was published in 1880, this valuable review of previous work is continued and completed. The exploring journeys and voyages, and the history of Peruvian cartography are here described in very full detail, from the commencement of the present century to the year 1878. These two volumes are as interesting as they are exhaustive, and the earlier portion affords proof of an amount of diligent and scholarly research such as had never before been given to the subject. The design is original, and there is no other country which possesses so complete a history of its geographical work, so admirably arranged, and in so compact a form.

These three volumes are all that have yet been received. The other parts were to treat of the physical geography and meteorology, the geology and mineralogy of Peru. Raimondi had published analyses of the thermal springs of Yura near Arequipa, in 1864, and his mineralogical volume was to contain fuller analyses of other thermal and medicinal waters. Two volumes on the botany and zoology were to follow. The concluding volume was to be devoted to ethnology, including descriptions of the architectural remains, pottery, arms, and other manufactures of the Incas and of other aboriginal nations and tribes.

The publication of this magnificent work, which was so well commenced, would have done honour alike to Don Antonio Raimondi and to the Peruvian nation. The Italian *savant* gave up his life to his adopted country, and Peru knew how to value such rare devotion. But disaster intervened to interrupt and mar the work.

The cause of the delay in completing the publication of 'El Peru' is not far to seek. The devastating war which was waged by Chile on her neighbour, from 1878 to 1883, put a stop to all useful work. The coasts of Peru were rendered desolate, and her capital was occupied by the invaders for nearly three years. Among other wanton acts of vandalism perpetrated by the Chilians, it is understood that a whole

edition of the fourth volume of the work of Raimondi was destroyed. They also sacked the national library, scattering the books and manuscripts to the four winds, and converting the rooms into a barrack.

After the evacuation of Lima by the Chilians in October 1883, we believe that Raimondi resumed his work, but under very different circumstances. The finances of the country were in such a state that aid from Government had become difficult, and for a time impossible. Looking to the vastness of the undertaking, Raimondi had felt, when he began the task, that he might not be spared to complete it. Yet when his third volume went to press his hopes must have risen. Those hopes were shattered by the disastrous war. All geographers must feel sympathy for the indefatigable worker in his disappointment, and regret that a great work of such promise should have been marred from such a cause. We are not aware in what state the great geographer has left his collections and materials, nor whether any portion of the remaining volumes is likely to be published. The death of Dr. Raimondi, under such circumstances, is a disaster not only to his adopted country but to the whole civilised world.

M. Pierre de Tchihatchef.—We have to announce the death, on the 13th of October, of Peter von Tchihatchef, one of our Honorary Corresponding Members. He was born in 1812 at Gatchina, near St. Petersburg. In 1842–44 he was attaché to the Russian embassy at Constantinople, when he travelled through Asia Minor, Syria, and Egypt. After visiting various European countries and carrying out a mission to the Altai, with which he was entrusted by the Russian Emperor, he from 1848 devoted himself to the exploration of Asia Minor. Between that year and 1853 he made six extensive journeys through that region at his own expense, with important results, especially in geology and botany. In 1858 he again visited Asia Minor and the highlands of Armenia. To ‘*Petermann’s Mitteilungen*’ he contributed some of the scientific results of these journeys, but they were all gathered up in his well-known work ‘*Asie Mineure*’ (8 vols. with atlas, 1853–68). In 1845 he published his ‘*Voyage Scientifique dans l’Altaï oriental et les parties adjacentes de la frontière de Chine*’; in 1859, ‘*Lettres sur la Turquie*.’ Other works by Tchihatchef are ‘*Une Page sur l’Orient*’ (2nd ed. 1877); ‘*Le Bosphore et Constantinople*’ (3rd ed. 1877); ‘*Considérations Géologiques sur les Iles Océaniques*’ (1878); ‘*Espagne, Algérie et Tunisie*’ (1880); a French translation of Griesbach’s ‘*Pflanzengeographie*’; ‘*Kleinasien*’ (1885); and ‘*Études de Géographie et d’Histoire Naturelle*’ (1890). He was long resident in England, and from time to time attended and read papers at the meetings of the British Association for the Advancement of Science. At the Nottingham meeting in 1866, in presenting a topographical and geological map of Asia Minor, he gave a sketch of the principal geological features of Asia Minor. At the Exeter meeting in 1869 he read in the Geographical Section a paper on Central Asia; and at Southampton, in 1882, one on the Deserts of Africa and Asia.

Mr. J. W. Barns, C.E., recently deceased, at the age of sixty-five, was well known as an engineer who had carried out various important public works in India, and was highly esteemed for his zeal, capacity, and integrity. He entered the Sind Irrigation Department in 1855, and earned from the head of that department in 1862, Colonel Fife, R.E., great praise for the economy in construction and accuracy of levelling with which he had carried out the canal works. The great Sind system of canals, irrigating over a million acres, was no mean school of engineering skill. It was, therefore, a wise selection which, in 1868, made Mr. Barns the superintendent of irrigation in the Feudatory State of Bahawalpur; which office he held till his retirement when the chief of that State came of age in 1880. His service in Bahawalpur

is summarised as follows by Colonel Grey, who was the political agent at that time :—“ A vast system of irrigation was constructed and left in thorough working order, which the State owes to Mr. Barns, under whose guidance and supervision the works were constructed.” The canals thus left by Mr. Barns to the Bahawalpur State are 1100 miles in length, irrigating, on an average, more than 300,000 acres. In addition to this, he advised Colonel Grey in the construction of a series of canals in the British district of Ferozepore, whose average irrigation is 180,000 acres.

Colonel Minchin, the political agent who employed Mr. Barns in Bahawalpur, reporting on his professional skill, said :—“ The Bahawalpur Canals are what is commonly known as ‘ Inundation Canals ;’ that is, they only run during the inundation season. But Mr. Barns so arranged the canal mouths that many of them could be kept open for nine months in the year. It was found that during the height of the floods, a much larger body of water was brought into the mouths of the canals than they could safely carry ; this defect was remedied by the construction of escapes near the head, the surplus water being led into local depressions, where it could be usefully employed in flooding large areas for spring crops, which could not otherwise be irrigated at all. These large works, which were most economically constructed, were, in my opinion, a real stroke of genius. I would particularly notice that the chief excellence of Mr. Barns’s work was its adaptation to the wants of the country, and taking advantage of every circumstance that would facilitate his schemes. This was only attained by real hard work and minute knowledge of the peculiarities of the country, and a thorough knowledge of his own branch of the profession. In almost every canal he was able to obtain surface flow within three miles of the head, and the canals were so arranged that the lower canal supplemented the one above it ; so that nearly every portion of the country, which lies along the banks of the Sutlej, Chenab, and Indus rivers for the distance of 300 miles, obtained canal irrigation.”

Mr. Barns’s linguistic proficiency and knowledge of native character were undoubtedly factors of great importance in his usefulness. But the main secret of his success was the confidence inspired by his character in all, native or European, with whom he came in contact.

Mr. Barns contributed two papers to the ‘ Journal ’ of our Society, one on the Subterranean Supply of Water in Beloochistan and the Hill districts of Western Sind, published in vol. xxxvii. p. 338 ; the other entitled ‘ Notes on the Physical Geography of the Bahawalpur State,’ with map, vol. xlii. p. 390.

REPORT OF THE EVENING MEETINGS, SESSION 1890-1.

First Meeting, 11th November, 1890.—The Right Hon. Sir M. E. GRANT DUFF, G.O.S.L., &c., President, in the Chair.

ELECTIONS.—*Commander Thomas Alderton ; Charles P. MacCarthy, Esq. ; F. von der Pfordter, Esq. ; John Beddome Snell, Esq. ; Wm. Hy. Wainwright, Esq.*

The paper read was :—
British Central Africa. By H. H. JOHNSTON, Esq., C.B., H.B.M. Consul, Mozambique. (*Ante*, p. 713.)

NEW GEOGRAPHICAL PUBLICATIONS.

(By J. SCOTT KELTIE, *Librarian* B.G.S.)

EUROPE.

Sella, V., and Vallino, D.—Monte Rosa e Gressoney. Oblong 4to., pp. 59, illustrations. [Presented by D. W. Freshfield, Esq.]

Signor Vittorio Sella has, in conjunction with Dr. Vallino, found time between two summers in the Caucasus to illustrate one of the most interesting of the valleys of the Italian Alps. Gressoney lies south of Monte Rosa, and its stream, the Lys, falls into the Dora Baltea near the lower end of the Valle d'Aosta.

The romantic scenery of the lower gorges, the pastoral charms of the upland meadows of the Val de Lys, are little known to the herd of holiday-makers; but they have attracted the better sort of Alpine travellers, from De Saussure and the Rev. W. S. King, the author of 'The Italian Valleys of the Pennine Alps,' to Robert Browning and "Margarita di Savoja, Regina d'Italia," who last year emulated De Saussure in passing three nights on the summit of the St. Theodul Pass and climbing the Breithorn.

The peculiar interest of these southern valleys of Monte Rosa to the geographer is the illustration they afford of the relations between topography and history. Their upper basins are inhabited by a population speaking an archaic German patois, who have up to the present day kept their local dialect and costume and usages intact, and have had their principal relations, not with Piedmont but with Teutonic Switzerland and Germany. Thanks to the researches of some foreign students and of the Rev. W. A. B. Coolidge in this country, we shall soon be in a position to trace exactly the date and circumstances under which these colonies moved across the Alps—as the Ossetes moved across the Caucasus. We shall be able to realise the time when Zermatt was nothing but a summer station of flocks, and when the Saasthal was known as the Martinswald and was without permanent habitations. In gaining this new knowledge we must make up our minds to give up one picturesque legend—that of the establishment at Saas of a colony of the Saracenic freebooters who infested the Great St. Bernard in the tenth century.

The authors of this volume point out that the construction of a railway in the Valle d'Aosta, and of a carriage road in the Val de Lys, must lead to the gradual disappearance of most of the local peculiarities of Gressoney, as well as of the northern connection of its population. They have, therefore, done their best to supply a trustworthy record of these features by a series of photographs and a suitable descriptive text, accompanied by specimens of the local dialect. The name Gressoney itself comes, they assert, from Kressen-au, the Cress-Meadow. They also furnish a topographical description of the crest of the Monte Rosa chain. The derivation of the name from Roosa, Val d'Aostan patois for glacier, has now been fully established. Up to 1840, writes Dr. Vallino, none of the summits of the group had separate names. Without endorsing the exact date, the statement is substantially correct; and it was a consequence that the name Dufour Spitze was applied to the loftiest summit by the Federal Staff, just as Mount Everest has been so named by the Indian Survey. The local name of the mountain has, however, in the case of Monte Rosa remained that by which it is known to geographers.

Photography can hardly surpass in brilliant representation of nature S. Sella's view of the ice-capped crags of the Lyskamm with Mont Blanc floating in the air above its top as seen from one of the peaks of Monte Rosa; and there are many views which illustrate, with a success that is altogether exceptional, the high mountain platforms—

“Where the white mists, for ever,
Are spread and upfurl'd—
In the stir of the forces
Whence issued the world.”

AFRICA.

Borelli, Jules.—Éthiopie méridionale. *Journal de mon voyage aux pays Amhara, Oromo et Sidama.* Septembre 1885 à Novembre 1888. Paris, 1890: pp. 520, maps and illustrations. Price 27s. 9d. [Presented by the Author.]

Southern Ethiopia, the subject of this work, is probably one of the least accessible parts of the world, lying as it does in an out-of-the-way corner of Africa, surrounded, except on the Abyssinian side, by deserts and unexplored regions. It is here that the kingdom of Shoa is situate, to which country M. Borelli undertook a politico-scientific mission under the auspices of the Minister of Public Instruction—(would that such a functionary existed in England for the purpose of encouraging and controlling scientific expeditions). During the three years and three months the traveller was away from civilisation, communications were from time to time received from him,* and French geographers followed his movements with the deepest interest, for the scene of his wanderings was that in which the veteran Abbadie first won his laurels, and several of his countrymen had with more or less success followed in his footsteps. M. Borelli determined to continue their work, cross the region south of Abyssinia, map and survey as circumstances might permit, trace out the mysterious course of the Omo (Enarya), and penetrate as far as possible into the continent, visiting the unexplored tract south of Shoa, and making known its inhabitants. Of the measure of success attending his journey, the reader of this volume will be able to judge. Starting from Suez the author took the steamer to Aden, whence he crossed over to Obock, a French settlement on the west shore of the gulf. Here he had to decide the knotty question of routes, complicated as this was, not only by the rivalry and jealousy of two principal tribes—the Danakil on the north and the Isa-Somali on the south, who command all approach to the rich lands of the interior—but by international susceptibilities and mutual distrust on the part of France and England. To the covert hostility of the British consul at Zeila the author attributes much of the difficulty and opposition he experienced in organising his caravan and making a start. At length all preliminaries were arranged, and Tajurah was finally selected as the point of departure—Tajurah, the principal city of the Danakil, or Afar as they call themselves, once a great entrepôt for the slave trade, now happily discontinued or nearly so. Here M. Borelli made the acquaintance of some of the principal chiefs, among others with Mahomed Loeta, the slayer of Munzinger Pasha, formerly an Honorary Corresponding Member of our Society. The route from Tajurah as far as Herrer, a kind of neutral point and meeting place of the nomadic tribes, was followed, with variations, as far back as 1841 by Captain Harris, of the Engineers, and his companion, Assist.-Surgeon Kirk, and was described in vol. xii. of the Royal Geographical Society's Journal. Soon after leaving Herrer, the direction is nearly due west to the Hawash, a river of no great importance but liable to extensive floods in the rainy season. After crossing this river the traveller enters Shoan territory and proceeds through a country infested by wild animals to Ankober, the capital. On arriving there M. Borelli found the king had transferred his residence to Antoto, several marches off in the mountains, and he accordingly lost no time in following him thither. At Antoto he took up his quarters from June 16th, 1886, to April 30th, 1887, passing his time in interviews with the king and his ministers, and in acquiring a knowledge of the language. Part II. of his book refers to this period. Menelek, king of Shoa, or Shwa, was a vassal of Johannes † Negus Negeust of Abyssinia, of whom he stood in awe, while exercising quasi independent sway in his own dominions. He claims to be descended from the son of the Queen of Sheba by Solomon, though it would be difficult to trace distinguished ancestry in his portrait given in the book. His Shoan subjects belong to two dominant races, the Amhara and Oromo, the former of whom were converted to Christianity as early as the fourth century by Frumentius; the latter

* See 'Proceedings R.G.S.,' vol. x. (1888) pp. 39, 451; vol. xi. (1889) pp. 110, 182, 250, and 560.

† Upon the death of Johannes, King of Abyssinia, in 1889, Menelek succeeded him.

have at times fallen under Muhammadan influences, and in the 15th century devastated the country, putting an end to the ancient empire of Ethiopia. It is worth remarking that the teaching of a Spanish Jesuit, Father Pedro Poez, two centuries ago, is still remembered in the country. At the present time the Amhara clergy take their orders from an "abuna" or father appointed by the Coptic patriarch at Cairo, and one-third of the revenue is set apart for his support.

Under the Negus or king the government of the country is carried on by certain high functionaries called "ras" and "dedjasmach," who exercise civil and military authority and have the right of appointing their subordinates. One of the two "ras," by name Gavanna, owes his exalted position to the conquests he has made on behalf of Menelek, and the successful way he has extended the limits of the kingdom. The law administered is styled the "Fata Negeust," or Abyssinian code, an ill-digested mixture of canonical precepts and compilations from Justinian. The penalties in case of crime are very severe, especially for homicide, the king's authority, to whom all such cases are referred, being supreme, and no appeal being admitted from his judgment. The usual oath is "by the death of Menelek," and the punishment for perjury is the loss of a limb or the cutting off the nose or ears. Oaths are also taken on the cross and the "Book," meaning the Gospels. A law, happily rarely enforced, forbids all Amhara from taking snuff or smoking, and this leads to some perversion of justice where informations are laid against a person out of malice, or to satisfy a private grudge. Every landowner administers the law on his own fief, but appeals are in such cases allowed, and nobody has the right of passing capital sentence except the king and one of the ras. The Shoan army is supposed to consist of 120,000 fighting men, of whom only one-quarter are armed with guns. The weapon of the Oromo, who are more warlike than the Amhara, is the lance, which they throw with wonderful dexterity and precision.

While staying at Antoto, M. Borelli made several excursions in the neighbourhood. On one of these he visited the Marquis Antinori's tomb at the station of Let-Marafia, founded by this eminent naturalist for the Italian Geographical Society. On the 1st May, 1887, our author set out on an expedition to Harrar, in company with his countryman M. Rimbaud. The two Frenchmen travelled through the province of Mindjar, one of the richest in Shoa. It is described as a magnificent, well-cultivated country, producing an abundance of cotton. Water is, however, scarce, and in order to supply their wants the inhabitants are obliged to dig enormous trenches 50 to 60 metres long and 30 to 35 wide by 4 to 6 metres deep. Another serious drawback is the number of wild beasts: lions, elephants, buffalo, hyenas, and hippopotamus continually made their presence felt, and caused our travellers anxiety. Nor was their reception by the inhabitants of the country remarkably cordial. As the guests of the king, and accompanied from station to station by his officer, the necessary provisions and a guide were reluctantly supplied, but it was with evident relief that each functionary handed them over to his successor, and sometimes the joy evinced at parting with the travellers took a more noisy and demonstrative form. "Here they are; here they are," one would shout out on approaching the station. "I am leading them to you. Give them beef, mutton, honey, bread, milk, &c." The town of Harrar contains a mixed population of 35,000 souls: Harrari, Somali, Oromo, Amhara, Danakil, a few Arabs or Turks, and six Europeans, of whom four are Greeks. The houses are built of stone and earth, and the streets are converted into ravines by the rains. M. Borelli touches on the history of Harrar under its various conquerors during the present century, but augurs nothing favourable from the recent Amhara domination. He suggests this as the reputed land of Ophir. Returning once more to Antoto the author prepared for his more serious journey to the south. This is treated of in the fourth part of his journal, and is geographically the most interesting.

Crossing the Hawash near its sources, the route lies in a south-westerly direction, passing near Mount Dendy (3417 metres), an extinct volcano, with a curiously formed lake in its crater, and Mount Harro (3286 metres), where traditions still linger of volcanic eruptions (both these mountains were ascended

by the author) and then through a magnificent park-like country, with gigantic trees, numerous streams, prairies, and natural hedges of mimosa and jasmine. The climate is temperate, the Oromo inhabitants are not inhospitable, the population is Mussulman.

The crossing of the Ghibié, as the Omo is here called, suggests some speculations to the author as to the course and ultimate discharge of this river, to decide which was one of the chief objects of his journey. Is it, he asks, the Juba, the Sobat, the Nile itself, or an independent river distinct from any of the well-known arteries of Africa? His further explorations threw light on this question. These are summarised in Annex C of his book, where he shows clearly that the Omo has a general course to the south, and after being joined by a number of tributaries, enters Lake Shambara (Samburo or Rudolf). This lake was not actually seen by M. Borelli, but from the information he obtained from the natives of that part he has little doubt in identifying it with the great lake discovered by Count Teleki and M. Höhnel between 2° 30' and 4° 45' of N. lat., which they named Lake Rudolf, and his interviews and conversations with these Austro-Hungarian explorers at Cairo confirmed him in this surmise.

The maps, of which there are several in the volume, based on the author's observations, enable the reader to follow the routes taken by him; and the scientific appendices and annexes will repay careful perusal. The illustrations are a great addition to the work.—[E. D. M.]

Chaddock, George A.—Narrative of a Voyage of Exploration in the s.s. *Maud* on the East Coast of Africa, undertaken for the purpose of ascertaining the value of waterways hitherto unexplored, and with the object of establishing trade thereon, in British interests. Liverpool, 1890: 8vo., pp. 56, maps.

Finch, John.—To South Africa and back; being the narrative of a journey through Cape Colony, Natal, Orange Free State, and the Transvaal, including visits to the Diamond and Gold Fields. London, &c., Ward, Lock & Co., 1890: 12mo., pp. vi. and 186, portrait and illustrations. [Presented by the Author.]

Rugg, Rowland.—Matabililand: its Gold Fields, Boundaries, Geology, Mineral and other resources, History, and Armed Strength; the Tati District, the Mining Concessions and Royal Charter of the British South Africa Company. Compiled from official information, and the Travels of Dr. Livingstone, Herr Mauch, Thos. Baines, Mr. Selous, and others. With map. London, E. Forster Groom, 1890: 8vo., pp. ii. and 133. Price 2s. 6d. [Presented by the Publisher.]

A collection of extracts, from Blue-Books, newspapers, and other sources, relating to Matabeleland, describing the country under a variety of aspects.

AMERICA.

Angel, Manuel Uribe.—Geografía general y compendio historico del Estado de Antioquia en Colombia. Paris, Imp. de Victor Goupy y Jourdan, 1885: large 8vo., pp. xv. and 783, maps and plates. [Presented by the Author.]

[Chili.]—Documentos para la Historia de la Nautica en Chile. (Del Anuario hidrográfico, t. 14.) Santiago de Chile, 1889: 8vo., pp. vii. and 149, map. [Presented by F. Vidal Gormáz, the Director of the Chilean Hydrographic Office.]

This volume contains: Diary of the voyage and navigation of Father José Garcia of the Company of Jesuits, from his mission at Cailin in Chiloe, towards the south, in the years 1766 and 1767; Brief notice of a former mission to the archipelago of Chiloe for the space of eight months; Diary of the voyage of Don Cosme Ugarte to the western coasts of Patagonia, 1767–8; Voyages of the Pilot Don Francisco Machado to the western archipelagos of Patagonia.

Greswell, [Rev.] William Parr.—History of the Dominion of Canada. Oxford, the Clarendon Press, 1890: 12mo., pp. xxxi. and 339. Price 7s. 6d. [Presented by the Delegates, Clarendon Press.]

In this little volume Mr. Greswell endeavours to trace in brief outline the history of the Canadian Dominion, from its earliest beginnings to the present day. The opening chapters contain a sketch of the early European voyages to America, followed by others dealing with—the native races; New France and New England; France and the Mississippi between 1663 and 1688, including a sketch of the explorations of Marquette and De la Salle down the Mississippi; History of Newfoundland and Nova Scotia; Events between 1713–1758, including an account of Verendrye's exploration in the North-west, and the further exploration of Hudson's Bay regions by Middleton; the Development of Canada (1783–1809), including an account of Alexander Mackenzie's exploration in the Great North-west, and of the voyages of Cook, Clarke, and Vancouver along the north-west coasts of America; the Great North-west, including a summary of the Arctic explorations of Capt. J. Franklin, Dr. Richardson, George Back, Dease and Simpson, Parry and John Rae; British Columbia, including a sketch of the explorations of George Vancouver, &c., &c. The volume is illustrated with 11 maps.

[**St. Domingo.**]—Meteorological Observations made at Sanchez (Samaná Bay), St. Domingo, 1886–1888. By the late W. Reid, M.D. London, Eyre and Spottiswoode, 1890: 4to., pp. iv. and 64. Price 8s. 6d. [Presented by the Meteorological Office.]

GENERAL.

Baker, [Sir] Samuel W.—Wild Beasts and their Ways: Reminiscences of Europe, Asia, Africa, and America. 2 vols. London, Macmillan and Co., 1890: 8vo., pp. (vol. i.) xii. and 419; (vol. ii.) vi. and 379. Price 32s. [Presented by the Publishers.]

Sir Samuel Baker is a sportsman in the true sense of the word, whose object in hunting was not merely to kill but to study the habits of the animals pursued. Thus in the present two very readable volumes, the result of a long life's experience in many parts of the world, we have many instructive details concerning the habits of the animals that have come under Sir Samuel's own observation. The work is fully illustrated, and is an important contribution to the natural history as well as to the literature of sport.

[**Brussels Conference.**]—Actes de la Conférence de Bruxelles (1889–1890). Bruxelles, J. Hayez, 1890: folio, pp. 703.

Cust, Robert Needham.—Three Lists of Bible Translations actually accomplished, corrected up to August 1st, 1890. 1. Alphabetical. 2. Geographical. 3. Linguistic. London, [Elliot Stock, 1890: sq. 8vo., pp. 115. [Presented by the Author.]

Guillemard, F. H. H. [M.A., M.D.]—The Life of Ferdinand Magellan and the First Circumnavigation of the Globe, 1480–1521. London, G. Philip & Son, 1890: cr. 8vo., pp. viii. and 353. Price 4s. 6d. [Presented by the Publishers.]

This is the latest volume of the series entitled—"The World's Great Explorers and Explorations." Dr. Guillemard has endeavoured to make his subject as complete as possible; he not only relates the events in connection with the voyage of Magellan, but slightly deviates from the original plan of the series by entering somewhat fully into the early life of the great circumnavigator. This is an important feature of the volume, as no complete biography of Magellan has before appeared in English. There is an ample supply of maps specially prepared for the volume, besides a number of illustrations, many of which are original.

NEW MAPS.

(By J. COLES, *Map Curator, R.G.S.*)

EUROPE.

Damian, Josef.—Tiefenkarte des Molveno See's. Von —, Gymnasiallehrer in Trient. Scale 1:25,000 or 2·9 inches to a geographical mile. Petermann's 'Geographische Mitteilungen,' Jahrgang 1890, Tafel 19. Gotha, Justus Perthes. (*Dulau.*)

Nord-Ostsee-Kanal.—Offizielle Karte vom —, bearbeitet von der Kaiserlich Kanal-Kommission in Kiel. Scale 1:100,000 or 1·3 geographical miles to an inch. Mit einer kurzen Beschreibung herausgegeben von L. Brennecke. Berlin, Pasch. Price 3s. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued since the 15th October, 1890.

1-inch—General Maps:—

ENGLAND AND WALES: New Series, with contours. Sheet No. 186, Bude, Clovelly, Thornbury, Stratton, &c. 1s.

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Miscellaneous:—

Index to the New One-inch Map of the Ordnance Survey of England and Wales, and Scotland, in 3 sheets. Price 2s. each. Scale 10 miles to one inch.—Large Index to Monmouthshire. 2s. 6d.—Large Index to Anglesey. 2s. 6d.

(*Stanford, Agent.*)

ASIA.

Chine.—Carte de la mission de la Compagnie de Jésus au Tchen-Ly sud-est en 2 feuilles, publiée par le Père Carrez d'après les documents chinois. Échelle de 1:400,000. Gravée par L. Wuhler, Paris. (*Dulau.*)

AFRICA.

Afrika.—Neue Spezialkarte der deutschen und britischen Schutzgebiete und Interessensphären in Aequatorial-Ost Afrika, nach den Vereinbarungen vom Juni 1890, von R. Kiepert. Westliches Blatt. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Weimar, Geographisches Institut. Price 1s. (*Dulau.*)

Matabele Gold Fields.—Rugg's new map of the —, and Portuguese Territory. Compiled from official information and the reports of Herr-Mauch, Thos. Baines,

Mr. Selous and others, by Rowland Rugg, 1890. Scale 1:1,360,000 or 18·6 geographical miles to an inch. London: E. Forster Groom.

The special feature in this map is the manner in which the position of the gold-fields in the territory of the British South Africa Company and the Portuguese possessions, are indicated. Notes on the concessions, the mineral wealth, &c., of the country are given in different parts of the map, which are likely to be useful to any person visiting or having business connections with the country. The map is roughly drawn, but indicates the physical features of the country sufficiently for the purpose for which it was constructed.

Stanford, Edward.—Northern Zambezia, &c. Compiled for George Cawston, Esq., at Stanford's Geographical Establishment, London. Scale 1:1,000,000 or 13·6 geographical miles to an inch. 1890. Price 8s.

The area included in this map, extends from the eighth to the sixteenth degree of south latitude, and from longitude 25° 20' to 33° 30' east of Greenwich. It has evidently been very carefully compiled, correctly exhibits the present state of our knowledge of the geography of this part of Africa, and is drawn on a sufficiently large scale to make it useful for reference in cases where smaller scaled maps would be of but little service. The boundaries of the British sphere of influence, on the north and west coterminous with those of the Congo Free State, on the north-east with the German, and on the south-east with Portuguese spheres of influence, are accurately laid down. The map is very clearly drawn, and contains an amount of information that it would be difficult to find elsewhere.

Being drawn in the same style and on the same scale as Stanford's maps of the "Transvaal Gold Fields," "Matabililand," and "Nyassaland," it can be joined to them, thus forming an excellent large-scale map of the whole of the territory added to the British sphere of influence, by the recent Anglo-Portuguese Agreement.

— A Map of Nyassaland, compiled at Stanford's Geographical Establishment, London. Scale 1:1,000,000 or 13·6 geographical miles to an inch. 1890. 2 sheets. Price 8s.

This is one of the maps referred to in the notice of the map of "Northern Zambezia"; it shows the eastern limits of the British sphere of influence, Lakes Nyassa and Shirwa, the mouths of the Zambezi, and the entire course of the Shiré. The Shiré Highlands, with Blantyre and the stations of the different missionary societies, and the African Lakes Company are laid down. The map is clearly drawn, and is in most respects the best map of this region that has been published.

AMERICA.

Argentine Republic.—Mapa Parcial de la República Argentina entre la latitud 35 hasta 42 sud y longitud desde 62 hasta 74 oeste de Greenwich, con un registro grafico de las Gobernaciones Nacionales de la Pampa, del Rio Negro y del Neuquen y con las provincias correspondientes de la República de Chile. Por Jorge J. Rohde. Scale 1:1,000,000, or 13·6 geographical miles to an inch. Buenos Ayres, Ernst Nolte, 1889. Price 12. 12s. (*Dulau.*)

This map, which is drawn in a very effective style, embraces one of the most important parts of the Argentine Republic. All the survey sections are laid down, and it is accompanied by letterpress in which a general description of the governments of Pampa, Rio Negro, and Neuquen is given, together with information as to the laws respecting immigration and the formation of agricultural colonies, the fauna and flora, and a list of landed proprietors with numbers against their names corresponding to others given on the map, by which the exact position of any property, and the name of its owner, can easily be found.

Argentine Republic.—Plano topográfico de las Gobernaciones de Formosa y del Chaco, por Carlos F. V. Hansen. Impresor y Editor, José Ruland, Buenos Aires, 1889. Se vende en la Librería Alemania de Ernst Nolte. Scale 1 : 1,200,000 or 16·4 geographical miles to an inch. Price 16s. (*Dulau.*)

— Mapa de los Ferro-Carriles, Telégrafos y Correos de la República Argentina construido por el Dr. José Chavanne, editado por la Compañía Sud Americana de Billetes de Banco, Buenos Aires, 1889. Scale 1 : 3,500,000, or 47·6 geographical miles to an inch. Price 17s. (*Dulau.*)

This is a useful map as showing the present state of railway enterprise and telegraphic communication in the Argentine Republic. The lines in working order, those under construction, or proposed, are distinguished from one another by the manner in which they are laid down.

Mexico.—Carta General de la Republica Mexicana, formada en el Ministerio de Fomento con los datos mas recientes por disposicion del Secretario del Ramo General Carlos Pacheco, 1890. Scale 1 : 2,000,000 or 27 geographical miles to an inch. Grabado por Erhard Hermanos, Paris. Price 2l. 12s. (*Stanford.*)

Evident care has been taken in the compilation of this map, which is probably the best for its scale of this country that has been published. The importance of each place as regards population is distinguished by symbols, in addition to which a statistical table is given exhibiting the proportion of the population to the area of each State. All means of communication are shown, and the districts where mining operations are carried on are indicated.

— Carta Minera de la Republica Mexicana. Formada por disposicion del Secretario de Fomento Gral. Carlos Pacheco por el Ingeniero de Minas Antonio del Castillo, director de la Escuela Nacional de Ingenieros. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Grabado por Erhard Hermanos, Paris. Price 15s. (*Stanford.*)

This is an outline map of Mexico, on which the position of the mines, and the nature of the minerals are shown.

— Bosquejo de una Carta geologica de la Republica Mexicana formada por disposicion del Secretario de Fomento Gral. Carlos Pacheco por una Comision especial, baso la direccion del Profesor Antonio del Castillo, director de la Escuela Nacional de Ingenieros, 1889. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Grabado por Erhard Hermanos, Paris. Price 1l. 10s. (*Stanford.*)

CHARTS.

Admiralty.—Charts and Plans published by the Hydrographic Department, Admiralty, in September and October 1890.

No.		Inches.	
45	m =	0·47	Irish channel:—Lough Carlingford to lough Larne, including the coast of Scotland from port Patrick to Kirkcudbright and the Isle of Man, 2s. 6d.
2049	m =	0·5	Ireland, south coast:—Kinsale to Wexford, 3s.
1777	m =	6·9	Ireland, south coast:—Queenstown and port of Cork (outer sheet), 2s. 6d.
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1400	m =	various.	Italy, west coast:—Pozzuoli bay. Castellamare bay. Port Torre Annunziata. Port Castellamare, 2s. 6d.
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1217	m =	0·16	West Indies:—Florida strait (south part), 2s. 6d.

No.	m	=	Inches.	
1390			0·5	Africa, east coast:—Chale point to Pangani, including the island of Pemba (plan, Wasin channel), 2s. 6d.
1473			various.	British New Guinea, Louisiade archipelago:—Rossel island and lagoon. Swinger opening. Rabuso creek, 1s. 6d.
1428			3·3	South Pacific, Society islands:—Bora Bora island, 1s. 6d.
1908	Plans in Lower California:—New plan, Playa Maria bay.			
1310	South-west coast of Pemba island:—Plan added, Mchengangazi. (<i>J. D. Potter, Agent.</i>)			

CHARTS CANCELLED.

No.		Cancelled by	No.
45	Lough Carlingford to lough Larne	} New chart, Lough Carlingford to Lough Larne	45
1971	Firth of Solway to loch Ryan ..		
2336	Kinsale to Brattin head	} New chart, Kinsale to Wexford ..	2049
2049	Brattin head to Wexford		
1777	Queenstown and Cork outer harbour	} New plan, Queenstown and port of Cork (outer sheet)	1777
1728	Port Torre del Annunziata, Castellamare on this sheet ..		
1217	West Indies, sheet I.: Florida strait	} New plans, Port Torre Annunziata, Port Castellamare, on	1400
1107	Plan of Bora Bora island on this sheet		
310	Bio island to Quebec.	} New chart, Florida strait (south part)	1217
		} New plan, Bora Bora island	1428

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 1346—England, west coast:—Firth of Solway. 2159, Scotland, west coast:—Firth of Clyde and loch Fyne. 1415, Ireland, east coast:—Dublin bay. 633, Ireland, east coast:—Harbours on east coast of Ireland. 881, Norway, south coast:—Approaches to Hangesund. 156, Sweden, west coast:—Måseskär to Hallö. 213, Denmark, east coast:—Grön sound entrance. 1187, Spain, east coast:—Alicante to Palamos, with the Balearic islands. 170, Sicily:—Cefalù to Mazzara. 189, Sicily:—Trapani to Marsala. 301, North America:—Lake Michigan. 1274, Gulf of Mexico:—Tortugas cays to cape San Blas. 1911, North America, west coast:—Juan de Fuca strait. 640*b*, Africa, east coast:—Pangani to Ras Kimbiji. 2837*a, b*, Persian Gulf:—Persian Gulf, 2 sheets. 2653, China, north-east coast:—Peiho or Peking river, sheet 1. 1047, Australia, north-west coast:—Cape Ford to Buccaneer Archipelago. 2726, New Zealand, North Island:—Manukau harbour. 2616, New Zealand, Middle Island:—Cape Foulwind to D'Urville island. 695, New Zealand:—Cook Strait. 2054, New Zealand, North Island:—Cook Strait and coast to Cape Egmont. 2529, New Zealand, Middle Island:—Cape Campbell to Banks Peninsula. 2590, New Zealand, Middle Island:—River Awarua to river Waiau. (*J. D. Potter, Agent.*)

North Atlantic Ocean.—Pilot Chart of the North Atlantic Ocean, November 1890. Published monthly at the Hydrographic Office, Navy Department, Washington, D.C. Richardson Clover, Lieut. U.S.N., Acting Hydrographer.

Portuguese Charts.—Plano hydrographico da Bahia do Mocambo. 1890. Scale 1:40,000 or 1·8 inches to a geographical mile. Levantado em 1888 por Francisco Corrêa Leotte, Conductor d'obras publicas e J. D. Leotte do Rego, Guarda-Marinha. Comissão de Cartographia. 1890.—Plano hydrographico da Barra e Porto do Rio Chinde. Provincia de Moçambique. Scale 1:20,000 or 3·6 inches to a geographical mile. Levantado de junho a agosto de 1889, sob a direcção do commandante, do canhoneira Liberal Manoel Lourenço Vasco de Carvalho, pelos officiaes da armada L. Caetano Pereira, Alvaro Andrea e A. da Costa Rodrigues. Comissão de Cartographia. Ministerio da Marinha e Ultramar. Lisboa.

ATLASES.

Atlas Antiquus.—12 Karten zur alten Geschichte von H. Kiepert. 10. bericht. Auflage. Berlin, D. Reimer. Price 15s. (*Dulau.*)

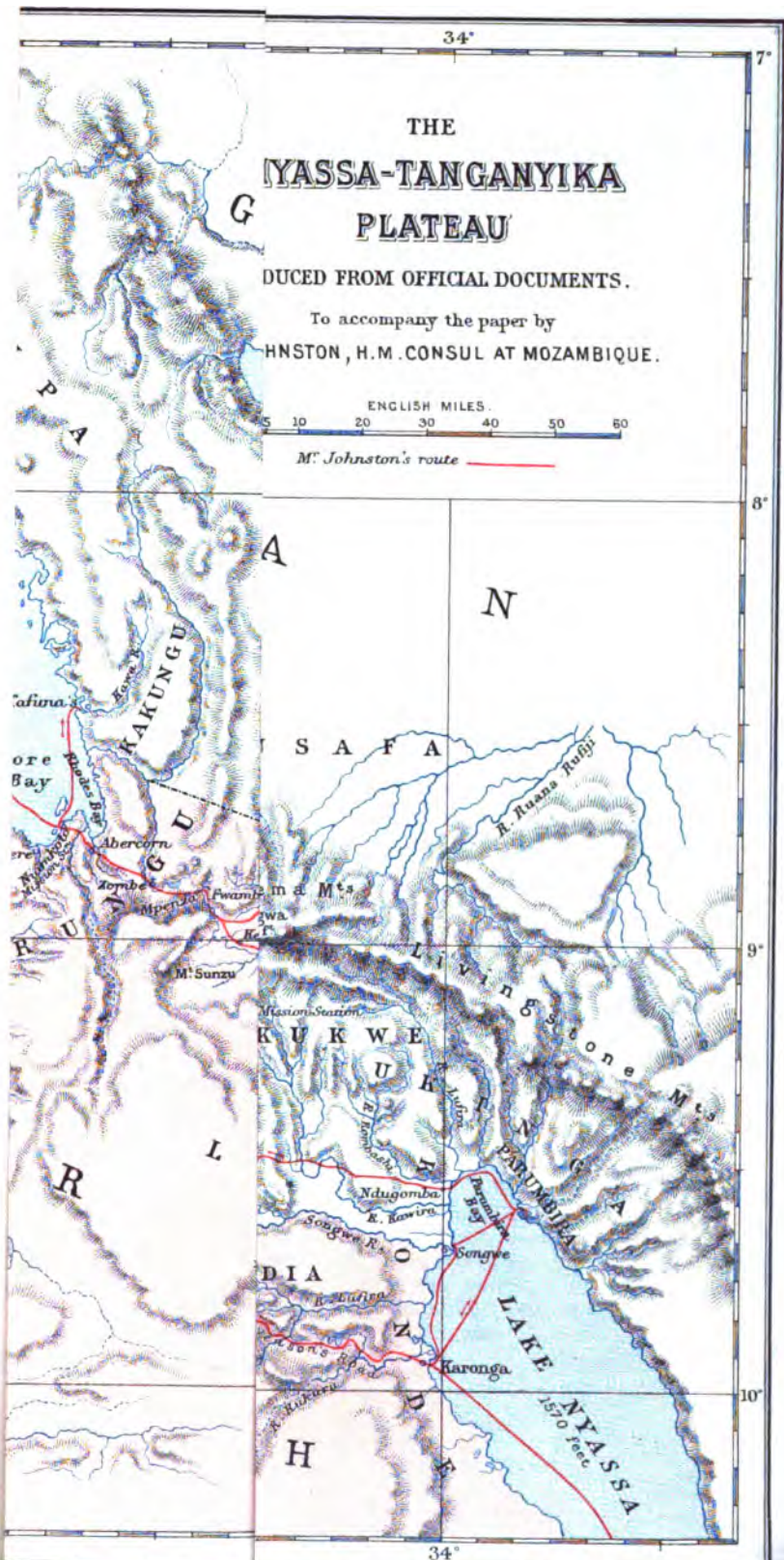
Levasseur, Émile.—Grand Atlas de Géographie Physique et Politique, par Émile Levasseur, Membre de l'Institut, Professeur au Collège de France et au Conservatoire des Arts et Métiers. Institut Géographique de Paris, Librairie Ch. Delagrave, Editeur. Paris 1, 2, & 3. Price 4s. each part. (*Dulau.*)

These are the three first issues of a general and physical atlas, which when completed will contain 160 principal maps, and 330 insets. The first issue is accompanied by an introductory notice in which the authorities consulted, and the scales on which the maps will be drawn, are given; and from this it appears that, with some necessary exceptions, the scales adopted are either uniform, or multiples one of the other. It is stated that the atlas has been five years in course of preparation, and that owing to Colonel Niox having placed some of his maps at the disposal of the author, it is now in a very advanced state. This is a satisfactory piece of information, as the fact of the maps being ready for publication will admit of the parts being issued at regular intervals. Part I. contains the following maps:—Central Europe orographically coloured; the Southern portion of the British Isles, with nine insets; Scandinavia, with six insets; South-east Australia and Southern Queensland, with two insets; and a political map of North America, on which all the principal railways, ocean steamship routes, and the ocean currents are shown. Part II. contains the World on Mercator's Projection, a political map of Europe, the French Colonies in America and Oceania, the Northern portion of the British Isles, with seven insets, and Austro-Hungary, with five insets and two sections. In Part III. there is an excellent orographic map of France, a map of the French Colonies in Asia, one of Holland and Belgium, with seven inset maps; a political map of Asia, on which the principal railroads, steamship routes, and ocean currents are shown, and a map of the Malay Archipelago.

The style in which the maps have been produced is not by any means uniform, but taken as a whole they are clearly drawn, and have the merit of not being overcrowded with names.

PHOTOGRAPHS.

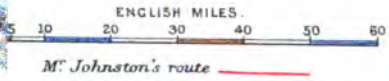
N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.



THE NYASSA-TANGANYIKA PLATEAU

DUCED FROM OFFICIAL DOCUMENTS.

To accompany the paper by
HNSTON, H.M. CONSUL AT MOZAMBIQUE.





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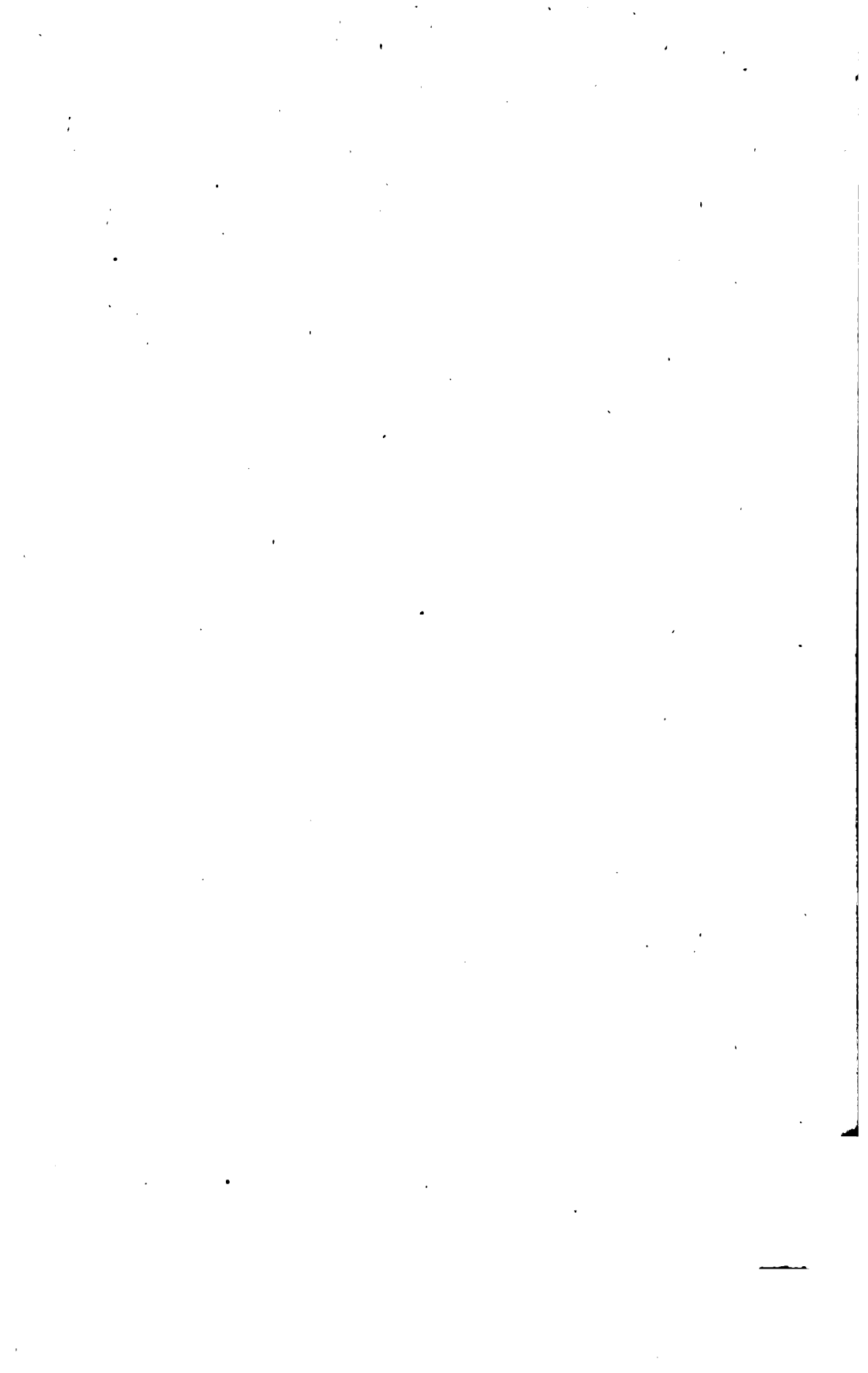
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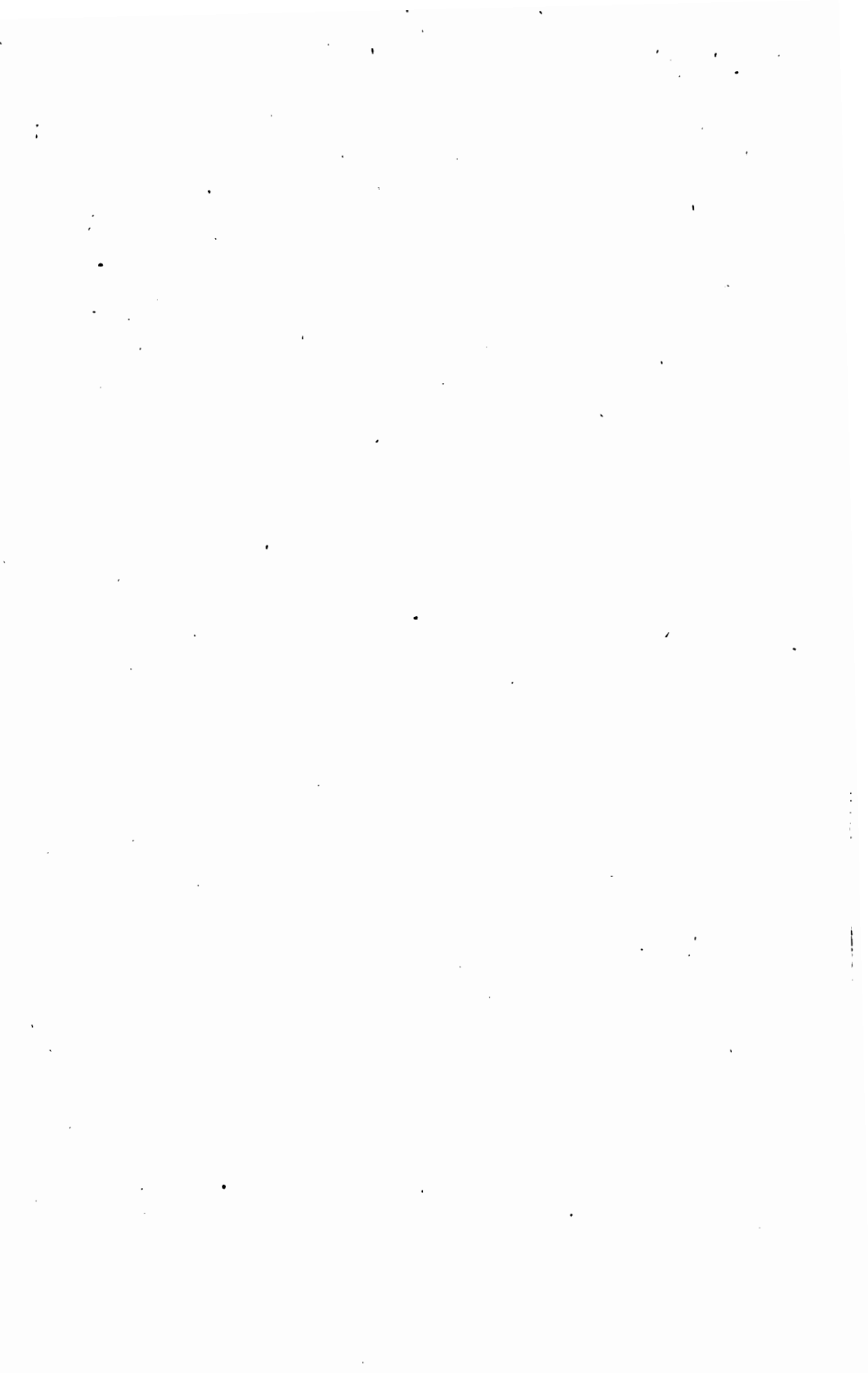
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the 1990s, the number of people in the UK who are aged 65 and over has increased from 10.5 million to 13.5 million, and the number of people aged 75 and over has increased from 4.5 million to 6.5 million (Office for National Statistics 2000).

There is a growing awareness of the need to address the needs of older people, and the UK Government has set out a strategy for the 21st century (Department of Health 1999). The strategy is based on the principle of 'active ageing', which is defined as 'the process of optimising opportunities for health, participation in society, and security in old age' (Department of Health 1999).

The strategy is based on three pillars: health, participation, and security. Health is defined as 'the state of being free from illness or injury', participation is defined as 'the ability to take part in the activities of everyday life', and security is defined as 'the ability to meet the needs of old age' (Department of Health 1999).

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