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GEOGRAPHICAL MAGAZINE.

EDITED BY

CLEMENTS R. MARKHAM, C.B., F.R.S.

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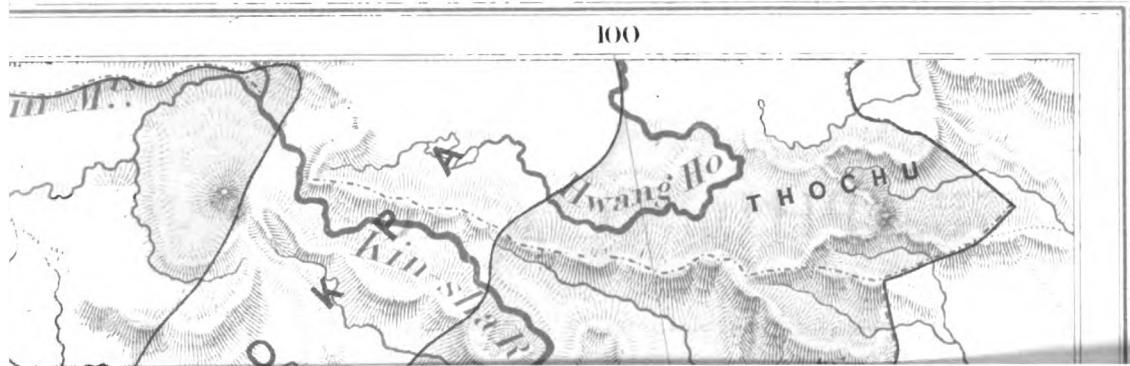
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THE  
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LANGUAGE-MAPS OF THE EAST INDIES.

I.

BRITISH INDIA AND ITS BORDER STATES.

PHYSICAL, Political, Geological, and Ethnical Maps meet the eye constantly: this is an attempt to produce a Language-Map, to ascertain the number of distinct vernacular languages spoken at the present time within the East Indies in its widest sense; to group them in families; exclude dialects, which are but variations, more or less marked, of the same language; define the areas, accurately or approximately, within which such languages are spoken; and state the number and religion of the population, where reliable data are forthcoming.

The idea is not entirely a novel one: Sir Erskine Perry in 1853, and Mr. Beames, of the Bengal Civil Service, in 1868, made meritorious attempts to produce such a map of British India; but their scale was small, and their information limited. In the last quarter of a century linguistic science and statistics have made great strides; and those, who are responsible for the language-maps in this and the succeeding number of the *Geographical Magazine*, have freely laid under contribution their numerous official friends in every part of India, in England, in France, and in Holland; they have had access to the libraries of the India Office, and the Asiatic and Geographical Societies; and have striven to enter no language, of which there does not exist a vocabulary, and state no fact unsupported by the best attainable authority at the present date.

Notice of the linguistic features of such languages, and their inter-relation with each other, will find a more suitable place in the pages of the Journals of the Asiatic and Philological Societies, or in separate treatises: one *dictum* only of linguistic science is exhibited in this map, viz., the indication by colour of the families, to which such languages are held to belong; but the reason for so grouping them lies beyond the scope of this magazine, which deals only with the positive fact of the distribution of the speakers of language, and not with the inductions founded on a critical examination of different languages.

The authorities consulted are the following:—

1. *Kafiristan*.—Dr. Trumpp, in *Journal of Royal Asiatic Society*: Map of Central Asia.
2. *Kashmir Frontier*.—Mr. Drew's *Jummoo and Cashmere*, Colonel Cunningham's *Ladakh*, Dr. Leitner's *Dardistan*.

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3. *Sind Frontier*.—Map supplied by the Commissioner of Sindh; *Sindh Gazetteer*; Hughes's *Baluchistan*.
4. *Punjab Frontier*.—Map supplied by the Commissioner of Peshawur, and Note by Dr. Bellew.
5. *Bengal*.—*Census Report of 1872*.
6. *Bombay*.—*Administration Report of 1872-73*, with Note by the late Dr. John Wilson, of Bombay; *Census Report of 1872*.
7. *Madras*.—*Census Report of 1871*; Bishop Caldwell's *Comparative Grammar*.
8. *Mysore*.—Rice's *Mysore and Coorg*.
9. *Ceylon*.—Sir Emerson Tennant's *Ceylon*.
10. *Chota Nagpur*.—The Personal Instructions of Colonel Dalton, late Commissioner; *Census Report, 1872*.
11. *Central Provinces*.—*Census Report of 1872*, and *Central Provinces Gazetteer*.
12. *Nepal Frontier*.—Essays of Bryan Hodgson, late Resident of Nepal, in the *Journal of Bengal Asiatic Society*.
13. *Eastern Frontier of Bengal*.—N.E. Frontier Map, and the Personal Instructions of Major Godwin Austen, Surveyor of Assam; *Census Report of 1872*.
14. *Munipur Frontier*.—Report of Colonel M'Culloch, Civil Officer of Munipur; *Records of Government of India*.
15. *Chittagong Frontier*.—The Personal Instructions of Captain T. H. Lewin, Deputy-Commissioner of Hill Tracts, and his book.
16. *Burmese Frontier*.—The Personal Instructions of Major G. Fryer, Deputy-Commissioner of Sandoway, and Captain Forbes, Deputy-Commissioner of Shwegyeen.

All these personal and written authorities have been carefully consulted and tested, and the results entered on the Index Map of British India supplied from the India Office, by Mr. E. L. Brandreth, late of the Bengal Civil Service, who has also superintended the construction of this map by Mr. Stanford, of Charing Cross. The number of books and essays in different journals which have been examined, in addition to those mentioned above, is very considerable. No pains have been spared.

And yet this map is only put forward as a first attempt to grapple with a great subject, and a target to receive the shafts of the local authorities in every part of India. Some will hit the red; some will aim at the blue: the object of the undersigned, and his friend above mentioned, is to touch the golden mean

B

of approximate, if not actual, accuracy; and no one will sit in severer judgment on this map than those, who have undertaken to compile and publish it, looking to future editions for annually increasing precision, and determined to arrive at some correct results on this important branch of knowledge.

Seven families of languages are exhibited by colours in this map:—

- |                                |                                 |
|--------------------------------|---------------------------------|
| 1. Aryan— <i>Red.</i>          | 5. Khasi— <i>Brown.</i>         |
| 2. Dravidian— <i>Green.</i>    | 6. Tai, or Shan— <i>Purple.</i> |
| 3. Kolarian— <i>Sienna.</i>    | 7. Mon— <i>Yellow.</i>          |
| 4. Tibeto-Burman— <i>Blue.</i> |                                 |

Of these the five first alone will be noticed in the remarks of this month: the two latter will appear in their fuller development in the second map of "Further India, and the Indian Archipelago," which will form part of the next number of this magazine. We proceed to notice these five families in order.

1. The Aryan family, also called the Indo-European, comprises many famous branches, two only of which come under present consideration: one the "Iranic" in part, and the other, the "Indic," in totality. Of the Iranic we have as representatives, the Pashtu or Pukkhtu, and the Baluchi. The bulk of the population which speak these languages, and speak them in their purest form, dwell outside the limits of British India in the independent States of Afghanistan and Kilat, but a certain portion of British subjects speak Pashtu in the divisions of Peshawur, the Derajat, and Rawulpindee, in the Province of the Punjab, and a certain portion of British subjects speak Baluchi in the lower portion of the division of the Derajat, to the number of 235,000, and the upper portion of the Sindh division of the Bombay Province, to the number of 145,000. They are Muhammadans.

The Indic branch of the Aryan family consists of seven great and seven less important languages. They are as follows:—Punjábi, Sindhi, Hindi, Bengali, Uriya, Maráthi, and Gujaráti are spoken by scores of millions, over a compact area, which is, perhaps, the largest, the most populous, and wealthiest linguistic platform in the world. Kafiri, Dardui, Kashmiri, Brahuí, and Sinhalese, are undoubtedly distinct languages, but spoken by a limited population only. Nepalese and Assamese might be treated as dialects of Hindi and Bengali respectively; but it has been deemed expedient to class them provisionally, in the present state of our knowledge, as languages.

The Punjábi is spoken by a Hindu and Muhammadan population of sixteen millions, resident in the lower ranges of the Himalayas, and the plains intersected by the five famous rivers, which give that province its name. There is a great variety of ill-defined dialects, but the Dogri of the Lower Hills, and the Mooltani—which last occupies a transitional position towards Sindhi—are very distinct. The Sindhi is spoken by a population of one million and three-quarters, of which one-fifth is Hindu and the remainder Muhammadan, residing on either side of the lower course of the River Indus, in the Sind division of the Province of Bombay. It is spoken also by the inhabitants of the Peninsula of Kach, an independent State, amounting to half-a-million, who are Hindu, and by a certain number of the Muhammadan subjects of the independent State of

Kilat. It has several clearly-defined dialects, one of which, Káchi, is transitional to Gujaráti. The Hindi is that magnificent language, which is spoken, in its pure form and its numerous dialects, by a population of seventy millions, the majority of whom are Hindu, but there are many millions of Muhammadans. It occupies an area larger than that of France, and so central a position, that it impinges upon every one of its six great Indic sister-languages, and overspreads a portion of the Province of Punjab, the whole of the North-West Provinces, with Oudh, a portion of the Province of Bengal, a part of the Central Provinces, the whole of the States of Rajputana, Bundelcund, and Bhagélcund, the Rajput States of the Hills, and the two great Maráthi States of Indore and Gwalior. One of its dialects, Urdu, or Hindustani, as the *lingua franca* of India, has a still wider development. The Bengali is spoken by a population of thirty-seven millions, a little more than half of whom are Hindu, and the remainder Muhammadan, inhabiting the delta of the Rivers Ganges and Brahmaputra, in the Province of Bengal. It has dialectical varieties, but no clearly-defined dialects. The Uriya language is spoken by eight millions in the Provinces of Bengal and Madras, and in the Central Provinces, who are chiefly Hindu. It has no defined dialects. The Maráthi spreads across the peninsula within the limits of the Province of Bombay, the Central Provinces, and the independent State of the Nizam. It is spoken by a population of ten millions. It has well-defined dialects, one of which, the Konkani, has almost assumed the rank of a language. The Gujaráti is the least important of the seven great Aryan vernaculars. It is spoken by a population of six millions, chiefly Hindu, in the Province of Bombay and the independent State of Gujarát. It has also a more extended use as the language of the Parsees, and of commerce in Western India.

Of the smaller Aryan languages, Kafiri is spoken by the Siah-Posh Kafirs, savage Pagans, outside the frontier of British India. Dardui and Kashmiri are spoken by a population of one and a half million, Hindu and Muhammadan, within the boundaries of the independent State of Kashmir. Brahuí is the language of a Muhammadan population in the independent State of Kilat. Sinhalese is the language of the population of the southern half of the Island of Ceylon, an English colony, amounting to one and three-quarter millions, chiefly Buddhists, and of the inhabitants of the Laccadive and Maldive Islands.

Nepalese is the language of the dominant tribe of the Goorkha independent State, in the lower ranges of the Himalayas, and is spoken chiefly by Hindu, of a number quite uncertain. Assamese is the language of the inhabitants of the Valley of Assam, chiefly Hindu, and amounting to two millions, in the Province of Assam.

2. The Dravidian family consists of four great and eight less important languages. The former are as follows: Tamil, Telugu, Kanarese, Malayálim. The latter are: Tulu, Kudagu, Tuda, Kota, Khond, Gond, Oraon, and Rajmahali. The Tamil language is spoken by a population, chiefly Hindu, of fourteen and a half millions in the Province of Madras, and the northern portion of the English colony of Ceylon. The Telugu is spoken by a population chiefly Hindu, amounting

to fifteen and a half millions, in the Province of Madras, the Central Provinces, and the independent State of the Nizam. The Kanarese is spoken by a population of nine millions and a quarter, chiefly Hindu, in the Provinces of Bombay and Madras, and the independent States of Mysore and the Nizam. The Malayálim is spoken by a population of three millions and three-quarters in the Province of Madras and the independent States of Cochin and Travancore, chiefly Hindu. Of the eight smaller languages the Gond is spoken by a population of one and a half million on the confines of the Provinces of Madras, Bengal, and the Central Provinces, who are Pagans. The remaining seven are spoken by a population of about a million Hindus and Pagans, scattered over the Provinces of Bengal, and Madras, and the Central Provinces in small patches, from Rajmahal on the Ganges to the Hills of Ootacamund, thus testifying to the enormous area over which this family has extended at some period of its history.

3. The Kolarian family consists of seven languages, spoken by a population scant in number, backward in civilisation, and Pagans, in the Provinces of Bengal and Madras and in the Central Provinces. They are as follows: Sonthal, Mundari (known also as Ho, Kol, and Bhumij), Kharia, Juang, Korwa, Kur or Kurku, and Savara. Their number is inconsiderable, and short of a million, but great interest attaches to the language and future prospects of this non-Aryan people, the survivors of the Aryan immigration.

4. With the Tibeto-Burman family, under the pressure of various circumstances, a different method is had recourse to. No name has been entered on the map, of which a vocabulary does not exist; but on the other hand, in dealing with forms of words taken down orally from the mouths of persons without culture, and possessed of no form of handwriting, it cannot be predicated with certainty, in the state of our existing knowledge, whether some are not mere dialects of one general language. On the other hand, the use of tribal names may lead into the error (which certainly exists as regards the Nagas) of lumping together totally distinct languages. For the sake of clearness we divide this family into four groups, upon *geographical* and not linguistic data.

(I.) Regions of the Himalayas, from the R. Chenab to Bhotan.

(II.) The horse-shoe valley of the Brahmaputra, and its borderers.

(III.) The Munipur and Chittagong hill-tracts.

(IV.) Burmah.

It may appear but a detail of names; but it is believed, that these names represent facts, some of them important, and all interesting. In the first group, situated in the Province of the Punjab, the North-West Provinces, and the independent States of Tibet, Kashmir, Nepal, Sikkim, and Bhotan, there are fourteen languages—Tibetan or Bhotiya, Kanawari, Surwar, Gurung and Murmi, Magar, Kusunda, Chepang, Pahari, Newar, Bhramu, Kiranti, Vayu, Limbu, Lepcha. With the exception of the first and the last, these languages are spoken by a hill-population in a backward state of civilisation, partly Hindu, partly Buddhist, and partly Pagan. The first on the list, Tibetan or Bhotiya, is a language of the greatest importance, spoken over an enormous area outside the frontier of British India by a Buddhist

population, of which we have no means of estimating the number. The last on the list is a vernacular of promise spoken by the people of Sikkim, about 7000 in number. In the second group, situated on the frontier of the Province of Assam, there are fifteen languages—Dhimal, Kachari, Aka, Deoria-Chutiya, Dophlia, Miri, Abor, Mishmi, Singhpo or Kakhyen, Naga, Liyang, Marung, Mikir, Garo, Pani-Koch. The number of each tribe is quite uncertain: they are generally uncivilised and Pagans; some are downright savages. In the third group, lying partly in the Province of Bengal and partly outside the frontier of British India, there are ten languages—Munipúri, Kapui, Tangkhul, Luhupa, Tipura, Kuki, Shendu, Banjoge, Sak, and Kyau; to which the same remarks will apply as were recorded for the second group. In the fourth there are the Burmese, with its well-defined dialects, and its congeners of the hills, the Khyen, Kumi and Mru, and the Karén, consisting of several well-defined dialects, spoken by a population in British Burmah of two millions and a half, chiefly Buddhist, with a sprinkling of Hindu, Pagans, and Muhammadans, and in the independent state of Burmah by a population of three and a half millions, chiefly Buddhist. To this group must be added, for the sake of exhausting the subject, the Mergui language, spoken by the scant population of the Mergui Islands, and the languages of the Nicobar and Andaman Islands, which are spoken by a population of about 8000. A fifth group might be formed of the languages lying entirely beyond the frontier and influence of British India, such as the Horpa, Manyak, and Gyarung, &c., which appear on the map, and of which we know little except their existence. Thus the Tibeto-Burman family contains a list of forty-four names, which might have been indefinitely expanded, had not all evident dialects been excluded.

5. In the Khasi family is one single language, spoken by a tribe on the southern frontier of Assam, who are grouped in twenty-five little republics, and has a population of about 85,000.

It would be of no advantage to detail the precise boundary line of each language, for the map is on too small a scale to define it with any degree of accuracy, nor would it be possible, with our present information, to do so. The great Aryan and Dravidian languages, respectively, melt, as it were, imperceptibly into their sister-languages, and on the border-land there is no doubt a dialect partaking of the characters of both. Minute local enquiry is necessary to define the precise town or village where a language of one family ends and that of another commences; and it would require very nice local knowledge of the physical features of the country, the ethnical features of the people, and the political circumstances of the province, to explain, how the present distribution of languages came about.

There are remarkable intrusions of one language into the area of another, and overlappings, which it is not easy to explain. Many of the aboriginal tribes of Central India have given up their language, and adopted a mongrel Hindi, and the same state of things is reported of the wild, and possibly pre-Dravidian tribes of the south of India. The Veddahs of Ceylon speak a dialect of Sinhalese, and the original language of that island, colonised by Aryans,

and Dravidians within historic times, has disappeared. But such linguistic anomalies are found everywhere, and now that civilisation and education are in progress we may expect further changes on the Language Map of British India, and the absorption of some of the weaker members of each family.

ROBERT CUST.

### THE NORTH-WESTERN FRONTIER OF INDIA.

EVER since the British occupation of the Punjab and Sind, the western frontier of India has been kept in a state of continual disturbance by the lawless tribes beyond it. The boundary line was drawn as much as possible in the plains, so as to avoid collision with the unruly highlanders; and it may have been expected that, being left to themselves, they would have remained contented among the hills, and not have ventured on attacking the well-guarded British districts in the lowland. Being also recognised as subjects of the Afghan and Baluch sovereignties, it might have been presumed that those native Governments would find the means of exercising such a control over these borders, as at least to prevent them from causing trouble to their powerful British neighbour, especially as the rulers of Kabul and Kilat might depend on British India for reasonable aid in endeavouring to keep the peace for the common benefit.

But although there has been from time to time, and there still is, some hope that the Khan of Kilat may in the future realise this expectation, there never was the slightest foundation for anticipating such a result from the Amir of Kabul, that has not been invariably disappointed. Besides being powerless to extend his authority up to the Indian frontier, and to restrain the turbulent tribes who trouble us, each Amir in succession has proved to be utterly faithless; and when we have been but too ready to accord our liberal aid, it has only been to find it turned against ourselves. Such, indeed, is the testimony of every authority to the national character of the Afghans, that it seems unwarrantable to expect any other treatment. At length it appears that the Indian Government have resolved upon reconsidering the organisation of the North-Western Frontier; and no doubt the whole subject will be thoroughly and fairly discussed in the full light of the knowledge and experience gained in the past, and especially during the last thirty years.

The circumstances of the present day are widely different from those which influenced the selection of the existing boundary line, and dictated our policy towards the tribes beyond. Then the Punjab had only been recently acquired, and British administration had to be organised and consolidated within limits involving the least amount of opposition, and admitting of the prompt establishment of peace. The few alterations which have been made since, have been forced upon the Government by the same conditions as those which now cry aloud for adjustment: namely, the offences of the tribes that were left beyond the British boundary, and were supposed to be subject to the Amir of Kabul, but who have proved to be quite beyond the reach of his influence or authority. The recent approximation of another great European power

towards the disturbed frontier, now gives to its settlement an increased importance, and is of itself a sufficient motive for undertaking the task.

The Indian side of the frontier is included within the British Divisions or Commissionerships of Sind, Derajat, and Peshawur, and the native dependency of Kashmir. The Sind frontier is divided between the districts of Karachi, Shikarpur, and Upper Sind. Derajat has the districts of Dera Ghazi Khan, Dera Ismael Khan, and Bannu. The Peshawur districts are Kohat, Peshawur, and Hazara. The Governorship of Gilgit comprehends the Kashmirian part of our frontier. At present, Sind is under the Government of Bombay, while Peshawur and Derajat are subordinate to the Lieutenant-Governor of the Punjab, and are thus more directly amenable to the Governor-General. The entire range of the frontier is, however, naturally connected by the great river Indus, which has Karachi for its seaport; and this union will be still further promoted by the connection of the Sind Railway with the Punjab line by the Indus Valley Railway.

Beyond the British boundary, Sind is in contact with Baluchistan, to which it is not intended to allude further on the present occasion. It is to the tribes and States on the Punjab frontier that we wish to call attention, with a view of showing that while we have been attributing the sovereignty over them to the Amir of Kabul, that potentate is almost entirely disowned from one end of the frontier to the other, and is utterly incapable of keeping the peace up to our limits, or even beyond a certain line. This line it is our present purpose to define, in order that the just and proper mode of dealing with the independent borderers between India and the actual limits of Afghan authority may be rationally considered.

The independent territories in question are all mountainous, and are naturally divided into two parts, by the Kabul River and the Plain of Peshawur. The situation of the city and fortress of Peshawur, in the midst of the plain, has brought under the rule of the British Commissioner a considerable tract to the south of the river, including the district of Kohat. It will, nevertheless, be convenient to treat of the group of independent highland communities north of the river separately, and this we proceed to do.

This group extends from the British boundary along Hazara and Gilgit on the east, to the extremity of Kafaristan on the west, and from the Plain of Peshawur on the south to the Hindu Kush on the north. There can be no question that Kafaristan (said to be called Wamastan by the natives) has always maintained its independence from the earliest times, in mortal defiance of the surrounding Muhammadans. The people have displayed the most friendly disposition towards the British, of which, however, but little, if any, advantage has hitherto been taken. It may be well to note particularly that Russian fire-arms are said to have already found their way into these impregnable fastnesses, the independence of which it is so much our interest to protect and secure.

There is no occasion for saying, as a recent writer does, that "the Kafars give us no trouble," for their nearest frontier is at least forty miles from ours, and the intermediate country is occupied by warlike mountaineers, who have been hitherto hostile



to them, but might be reconciled. Neither are we concerned because the Kafars hold the Chitral or Birughil Pass, on the Hindu Kush, for they do not. Nor can it be true that their number amounts to a million, which would be nearly one-fourth of all Afghanistan, it is probably only one-tenth of that number. More absurd is the remark of the same author, that the occupation of the Chitral or Birughil Pass by the Rajah of Kashmir, would be the best arrangement for pacifying the Yusufzai tribe, who are settled two hundred miles away from it, in and along the Peshawur district. It is upon no such false pretences as these that India can claim any concern in the future of Kafaristan. It is because that country is a salient, impregnable, and especially commanding portion of the continuous group of independent highlands which lie between the British frontier and the Hindu Kush, dominating all the mountain passes between the Oxus and Indus basins, and therefore making it highly desirable that the whole group should be in friendly connection with the Indian Government.

Kafaristan occupies the most western part of these independent highlands, where the summits of the Hindu Kush coalesce with the lofty extremity of the Himalaya. It caps the mountainous region of Badakshan in the Oxus basin; overlooks most of the passes at the head of the Kabul River and the main stream itself, together with the lower course of its principal affluent—the Kunar River. Its people are of a primitive race and quite distinct from the Afghans, whose rule they defy, and whose Muslim faith they reject. Their language is said to be of Sanscrit origin; their fidelity is proverbial, and in striking contrast with the notorious treachery of the Afghans. Neither these people, nor their neighbours in Chitral, will ever submit to the Afghan yoke, but they have displayed a marked partiality for Europeans; and if we neglect their friendship, we cannot complain if the Russians accept it, and give them the protection which we have so far tacitly refused.

The next member of the highland group, on the eastern border of Kafaristan, is Chitral, situated, like it, between the summits of Hindu Kush, and the culminating ranges of the Himalaya. The Kunar River here divides the two mountain systems, until it turns southwards through the Himalaya to join the Kabul River near Jelalabad. The authority of Chitral extends eastward beyond the sources of the Kunar into Yasin, which lies at the head of the Gilgit River, and joins the British dependency of Kashmir. The Chitrali, like the Kafars, are a distinct people from the Afghans, and, although Muhammadans, they remain quite free from Afghan influence. Thus without abstracting an inch from the actual dominions of the Amir of Kabul, it may be possible to establish such a friendly connection with Chitral and Kafaristan, as would serve to secure the mountain passes in more faithful hands than those of the Afghans, as far west as the head of the Kabul River at least, and practically perhaps as far as Bamian.

The remainder of the group occupies the mountains between the frontier of the Peshawur Division and the summit of the Himalaya. Starting from the British district of Hazara, there are first a few petty

tribes on the left bank of the Indus, including Chilas. Next are the petty tribes on the right bank of the Indus, extending from Gilgit and Yasin to Peshawur, and including Dilel and Buner. Then comes Swat, Panjkora, and Bajawar, the latter adjoining Kafaristan.

It is here of importance to understand that the valley of the Indus, with its branches, as well as the great river, are now wholly in foreign territory from the point where the British or Kashmir boundary crosses the river at the roots of Nanga Parbat Mountain, down to the confluence with the Indus of the Barrando River, which joins it from the State of Buner, on the right bank. The passage of the Indus is thus placed beyond British surveillance or control for a length of not less than 150 miles, the British boundary being seldom less than 30 miles distant throughout that extent. For a further distance of about 24 miles the left bank only is in British possession, the right bank being held by the chiefs of Buner. The passage of the river, with its ferries, is thus left open for a considerable distance; and the mischief that may arise in consequence was sufficiently proved by the raid of the Hindustani fanatics. There would probably be little difficulty in establishing friendly relations with these Indus tribes, including the more important chiefs of Buner.

The Swat territory is said to stretch up to the summits of the Himalaya, and to extend to the Indus on the north of Buner. The aged Akoond of Swat, who was formerly in league with the fanatical Muhammadans in various parts of India, seems to have become aware that his own authority is endangered by a colony of these intriguers, and he appears to have become sensible of the value of our friendship. Panjkora and Bajawar lie between Swat and Kafaristan, the former stretching up to the summits of the Himalaya and touching Chitral. We do not care to raise a question about the doubtful allegiance of Umankeel, Momund, and others near the Kabul River, as these may be left to fall into their places in any arrangement for the settlement of the group of territories, about the independence of which there can be no doubt.

We have thus begun to point out some of the facts that serve to define the real limits of Afghan sovereignty, after unavailing attempts for thirty years to make those limits conterminous with the boundary which it appeared convenient to fix for ourselves. We have traced one distinct block of highland States, where the Amir of Kabul cannot exercise a vestige of the authority that we have chosen to attribute to him. Indeed, any attempt to do so could only be made with our concurrence, and would certainly fail except in making the British as much hated as the Afghans. On the other hand, we alone are competent to aim at bringing about a peaceful settlement of the existing native interests on the basis of our common security. Our own interests, receiving an impulse from the closer approximation to India of another great European power, now call upon us to decide promptly upon the future of this group, and its relations to British India. We recommend it to be treated as an independent group of Hill States, connected with India by ties of mutual advantage, which we doubt not can be effectually settled in due time.

Before taking into consideration the next part of the Afghan frontier towards the south, it is deemed necessary to invite some attention to the countries which adjoin Kafaristan and Chitral, on the northern slopes of the same mountain system, the Hindu Kush. These are Badakshan and Wakhan, which, although intimately connected with Chitral and the Kafars by race and circumstances, have recently been allotted to Afghan-Turkistan by Anglo-Russian diplomacy. No discussion of the settlement of this part of the North-West Frontier would be complete which neglected this branch of the subject.

The Afghans having acquired part of Turkistan, containing Balkh and Kunduz, in the lowland plain of the Oxus, laid claim to the mountainous countries of Badakshan and Wakhan, which bear much the same relation to the Oxus lowland, in regard to increasing altitude, that Kashmir and Balti bear to the plains of the Punjab. The Russians having also established themselves on the Jaxartes, in the northern part of Turkistan, and having gained an influence over Bokhara, which borders on Balkh, it was considered desirable that an arrangement of the limits of Afghan-Turkistan should be made in conformity with the wishes of the two European powers.

At this time such a liberal subsidy had been accorded by the Government of India to the Afghan Amir as to warrant the assurance that reliance might be placed on his fidelity and friendship, and it became the fashion to regard Afghanistan as forming a convenient neutral zone between the opposite political and commercial principles of Russia and England. We are now compelled to think differently.

It also happened that the occupation of Northern Turkistan by Russia, subjected to her monopolizing commercial tariff, one of the two continental highways, by which trade mainly traverses the interior of Asia. This is the Jaxartes route, as it is commonly called, extending from China in the east, through Kashgar and Kokand, to Bokhara and the west. The second and alternative route also proceeds westward from Kashgar, passing through Yarkand and reaching Bokhara and the western trade, by way of the Oxus and Balkh. When the passage of European commodities other than Russian, became obstructed or stopped by way of the Jaxartes, the Oxus route of course acquired increased importance.

Nevertheless, when the northern limits of Afghan-Turkistan came to be discussed, it was proposed by the English Foreign Office on the recommendation of the Indian authorities, in spite of remonstrance, that the boundary should be drawn along the River Oxus and its southernmost headwater, up to the summit of the Hindu Kush. The passage along the Oxus between Balkh and Yarkand, would thus have been effectually intercepted, including indeed all the lines of communication north of the Hindu Kush, and the influence of Russia would have been carried, at our own instigation, right across the Oxus basin, nearly up to the British boundary. Fortunately, this mischief was at the last moment prevented by the interposition, it is said, of Sir Henry Rawlinson, who succeeded so far as to get the Anglo-Russian boundary of Afghan-Turkistan diverted from the southernmost headwater of the Oxus, to the next stream on the north, which flows from Wood's Lake Victoria. Thus a narrow passage was retained along the Oxus, through Badak-

shan and Wakhan, for the transit of trade between Balkh and Yarkand, free from the obstruction of the Russian tariff.

But although a free passage was secured, a part of Wakhan was sacrificed to the idea of making the Oxus the boundary. It cannot have been considered that the inhabitants of a narrow mountain vale, are equally concerned in both sides of it; and that the subsistence of the people and everything connected with their welfare, demand that the whole of the valley and of the territories annexed to it should have been dealt with intact. From our point of view, it should be the object of British diplomacy among these ancient highland clans, to make their interests and welfare identical with our own,—and not to treat them as if they had no more feeling than the rocks which form their fastnesses, their homes, and the tombs of their ancestry. These people have survived all the destructive irruptions of the barbarians who have overrun Asia, and their antiquity, at least, is denoted by their claim of descent from Alexander the Great. It is a strange and uncomfortable reflection that after surviving so many perils, Badakshan and Wakhan should be allotted to the plundering Afghan by the advice and concurrence of the British, and Wakhan itself partitioned without the slightest necessity. Connected by many ties with independent Kafaristan and Chitral, we still hope for a revision or abandonment of the Anglo-Russian arrangements, and for the eventual rescue of Badakshan and Wakhan, or at least the latter, from the worthless Afghans. Their amalgamation or confederacy with the adjoining independent Hill States, and the identification of their interests with our own, should constitute the entire group as a first line of defence against any foe attempting to advance through them, or by way of Kabul against India.

The reasons which guided the selection of the course of the Oxus as the boundary through Wakhan are entirely groundless. They were derived from the historical disputes for the possession of the Oxus Lowland, which pointed to the Oxus as the best boundary between Balkh and Bokhara. Hence it was determined to make the Oxus the boundary, not only in the lowlands, but also through the Alpine valleys and secluded communities of the highlands. It was all one to the learned pundit who had studied the conflicts of Persian, Afghan, Bokharian, and the rest, which had especially related to the possession of Balkh; and he entirely overlooked the altered nature of the case when he thought it an easy matter to carry his red line, which fitted so well along the river in the plains, also along the river in the mountains, about which history told him next to nothing, and geography only revealed herself obscurely to her most ardent admirers.

To the credit of the Russians, it must be said that they only submitted to our dictation in this matter. They made several attempts to preserve the independence of Badakshan, but were overruled; and we have reason to believe that they were quite ready to allow the red line to embrace the whole of the Upper Oxus basin, including besides Badakshan and Wakhan, the territories of Karateghin, Darwaz, Roshan, Shignan, and the Pamir. This would have been consistent with the common character of all these Hill States, which only need the pressure of similar circumstances to unite them like Switzerland; and be it remembered

that they have hitherto held their own against all the surrounding powers. We hope to see the policy recanted which aimed at forcing merciless and worthless Afghans up to Lake Victoria, and another adopted consistent with their true limits, and the just interests of ourselves and our actual neighbours.

Turning now to the frontier which stretches for 600 miles between the Kabul river and Sind, along the Commissionerships of Peshawur and Derajat, a still more disturbed and unsettled condition of the tribes beyond the British boundary line presents itself. First of all is the notorious Khaiber Pass, with the parallel passes of Tahtara and Abkhana, which cross a mountainous spur or offset extending from the Safed Koh at an altitude of about 5000 feet, and afford access between the British plain of Peshawur, and the Afghan valley of Jelalabad. Here are the Afridi, who are allowed to maintain an independent sway, and to obstruct at their pleasure not only the passages between Peshawur and Jelalabad, but also between the two British districts of Peshawur and Kohat; for their independent territory is permitted to be thrust forward between Peshawur and Kohat from the Kabul River almost to the Indus. Nominally, we choose to consider these highland robbers as subjects of the Amir of Kabul, but, except to play off that potentate against ourselves, his authority is as much defied by them as our own.

It would be wearisome if not pedantic to parade the long list of marauders that occupy the highland region west of the Derajat. The Suliman Range which skirts the right bank of the Indus, and is penetrated by at least fifty passes, is but the escarpment of the plateau which finds its backbone and culmination along the water-parting that divides the Indus basin from that of the Helmund, at a distance varying from 50 to 150 miles from that outer range. The whole of this considerable territory is, with scarcely an exception, utterly beyond the power or control of the Amir of Kabul. The peaceful Povindah traders, who carry on a very extensive trade between India and the interior of Asia, are obliged to be organised into bands of several thousand armed men, in order to fight their way through the murderous Wuzeris, who are permitted to pursue their lawless wills by the two sovereign States on either side of them.

With such results of thirty years of established power, it may now be a fit time to reconsider the strategical character of this part of the frontier line, and whether it is safer to remain at the foot of the hills, leaving every pass in treacherous and hostile hands, or whether we should make a determined effort to support the peaceable tribes, while we subdue the lawless and reduce them to order, and at the same time establish our frontier along the mountainous water-parting which divides the basins of the Indus and the Helmund. There, in all probability, would be found the actual limits of the Amir's administrative power, and also a strategical line facilitating the defence of India. The warlike people once subdued and brought under government, instead of being thorns in the sides of the settled populations, may be partly turned into a valuable soldiery, and aid in keeping the peace which they now break. This is a problem often solved before in India; and thirty years' experience on the North-West Frontier shows that it must be solved there, if we would not submit to be constantly

harassed by highland robbers, and allow the power of the British Government to be degraded and despised—a result scarcely compatible with our tenure of India. This would be no injury to the Amir of Kabul, for by coming into actual contact with the area really subject to his authority, and contributing to his revenue, we should remove serious causes of dissatisfaction between the two powers, and be better able to act a friendly part towards him. Considering also the self-supporting nature of these highlands, there can be little doubt that they would come to be no burden to a strong and peace-preserving Government.

With such views, it is perhaps a misfortune that the Punjab authorities, under the orders of the Government of India, have been so careful to avoid any undue intrusion on the territory ascribed to Kabul, as to have refrained from acquiring ordinary geographical information concerning the Afghan highlands west of the Indus. Friendly invitations addressed to officers by native chiefs have been ordered to be declined obviously on this account, although their acceptance would have safely contributed much valuable information. Hence large tracts within this part of the Indus basin remain totally unknown, and would have to be explored like new discoveries. The basin of the Helmund beyond is much better known, thanks to the military surveys made during our former occupation of it. It is the country in some parts within 50, and in others within 150 miles of our own frontier, that has been so jealously sealed against the travelling propensities of our soldiers and civilians by the Indian Government. The Baluch territory is somewhat better known, thanks to recent intercourse. These are circumstances strangely at variance with the double dealing that a recent writer has attributed to the Punjab Frontier System, and go far to prove the fidelity which has been observed by the Government of India towards Kabul.

In advocating these views, let it be understood that we wish to respect the independence of the Afghan sovereignty within limits appropriate to its power, and consistent with the security of India. Our liberality and friendship have been strained to the utmost to support and extend his authority, without kindling the slightest reciprocity, or inducing him to keep the peace on our border, but eliciting, on the contrary, the most inimical conduct. It is now obvious that the remedy must be administered by our own hands; and if the Amir is not submissive, it may become a question whether the Shah would not be a better neighbour than the Amir.

If notions like these find favour with Her Majesty's Government, instead of reducing the control of the frontiers from three Commissioners to a single one, we should recommend the amalgamation of Sind with the Punjab, and the establishment of extra Political Agents in concert with the Lieutenant-Governor of the Punjab and three Commissioners of Sind, Derajat, and Peshawur, for service beyond their respective frontiers. The transfer of South Canara and Coorg, and perhaps Malabar, from Madras to Bombay may complete and facilitate such a rectification of Western India.

### THE STILL UNEXPLORED PARTS OF SOUTH AMERICA.

A REVIEW of the extent of the region which is still unexplored in South America will help to dispel the delusion that discovery and exploration are nearly at an end, and that henceforth this, the most important and interesting part of the work of the Geographical Society, will have to give place to scientific deductions from the work of former explorers. This delusion seems greatest when we think of the vast unknown region round the North Pole, and of the interiors of Asia and Africa. But in South America, too, there is still exploring work which will suffice for more than one generation.

The work of geographical exploration is divided into three stages. There is first the report of the pioneer explorer who penetrates into a previously unknown region. There is next the more detailed work of the topographical surveyor in a country hitherto unmapped and imperfectly known. Lastly, there are the operations of the trigonometrical surveyor and the physicist. In South America there is still much work of the first kind, a still vaster area imperfectly explored, while the third and final stage of geographical exploration has not been reached in any part of the continent. So that, in this division of the globe, there is plenty of work for geographers for generations to come.

Commencing our review from the south, there is much that remains undiscovered in Patagonia and the extreme south of Chile, and still more that is, as yet, very imperfectly explored. The surveys of the Patagonian coasts and islands are even yet incomplete, though the work of FitzRoy and King has lately been supplemented by Captain Mayne, and by the Chilean officers. One of them, Captain Simpson, has done most valuable hydrographical work. The labours of Captain Simpson and his brother officers have been recorded by Captain Vidal Gormaz in those admirable annual Reports published at Santiago, and reviewed in our numbers for May 1873, p. 73; June 1876, p. 160; and April 1877, p. 94. As regards the interior of Patagonia, Captain Musters was the very first traveller who ever traversed that wild region from south to north, and this fact alone shows how much remains to be done there. I have just received a letter from Señor Moreno, of Buenos Ayres, who recently explored the River Santa Cruz in Patagonia, and had the gratification of reporting to his Government that the "Plains of Mystery," so named by Admiral FitzRoy, no longer corresponded to their name. But he still speaks of the greater part of Patagonia as practically unknown. Yet enough is known to enable him to say with confidence that the unexplored region conceals immense palæontological and ethnological treasures, entirely new material for zoological and botanical studies, and geographical features of great interest. Señor Moreno himself has already done much to throw partial light on what is still unknown. Besides his Santa Cruz expedition, he has visited the lake of Nahuel-huapi, and has undertaken other excursions into Patagonia. He has also made important ethnological and geographical discoveries, including the collection of skulls closely resembling that of Neanderthal, and numerous fossils. I mention the labours of this distinguished Argentine

geographer, first, to show how much is still unknown in this part of South America, and secondly, because the meeting should know that the interests of geography are not neglected by South Americans, and that, although there is much to be done, progress is being made by able and zealous explorers.

Proceeding northwards we next come to the "Gran Chacu," where there is a vast unexplored region within the basins of the Paraguay, Pilcomayo, and the Vermejo. Although Captain Cilley has done a great deal of good work in the upper Paraguay basin, the course of the Laterique is still entirely unknown. In the actual sierra of Bolivia, Captain Musters and his colleague Mr. Minchin, as well as Mr. Matthews, have for the first time constructed maps with any approach to accuracy, and have fixed numerous positions. They have thus rendered very important services to our science; and geography is no less indebted to Colonel Church for his valuable additions to our knowledge in the basin of the Madeira, and of its tributaries the Beni and Mamoré. Still there is a vast extent of interesting country which is practically unknown in the provinces of Lipez, Chichas, and Carangas, and especially round the western side of Lake Poopo. In many respects the Andæan System is, to the physical geographer, the most interesting mountain mass in the world, for here the phenomena of earthquakes may be studied on the largest and most awful scale, here are volcanic chains extending hundred of miles, and fossiliferous Silurian rocks raised in the form of mountain peaks 20,000 feet above the sea. Here, too, the meteorological and other physical phenomena connected with mountain chains are of peculiar interest. Yet the orography of western South America is very imperfectly understood, and this is particularly the case as regards the peaks and ridges of south-western Bolivia, where Tajama is shown (on Colonel Church's map) to attain a height of 22,350 feet. Mr. Minchin has fixed the height of Illiniani at 21,040 feet, and Illampu at 21,470. Do the peaks of the volcanic coast range, or those rising from the fossiliferous wall of the Eastern Andes attain the greatest height? This is one among many geographical questions of great importance, for the solution of which we must wait until men like Musters and Minchin have been over the whole ground.

In the vast region of the Madeira basin, which has been the scene of Colonel Church's invaluable labours, there is a yet more extensive unknown area, over which historical tradition has thrown a halo of romance. The scenery of the eastern slopes of the Andes is unsurpassed in magnificence and beauty in any other part of the world. The lovely valleys lead down towards an unknown region, into which thousands of the Ynca race fled from the conquering Spaniards, and where tradition placed the fabled riches of Exein and the Goan Paytite.

The most recent official Brazilian map of the Madeira and Purús, communicated by Colonel Church, is exceedingly valuable; but it serves to show how incomplete is our knowledge of the Madeira River System, and how much remains to be done. I descended the valley of the Tambopata for some distance in 1860 and Señor Raimondi has since followed up my footsteps, but beyond my furthest point the country and the courses of the rivers are still unknown. The courses of the Caravayan rivers, descending from

slopes which are probably as rich in auriferous deposits as any equal area upon the surface of the globe, are also unknown. The physical features of this Caravayan region are expressly interesting, because the little that is known indicates the existence of a range analagous to the Sewaliks at the foot of the Himalayas, and of long lateral valleys like the dŭns of India. Mr. Saunders has endeavoured to give expression to these features in his map of the empire of the Yncas.

But the most important portion of the unexplored region in this part of South America is undoubtedly the basin of the Madre de Dios, the river which drains the Montaña of Cuzco, the imperial city of the Yncas. Geographers long supposed that the Madre de Dios was a tributary of the Purus. This was the opinion of Father Bovo de Revello; and I received that impression from him when I explored the valley of the Tono as far as the Madre de Dios in 1853. I was then very young, and with no resources, without followers, without food, and without shoes. The good Father almost forced me to return to the Andes, but I did so with extreme regret. Lieutenant Gibbon afterwards reached and turned back nearly at the same point; and the Madre de Dios remains to be explored. The admirably executed discoveries of Mr. Chandless have since proved that the Madre de Dios is no part of the Purus System; and his scientific exploration of the Purus and Aquiry, which won for him the Gold Medal of this Society, is a model of geographical work of the highest order. Colonel Church has collected much information respecting the Madre de Dios and other important tributaries of the Beni. Still the work of discovery in this region remains to be achieved.

Professor Orton, of Wassar College (New York), justly attached so much importance to the exploration of the basin of the River Beni, that he made a special journey to Peru in 1875 for the purpose of undertaking it. His scientific attainments and excellent qualities as a traveller made it certain that geography would reap great benefit from his researches, and no doubt he had time to collect much valuable material. But the melancholy news of his death arrived by the last mail. He was taken ill in the territory of the Moxos, and, dying at Puno, was buried on an island in Lake Titicaca, almost on the threshold of his intended discoveries.

The head-waters of the Ucayali were as unknown as those of the Beni, until the energetic efforts of scientific officers in the employment of the Peruvian Government completed a preliminary exploration of them in quite recent years. The society has only just received a copy of the Report of Mr. Wertherman, who, accompanied by an English Naturalist named Whiteley, has been the first to discover the course of the important River Perene from the Andes to its junction with the Ucayali. This achievement is one of great geographical importance, and will doubtless lead to the more complete exploration of a region respecting which our knowledge is very scanty. The portion of the chain of the Eastern Andes, with its ramifications, where are the sources of the Perene and other affluents of the Ucayali, is very little known, and its treatment on most maps is confusing and erroneous. It must, however, be some time before full geographical light can be thrown upon this section of the Andæan System. It is not less desirable that

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we should have fuller descriptions of the coast-valleys and of the Cordilleras between Ayacucho and Arequipa, and accounts of the wholly undescribed country comprised in the Peruvian provinces of Lucanas, Pariaracohas, Cangallo, Aymaraes, and Cotabambas. We shall, no doubt, acquire much additional information from the forthcoming work of Don Antonio Raimondi. At present, however, a great part of Peru, including regions the physical geography of which is specially interesting, is unexplored and undescribed.

Further north, in the Andes of Caxamarca and Quito, we come to a region which has been treated of by the Ulloas and by Humboldt, and to the classic ground where Condamine was the first to measure the arc of a meridian. But even here there are extensive tracts to the eastward of the Cordilleras which need further exploration. When, a few years ago, Wertherman entered the country of the Jivaros, and passed the Pongo de Mauseriche on the Marañon, his journey involved geographical discovery; and the geographical work of Mr. Spruce, whom I employed to collect plants and seeds of the red-bark species of chinchona in the Ecuador forests, was both new and important. There is still much useful work of the same kind to be done in Northern Peru and Ecuador, especially in the basins of the Pastasa, Morona, Santiago, Tigre, and Napo.

Next to the Napo comes a great tributary of the Amazon, on its left bank, which, until quite recently, was entirely unknown. This river is the Putumayu, which rises in the eastern Cordillera near Pasto, forms the boundary between Ecuador and Colombia in its upper course, and falls into the Amazon within Brazilian territory. Its great importance as a fluvial highway is obvious, for, if navigable, it would carry the chinchona bark and other valuable products of the Pasto country, direct to the Atlantic.

The exploration of this great river by Mr. Alfred Simson, an enterprising young English traveller, is by far the most valuable contribution to our knowledge of Amazonian geography that has been made for a long time. Mr. Simson's very interesting narrative was printed in the last number of our *Proceedings*.\* The idea of opening this route to the Andes was conceived by some enterprising Colombians who descended the river in a canoe; and Mr. Simson was then intrusted with a steam-launch to ascend the Putumayu from the Amazon, and ascertain its navigability. The direct distance from the source under the volcano of Pasto to the mouth in the Amazon is 620 miles, and by the windings of the river 1200 miles, the mouth being 1800 miles from the Atlantic, or 3000 miles from the source to the ocean. Mr. Simson describes the currents, the character of the curves and river-banks, and the general features of the stream, with intelligence and care; but unfortunately he was unable to take astronomical observations or to make a survey. This is one out of many examples of the great importance of supplying convenient means for young travellers to acquire these necessary qualifications before leaving England. The subject is a very important one in the interests of sound geography, and is one which might well engage the attention

\* *Proceeding of the Royal Geographical Society*, vol. xxi., No. VI., p. 569. (September 19, 1877.)

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of the Council of the Geographical Society. Mr. Simson, in the absence of such observations, was a first pioneer discoverer. The course of the Putumayu still awaits exploration by a traveller such as Chandless or Spruce.

Next below the Putumayu, and still on the left bank of the Amazon, comes the great river of Caqueta or Japurá, which rises on the eastern slopes of the Cordilleras of Popayan, and has a still longer course than the Putumayu. Martius ascended it to the falls, and it is frequented by traders. Mr. Bates, however, who is intimately acquainted with the part of the Amazon where the Japurá empties its waters into the main stream, and was long resident at Egas, will be able to tell us to what extent the basin of the Japurá has been properly explored.

On the right bank of the Amazon, between the Yavari and the Purus, around the head-waters of the Jutáy, Juruá, Tefé, and Coari, there is a vast undiscovered region. Mr. Chandless ascended the Juruá for 800 miles; but the Tefé and Coari have never been explored.

Part of Colombia also presents a wide field for discovery. There is an enormous tract, bounded on the west by the slopes of the Cordillera, on the east by the Orinoco and Rio Negro, on the north by the River Meta, and on the south by the Uaupes and Japurá, which is practically unknown. This region is also surrounded with a halo of romance, for here the old conquerors of the sixteenth century believed that the far-famed El Dorado dwelt in golden abundance. In 1536 George of Spires set out from Coro, in Venezuela, with 400 men, to solve the mystery which enveloped this unknown region. The resolute warriors penetrated into a country which has scarcely ever been visited since, and even reached the banks of the Japurá. A glance at the map will show the immense extent of country which was traversed by George of Spires in this daring and romantic expedition, which occupied him three years. His lieutenant, Fedreman, marched in a more westerly direction, crossed the Meta, ascended the most difficult part of the Cordillera of Sumapaz, and in April 1539 met the famous conqueror Quesada on the Plains of Bogota. Soon afterwards, in 1541, Philip von Hutten, a German follower of George of Spires, led another great expedition from Coro in search of El Dorado. This dauntless commander entered the country which Mr. Wallace, in 1853, called "the unknown regions between the Rio Guaviare on the one side, and the Japurá on the other."

Modern travellers will have to emulate the daring of these searchers for El Dorado, in the re-discovery of the now unknown region. But its exploration is undoubtedly a matter of great geographical interest. Moreover, there are many parts of the Colombian Andes which need further examination. I may mention that I have despatched that admirable collector, Mr. Robert Cross, no less than three times to obtain valuable species of chinchona plants in the forests of Popayan and the Upper Magdalena, and on every occasion his work has involved more or less of geographical discovery. Last October he reached the head waters of the Japurá.

In these brief notes I have mainly confined myself to the western half of South America. But there is

much exploring work to be done also on the Brazilian side, and in Guiana.

Mr. Spruce ascended the Trombetas, but otherwise the whole region from the Rio Branco to the Atlantic is entirely unknown (a distance of 600 miles), including a dividing range, plains, and forests.

I believe, however, that enough has been said to show that there still remains a vast amount of exploration, and even of discovery, to be achieved in South America; that it is work which is well worthy of the attention of the Geographical Society; and that, so far as that continent is concerned, geographers will have no need to sigh because there are no more worlds to conquer, for generations yet to come.

CLEMENTS R. MARKHAM.

### THE ANCIENT SILK-TRADERS' ROUTE ACROSS CENTRAL ASIA.

THE paper on the above subject read by Baron Richthofen before the Berlin Geographical Society, on the 5th of May last, was based, in a great measure, on the general views enumerated in the author's recently-published work on China, the more detailed information being derived from Ptolemy and Chinese sources. It opened with a general sketch of Central Asian geography, in which the parts played by the Himalayan, Kuen-Lun, Tien-shan, and Altai Systems were clearly expounded. The Tarim basin the author likened to a gigantic horse-shoe-shaped plain, the sides of which are formed by the Tien-shan and the Kuen-Lun. This horse-shoe was the western part of a former extensive sea, which was bounded on the north by the Altai Range. Its eastern limit cannot at present be defined with accuracy, but it nowhere trenched on the confines of modern China. One noteworthy feature of this great inland sea, which is even now testified to by the name *Han-hai*, or "dried-up sea," applied by the Chinese to its former site, was the depression or arm between the Tien-shan or Altai Ranges, by which it communicated with another extensive sea, beginning about Lake Balkash. In the recesses formed by the spurs of the Tien-shan and of the North Persian Ranges, civilised nations formerly existed, and extended to the banks of the Jaxartes and Oxus, and their tributaries. With the exception of the less important oases in the Tarim basin, they were the first civilised countries to be found west of China, from which they were separated by thirty degrees of longitude, the only practicable line of communication lying across steppes and deserts.

The migrations of nations and the movements of traders are very unlike, though both follow distinct laws. The former have always chosen localities which have afforded them broad, easy, and natural routes into warm and fertile plains. Mountains were only crossed where a low pass gave easy access to the wished-for goal. These successive waves of migration came from the north-east; but when they ventured into the basin of the Tarim, they were caught in a *cul-de-sac*, whence they could only escape by the way they came. In pre-historic times migrations towards China may have found their way into the region referred to. But as soon as its people were capable of looking after their own interests, the only available



exit lay through the Dzungarian trough between the Tien-shan and Altai Ranges, mentioned above. From thence they invaded Europe, Persia, and India. Mountain passes naturally did not present such insuperable difficulties to passing armies, and on several occasions large hosts have made their way from China to Turan over the passes near the sources of the Oxus and Jaxartes, and from Turan to the western oases in the Tarim basin.

The movements of traders follow entirely different laws. They invariably sought the shortest routes between the two countries whose goods they wished to exchange one for the other. Among these goods, silk has played an important part since the earliest ages. The duration of this silk trade is most conveniently divided into two periods—the first from remote and uncertain ages to about 114 B.C., being the period of indirect traffic; and the second from 114 B.C. to 120 A.D., being the period of direct commerce between China and the Turanian plains. In the book *Yue-kung*, which treats of the history of China during the last 4000 years, silk is mentioned as an article of tribute in some of the provinces, and we learn therefrom that the great Yue aimed at introducing the growth of the mulberry and silk culture in the lands about the mouth of the Yellow River. A thousand years later the *Chuli Book*, which contains the official precepts of the Chu dynasty, makes frequent mention of silk, and it is probable that the precious jade of Khotan was largely exchanged for it, though, probably, not by a direct traffic between the two countries.

It is uncertain how far back silk stuffs were first exported to India and Western Asia. The Chinese name for silk was *Sz'*, and it is curious to observe that both this name and the product itself made their way into Corea, Japan, Mongolia, and (especially) Central Asia, and in later times into Greece and the other European countries. After a time the letter *r* got affixed, and the root-word was thus changed into *ssir* or *sser*. The word *Sherikoth* in Isaiah probably refers to the same, and the Arabs to this day call a piece of silk goods *saraqat*. It is probable that Herodotus, in speaking of the fineness of the Median dresses, alludes to silken stuffs. The first undoubted mention of the manufacture is to be found in Nearchus (320 B.C.), who speaks of the Seric stuffs of India, of the people called Seres, and of their country, Sera. There is no evidence to show by what route these silks reached India, Persia, and Media. It is supposed that the princes of the house of Tsin, who since the eighth century before Christ occupied a small principality in the western part of Shensi, extended their dominion into Central Asia, and that by this means the Chinese carried on direct trade with the lands about the Oxus. This supposition rests on three points: the mention of a country called Sinim by Isaiah, the frequent mention of the name *Matchin* (which was supposed to refer to China) by Firdusi in speaking of early Persian history, and the frequent allusion in the *Mahabharata* to the *Tchina* people in the north-west of India. Against this, however, must be remarked that the Tsin princes certainly never penetrated into Central Asia, nor, as far as can be shown, beyond the Yellow River; that the name *Matchin* was used to designate any powerful princes of Turan, with whom the Persian kings had

intercourse; while the researches of recent travellers have disclosed the existence of a people called *Tchina* in the North-western Himalayas. There is no proof that the Chinese ever journeyed beyond their western borders before the second century of our era, or even that they knew of the existence of other nations beyond their immediate neighbours in Central Asia. The producers and consumers of the silk were thus equally ignorant of its destination and origin. There is good reason for supposing that the inhabitants of Khotan, who were known to the Greeks under the name of *Issedones*, were the chief medium of transmission of the silk trade across the passes into India and over the Pamir.

The second period of the silk trade, embracing the period of direct traffic between China and Turan, begun with the year 114 B.C., in which the first caravan set out westward, and ended about 120 A.D., when the power of the Han dynasty was on the wane. The direct traffic only flourished when all Central Asia was subject to one sovereign will. It was never more prosperous than when the Mongols exercised supremacy over the lands between China and Europe, but before that time it had revived in the seventh and eighth centuries, when the Tang dynasty extended their rule to the Caspian Sea. One of the chief circumstances which helped to develop it was the building of the Great Wall, which the great Tsin-shi-wang-ti erected to protect his kingdom from the attacks of the Hiungnu, who had for centuries molested the vassal princes and chiefs on the northern borders of the empire. During the Han dynasty (205 B.C.) the successive waves of invading hordes from the steppes broke themselves against the wall, and gradually falling out among themselves, dispersed and retired through the Dzungarian valley or depression into the Aralo-Caspian basin. At the beginning of the second century, the Usun people, who lived in the Alashan mountains and near the Etsina River, engaged in conflict with the Yuëtchi people, who lived about Kan-chow-fu, and were vanquished by the latter who migrated through Dzungaria to Ili, where they came upon the *Sz'* people. Twenty-two years later, the Usun revenged themselves by driving the Yuëtchi out and settling themselves in Ili and the Tien-shan, while the Yuëtchi and the *Sz'* migrated towards the Jaxartes.

These wanderings now began to have their effect on the silk trade. In 140 B.C. Hsia-wu-ti, the greatest King of the Han dynasty, wishing to break the power of the Hiungnu, sent his General, Tchang-kien, into Central Asia to conclude a treaty of alliance with the Yuëtchi. This is the first Chinese expedition to the West of which we hear, and the report, which after thirteen years adventurous wanderings, the General furnished, on his return home, has the appearance of a description of previously unknown wonders. Although the expedition failed in its immediate object, it returned with the novel intelligence that in the far west of Turan there dwelt great and civilised nations, who owned grand cities and engaged in commerce, who esteemed very highly the Chinese silk, and wished further to do direct trade with China, of whose greatness they had often heard. The Emperor recognised the importance of acting on this wish, and endeavoured by every means in his power to further its fulfilment. The ways by which this was attempted to

be carried out are interesting. Tchang-kien reported that westward the Hiungnu formed an insuperable bar to commerce, as they commanded the entrance to the Tarim basin. But he suggested an alternative. Among the Tahia, a people dwelling in towns south of the Upper Oxus, he was surprised to see a certain sort of reed or grass, and a stuff, which in his opinion must have come from his native home, Shu (the plain of modern Ching-tu-fu). He was informed that they came from a land called Yin-tu, which lay some thousand *li* south-east of Tahia, and where the people lived in hot plains and rode on elephants. Through this land of Yin-tu (*i.e.* India) Tchang-kien thought it would be easy for people from Shu to reach Tahia. This suggestion was followed up with energy, and a number of expeditions were sent, but unfortunately failed through the hostility of the mountain tribes, and led to no other result than the discovery by some merchants of Burma and of the great rivers of South-eastern Asia.

In the meantime, affairs in the North took a more favourable turn. A young leader, called Ho-kiu-ping, placed himself at the head of a Chinese army, and for the first time in Chinese history advanced into the Steppe, and easily vanquished the Hiungnu, opening the road into the Tarim basin.

This was an event of great importance for the future history of China. The road referred to was called the Yue-monn passage, or the way of the Yue gate; *yue* being the name applied to the jade of Khotan, and the Yue-gate being a rocky defile through which the precious mineral was conveyed along the only natural way between the Tarim and China—a sort of depressed road between high mountains on the one side and a steppe plateau on the other. This approach proved to be the key of Central Asia and of great future moment, both in political and commercial exigencies.

The inhabitants of the oases on the south of the Tarim, freed from the presence of the Hiungnu, received the Chinese with open arms, and in the year 114 B.C. the first caravan started for the West. Judging from the fact that it reached the land of Tahia and Ansi, it must have crossed the Pamir. But the city of Tawan formed the chief mart; it lay on the Jaxartes and the way to it was over the Terek Pass. From five to ten large caravans visited the town yearly, and the first sudden effect of this was to depreciate the value of the silk. On the approach however of a Chinese army in 104 B.C. matters improved, and the market for the silk extended further and further westward, until the Roman empire was reached.

For 120 years the way remained open, but at the expiration of that time the Hiungnu again gained possession of the trade route, and the Tarim basin was lost to the Chinese for fifty-six years. General Pan-chow then not only regained the whole of the lost country, but also (95 A.D.) led a victorious Chinese army across the Pamir Steppe to the Caspian Sea, where, for a brief time, the Chinese and Roman empires were brought into close proximity without, however, any permanent result. In 120 A.D. the Chinese again lost their control of Turanian lands, and in 150 A.D. all direct communication with the west of the Tarim basin ceased.

As regards the geography of this subject, one of

the most important points is to fix the site of Tawan. Baron Richthofen considers that Remusat's opinion that Tawan was the capital of the modern Khokan or Ferghana is erroneous. Tawan, he points out, was not the first kingdom reached after crossing the Tsung-ling Pass (Terek-dawan), but Hiusiun, whose king lived in Usi (Osh?) 500 *li* from the mountain pass. It was 920 *li* from Usi to Tawan, which would bring us to the great bend of the Jaxartes, near Oratepe, which was called Sutrushna by the Arabs, a name which we easily recognize in Su-tui-sha-na, which it appears from Chinese sources was the subsequent name of Tawan. The people of Tawan were a commerce-loving people, but brought the silk only to the nearest markets, whilst the Ansi, who possessed many towns, vessels, and waggons, who were addicted to agriculture and had stored up riches, conveyed it to the northern slope of the Iranian Plateau and the shores of the Caspian. As regards the nationality of these traders, it would appear from Tchang-kien's description that they were Tajiks. They spoke different tongues, but also had one common *lingua franca* for trading purposes, and there is ground for concluding that the trading inhabitants of the Tawan, Tahia, and Ansi kingdoms, were the Persian-speaking predecessors of the Tajiks.

In the Han annals, the Chinese complain that they were prevented by the Ansi from entering into direct commercial relation with the *Ta-tsin* or Romans. The silk reached India through the medium of the Tahia, who inhabited the oases of Balkh and Kunduz and other districts south of the Oxus. In the last century before Christ the Roman authors begin to speak of Seric stuffs, of the land Serica, and its people, of which they heard only indirectly and from vague report. There is no proof that the Romans ever held direct intercourse with the Chinese.

With regard to the routes of the silk traders, we gather most information from Chinese sources, and first among these we must place the annals of the Han dynasty. At present we know of one route in the valley of the Tarim which follows the western and northern edge of the horse-shoe above referred to. Mediæval travellers, Buddhist pilgrims from China, Marco Polo, and Shah Rukh's ambassadors testify to the existence in their time of kingdoms and towns along the southern edge of the basin between Khotan and Lob-Nor, and these were united by diverse routes; but in the middle ages these latter were fast disappearing, and there were traditions of buried treasures, sand-covered towns, and even kingdoms which had disappeared beneath the encroaching sand desert. In the time of the Han dynasty things had not got so far, and these districts were in a better condition. There were then two kingdoms, called Liulan and Kuchi, on Lake Lob, and Yutien (Khotan), which are generally mentioned. There were roads between Lob-Nor and Khotan, called the "southern roads," one along the Tarim, and one along the southern foot of the Tien-shan (the northern one). But the latter, west of Kucha, was occupied in ancient times by hostile tribes, and the southern road was more frequently used. The official road extended from Liulan, on Lake Lob, for 720 *li* to Tsie-mo, where roads to the north and south diverged. Hsiau-wan and Yung-lin appear to have been situated on southern tributaries of the Tarim which are now filled up with sand. The



road then led to Yutien (Khotan), Soku (Yarkand), and Suléi (Kashgar). The roads over the Pamir and Terek Passes were certainly much used; but, unfortunately, a detailed description of them is wanting.

Turning to western writers, we come first upon Ptolemy, who wrote about 150 A.D., and who derived much of his information from Marinus (contemporaneous with Pan-chow, who conquered the Tarim basin, and led his army as far as the Caspian). The weight of evidence goes to prove that Ptolemy's *Serica* denoted not merely China, but also the basin of the Tarim, or the greater portion of it, and the old silk-traders' route lay at the southern foot of the Tien-shan. The difficulty of identifying the places mentioned by him arises partly from the erroneous idea that the present route was the only one then in use, partly from the omission to consult the Chinese authorities, and partly from a failure to take ancient names in preference to modern ones for purposes of comparison.

In expounding the geography of *Serica*, Ptolemy found himself in the position in which many geographers stood at the beginning of this century as regards their knowledge of diverse continents, *i.e.* they possessed a knowledge of the countries which in some particulars was precise, but had to lay down the courses of rivers and the direction of mountain ranges, the positions of cities and districts, out of itineraries and vague information. By this means rivers, which later information showed to be separate, got thrown into one, mountains were incorrectly laid down, and maps were generally erroneously constructed. Ptolemy's knowledge was of an analogous character. On the Indian side the districts at the foot of the Himalayas were known among the Greeks by the name of Emodus. Of the mountainous land between the Indus and Oxus little was known beyond the road between Balkh and Peshawur. The region of the Upper Oxus and Jaxartes was somewhat better known, and its supposed meridional range and water-parting was called Imaus, and supposed to be a spur of the Emodus. Silk was brought across both the Imaus and the Emodus: across the former to Sogdiana and Baktriana, and across the latter to India. Beyond was *Serica*; but as this was partly identified with the political limits of China, which was known not to reach as far as the Imaus, the region immediately beyond was called *Scythia extra Imaum*. Ptolemy acquired his information respecting *Serica* both from India, in regard to the regions across the Emodus, and from Sogdiana and Baktriana, with reference to the regions east of the Imaus; but, as Colonel Yule has remarked, he was unable to focus the two stereoscopic pictures into one. Marinus, on whom Ptolemy mainly relied, was exposed to the danger of misspelling names, as he acquired his information second-hand; and of the agents of Maës Titianus, the Macedonian merchant, who went to China for silk, we do not know of what nationality they were, but it is probable that they were Persians, or Persian-speaking Tajiks. Bearing this in mind, as well as the fact that in Marinus's time western travellers entered on Chinese ground not far distant from Kashgar or Yarkand, and that the names of places must be identified with names of some antiquity, and not with modern ones, we shall be in a position to form a tolerably correct notion of the silk route of Marinus and Ptolemy.

Its point of departure was Baktra (Balkh), and its terminus Tshang-ngan (Hsi-ngan-fu), whether the traders managed to reach this latter place or not. It is probable that the embassies sent by the princes between Persia and the Altai to the Court of China during the two preceding centuries did not go beyond it, and that it was not even visited by the foreign merchants. The latter appear to have converged from different directions on Sha-chow, and the stations Yang-kwan and Yu-monn-kwan were points of departure for the same.

The position of the kingdom of the Issedonese is of importance in determining the route of the silk traders. Greek writers had spoken of this people as a great nation. And in the whole basin of the Tarim, there was only one kingdom corresponding entirely to the description given by them, and that was the Yue-tien of the Chinese, the capital of which was Khotan. Ptolemy represents the country of the Issedonese as lying north of a mountain range which he calls the Kasian Mountains. The similarity of the name has led Deguignes, D'Anville, Lassen, Ritter, Humboldt, and other commentators on Ptolemy to identify the same with the modern Kashgar. But the name of Kashgar was not then in existence, the town being called Suléi for several centuries after. A glance at the map, however, will show a striking analogy between the Kasian Range and the western Kuen-Lun, and a further link is found in the name of the chief product of the country, *i.e.*, jade, which among the Chinese was called *yue*, but among the Persian and Turkish nations appears to have been generally called *kash*. The range seems thus, by a practice common elsewhere, to have been named after its most important mineral product. The identification is clinched by the fact that Issedon *Serica* is described by Ptolemy as the most important place along the trade-route, and the Chinese accounts give Yue-tien as the chief place.

A second phase of importance on the line of route was Daxata, which Hager has shown to be a Grecised form of the Persian *Desht*,—sand—a term which is to be found in the name of the town, Sha-chow, referred to above, which really means "Sand-town." Turning to that portion of the route between Issedon *Serica* (Khotan) and Daxata (Sha-chow) we come upon two localities, *Thogara* and *Drosache*. The latter, Baron Richthofen has been unable to identify, but the former name has, he points out, similarity to the Tukhâra of the Indians, or Tu-hö-lo of the Chinese, a people who during the seventh century of the Christian era were found by Hwen-Tsang to have once dwelt a few days' journey east of Khotan, and whose name still prevailed there at his time, although the people themselves (who are probably identical with the Yue-tchi above-mentioned, or, at all events, the greater part of them) had, in the second century A.D., lived in the vicinity of Kanchow-fu, and at the time of the Buddhist pilgrim's journey settled partly on the Upper Oxus and partly on the Upper Indus. It is not unlikely that the encroachment of the sandy desert had caused a portion of the people to migrate from their ancient oasis in the valley of the Tarim, but that enough of them remained to give their name to the old site. The identity of the site with Ptolemy's *Thogaroi* is confirmed by the name *Aspacares*, which is very

like the Persian name for nation of riders, and which referred to the great Tibetan nomad race called No-kiang which, we learn from Chinese sources, dwelt south of the oasis. Asmiræa, too, is described by Ptolemy as lying south of the river Oikhardes, which must be the Tarim. The important town of Tsiëmo where the northern and southern roads diverged, is the only name which has any similarity to Asmiræa.

Eastward of Daxata, or Sha-chow, the old silk route rested only on vague hearsay evidence. The traders reported that a river and a mountain had to be crossed before reaching Sera metropolis. The river is given as a branch of the *Bautisos*, which must be the Hwang-ho. But *Bautisos* is the name of the stream flowing north of the Emodus through the land of the *Bautæ* (*i.e.* Bhot, or Tibet in its restricted sense), or, in other words, the *Yarudzangbo*, or Upper *Brahmaputra*. It is evident that Ptolemy's information derived from India here occasioned him some confusion, and that he has assumed that the Hwang-ho, which flowed out of a little-known mountainous country, and the *Brahmaputra*, which, according to the Tibetans, flowed eastward into an unknown region, were one and the same. Similar instances of erroneous geographical conclusions may be found in Livingstone's supposition that the *Lualaba* and Nile formed one river, and the theory, not long since held, that the *Sanpu* and the *Irraawady* were one and the same.

The western limit of *Serice* would appear to have been near *Kashgar* and *Yarkand*, where *Marinus's* information leads him to place them. *Kashgar* (*Suléi*) was a small kingdom, while *Yarkand* (*Sokuu*) was more important, and was often united with *Yue-tien*, or the *Issedon* kingdom. In 87 A.D. the Chinese and *Yue-tien* made common cause against *Sokuu* and overthrew it, and from that time the western limit of *Serice* appears to have been where the agents of *Maës Titianus* placed it. Before 87, a portion of the *Issedon* kingdom belonged to *Scythia*, *i.e.*, to the non-*Seric* country, and *Issedon Scythia* was therefore a natural form of expression. The western boundary then lay between *Yarkand* and *Khotan*, and this corresponds with Ptolemy's map. Another possible explanation is, that as the Greeks designated all nomads by the name of *Scythians*, and as they heard of the existence of many of these nomad tribes eastward of the *Imaus*, Ptolemy was induced to lay down a sharp eastern boundary to *Scythia extra Imaum*, and that the same boundary formed the western boundary of *Serica*, which was thus shifted too far eastward.

In endeavouring to fix the direction of the route of the agents of *Maës Titianus* between *Baktra* and the *Tarim* basin, we meet with many difficulties. In settling this question the position of *Issedon Scythia* becomes of great importance. On Ptolemy's map it lies east of *Imaus*, west of the sources of the *Œchardus*, south of the *Auxacian* mountains, which were probably the mountains on the west of the *Tarim* depression, where they approach *Aksu*, and north-west of *Issedon Serica*. This description would correspond to *Kashgar* and *Yarkand*, and the pass leading to it would be either the southernmost *Pamir Pass* from *Badakshan* or the *Terek Pass* to the north. The latter answers best to the description. From *Baktra* there ran an important route, *i.e.*, that past *Samarkand* throughout the length of *Ferghana*, and it appears, from Chinese authorities, that this was once a great commercial line of

route.\* In the *Takht-i-Suleiman*, near *Osh*, some professed to recognize Ptolemy's "stone fort," which was west of the *Imaus*; but inasmuch as important places such as *Samarkand* are not mentioned, Colonel *Yule* suggested, in 1866, that some intermediate line was the one sought for. Later research has proved that there are various routes through *Karateghin*, and the *Alai* country, which might have been utilized for trade purposes. It is possible therefore, that at the time when *Baktra* was the centre of a flourishing commerce, a direct way to the *Tarim* basin was preferred to the circuitous route by *Samarkand*, along which also heavy dues were exacted. The land of the *Comedæ* is probably the *Kiumito* of *Hwen-tsang*, and the land of *Komèdh* in *Ibn Dasta*, which probably lay north-east of the great bend of the *Oxus*. The stone tower would thus have been situated at the upper end of *Karateghin*, where the valley rises up to the steppe country of the *Alai*. This, however, does not coincide with the theory that *Osh* was the site of the stone fort.

There is much room for conjecture in the question as to the route from the Stone Fort to *Issedon Scythia*. Ptolemy gives a caravanserai on the line of the *Imaus*, *i.e.* near the water-parting. This would naturally be situated at the point of junction of two important trade routes, and was very probably at the point where the way from *Karateghin* joined that from *Ferghana* and the *Terek Pass*. At the present time *Balkh* has lost its importance, so that the *Karateghin* route has fallen into disuse; but in the fifteenth century, *Shah Rukh's* embassy, on its return, separated into two parties in the "defile of *Andijan*," one going towards *Balkh*, and the other towards *Andijan* and *Samarkand*.

The summary of his researches is thus given by *Baron Richthofen*. From 114 B.C. to 120 A.D. (with a break of fifty-six years between), the silk was brought along routes from *Sha-chow* and *Lob-Nor* which traversed the southern part of the *Tarim* basin, and preferably used the *Terek Pass* for those caravans resorting to the great mart of *Tawan*, or *Ora-tepe*. From thence the silk went to *Samarkand*, and thence partly through the lands of the *Upper Oxus* to *India*, and partly through the lands of the *Parthians* to *Further Asia* and the *Roman* market. The only journey of western traders of which we possess detailed information did not, however, follow the *Samarkand* route, but diverged, probably, at *Merv*, and passed through *Balkh*, probably through *Karateghin* and the *Alai*, entered the *Tarim* basin at *Kashgar*, proceeded to *Khotan*, and followed the southern border of the basin of the *Tarim*, till they reached *Sha-chow*. From thence to the chief mart of *China* the account is too vague to follow. When the Chinese lost their hold on the *Tarim* basin in 150 A.D., they could no longer protect their caravans, and the trade fell into the hands of the *Persians*, and *Kan-chow-fu* became the frontier mart of *China*. The introduction of the silk into *Europe* dates from the sixth century, when *Dizabul*, the Prince of the *Tukin*, sent an embassy to *Constantinople* to secure a market for the silk. From the following century the overland route of the silk traders lost all its former importance.

\* This coincides with the opinion expressed by *Sir Douglas Forsyth*. See our number for February last, p. 51. (ED. G. M.)

## AFFAIRS IN JAPAN.

THE rebellion in Japan, we may now assume, after repeated false announcements to that effect, has been completely quelled. It has ended in the indiscriminate massacre of the few who remained steadfast of the rebel army, with their two leaders Saigo and Kirino.

The Government has once more established its authority over the whole country, though at a cost to itself of 12,000 men, and between 7 and 8 millions sterling, and its duty, now, is to examine its position as regards the country.

The fire, which burst forth nine months ago in Satsuma, and which has just been quenched, is smouldering in many other districts. Discontent is common, and, what is almost the only means of redress open to a Japanese, namely, assassination, is attempted and threatened in various quarters. The failure of their fellows in Satsuma will not deter the high-spirited and reckless Samurai, or even the more peaceable agricultural classes, from making further efforts to relieve themselves from what they believe to be serious wrongs. It is not probable, owing to the vigilance and summary measures of Government, that the result of these efforts, will, for the present, attain larger proportions than desultory and local risings, but these may be found sufficiently harassing, and the country's welfare demands the removal of all occasion for them. That *all* cause for discontent cannot be removed without a change of Government, probably, those best acquainted with Japanese affairs will be disposed to agree. But there are no means by which this can be effected, except by successful rebellion. That method has already been tried, and has failed, and it is therefore probable that the present Government, with some possible modifications, will remain in power. The people can, now, only rely on the undoubted intelligence of most of its members for a more acceptable conduct of the affairs of the country.

The rebellion, just ended, headed by the soldier and politician, Saigo Kichunoske, has not been wanting in incidents, illustrative of his extreme daring and skill. That a man, such as he, of the greatest honesty of purpose, of undoubted patriotism, fully acquainted with the political affairs of the country, and bearing, probably, the most honourable name in it, should head a movement, having for its object the overthrow of the Government, is evidence that some justification exists for the disaffection which prevailed.

Suggestions have been made that the sole object of the movement was the maintenance of the ancient supremacy of Satsuma. But the character of Saigo, his former efforts on behalf of the Mikado, and the high qualities of his statesmanship, render it extremely unlikely that he would lend his assistance to an idea so opposed to the scheme of government adopted by Japan, or to an effort so palpably abortive. His stake in the movement was a vital one. He knew well that, in the event of failure, no mercy would be shown him by those against whom he took up arms; his doom would be certain death. Can it be supposed, therefore, that he would have accepted this risk for a *chimera*—for an idea begot in the feudal times, which, except to a few fanatics, had long since been obliterated? There can be no question that an overpowering sense of wrong impelled him to action, and we, in a former article, gave, from the best infor-

mation then obtainable, some idea of the nature of this. From the news since received, our impressions have, to some extent, received confirmation.

Saigo, according to a native paper, the *Akebono Shimbun*, intent upon representing to the Government the evils which he imagined it brought upon the country, had determined to proceed to the capital, and do so in a conciliatory and temperate spirit, when the confessions of the men who were said to be sent by Government officials from Yedo for the purpose of accomplishing his assassination, were laid before him. The passions aroused by this attempt, coupled with the hot-headedness of the young Samurai by whom he was surrounded, who, in fact, took offensive measures before he sanctioned them, led him to a change of procedure, and to the acceptance of the leadership of an eager band, numbering 15 or 20 thousand.

It is difficult, at this moment, to speculate upon the probable results of the rebellion, or the changes it is likely to produce; and it is impossible to extract from the native papers, owing to the strictness of the surveillance under which they are placed, any impartial, or even fair, opinion. One of these, the *Hochi Shimbun*, in an article of more than ordinary merit, describes the policy of Saigo as being prompted by a desire to re-establish the feudal system. It charges him with separating himself from the principle of a central government, and with having, for years, nourished and collected what was left of the feudal sentiment in the country near his own person. And it concludes, with unquestionable correctness, that his present failure will be the means of completely clearing the country of all further attempts to revive it. The article ends thus:—"All the subtle powers of the feudal system were here assembled, and broke out in one corner in the south-west, so that Saigo's last battle was not only his own last struggle, but was the last struggle of that subtle force which animated the feudal system. The poisonous influences of this institution have now been extinguished, and if this empire is again disturbed by war, it will arise from some other cause."

Doubtless, the feudal system has been finally obliterated; but that its revival was ever present in the mind of Saigo, his former well-known career and high intelligence gives a distinct refutation to. The assertion is the means by which the Government, through its coerced organs, attempts to conceal its own delinquencies, and to throw the stigma of fanaticism on a well-meaning and carefully-balanced mind.

It has been evident that for years the feeling against so despotic a form of government, and against the arbitrary edicts emanating from a few of its higher, but little respected officials, to which absolute submission is demanded, and against which there is no appeal, has been gradually gaining strength among all classes. The native press, subjected as it is to the sternest censorship, gives frequent utterance, though in covert and indirect terms, to the palpable desire of the country for more freedom and a greater liberality of treatment. And there can be no doubt that to this, coupled with the action of the Government, effecting, as he considered, the wholesale robbery of his class; the attempt, to which he believed Government officials were a party, to accomplish his assassination; and his suspicions of the gross venality of

the Mikado's advisers, must be attributed the action of Saigo and his followers.

What his real motives were, or if he had been successful, what form of Government he purposed establishing, will probably never be accurately known. Suffice it, his motives were honest and his ideas of government founded upon a highly cultivated intelligence.

Kagoshima the capital of the province of Satsuma, and a large and important town, was the point from which the first operations of the rebellion were commenced in January last. It was not considered advisable to occupy this town, and the rebel army, after possessing itself of the stores of ammunition which are always kept there, proceeded northwards, gaining considerable additions to its numbers as it went. Kumamoto, a large fortified town on the west coast of the province of Higo, was taken and held for some time, but after severe fighting, in which there was great loss of life on both sides, the rebel troops were forced to evacuate it. They then proceeded southwards, and held for a time Hitoyoshi and other large towns. Suffering continued defeat, they retired westwards through a thinly populated and exceedingly mountainous region. The warfare here was of a very uncertain nature. Small bodies of the opposing troops occasionally met, and in such encounters it is said the Imperialists generally were successful. There were evidences of a failure of supplies in the rebel army, stones being used as bullets, and food being unprocurable in the hilly districts. It gradually retreated before the advancing Imperialists, being much harassed by them, and as it neared the eastern shore of the island it became partially demoralised and wholesale desertions from it took place. Saigo, with his force thus weakened, nevertheless boldly emerged from the hilly region, and, with the remainder of his army, took possession of Nobeoka, a large town on the east coast of Kiushiu.

It might appear that, to leave the protection of a broken mountainous country, and to lay his reduced and ill-provided army open to direct attack, was foolhardy and ill-advised, had not some other reason existed for such a step. Nobeoka lies at the head of a small bay, which forms an excellent harbour for native craft, and is conveniently situated for carrying on communication with the Island of Shikoku. An excited agitation against the Government had sprung up in the province of Tosa, which forms a great part of Shikoku. A long and elaborate memorial detailing the grievances of the Tosa Samurai had been presented to the Mikado, the authors of which were, instead of any redress being offered, apprehended and imprisoned.

This causing increased excitement, it is believed that *pour parlars* passed between Saigo and the leading men in Tosa, and offers of assistance to him were freely made. He, probably, therefore, in the expectation of the arrival of reinforcements from Shikoku, occupied Nobeoka to facilitate their landing. But, no assistance from Tosa arrived, probably on account of the care with which the channel between the two islands was watched by the Government cruisers, many of which were known to be in the vicinity.

Saigo, after a struggle with the Imperialists, was obliged, on the 14th of August last, to retreat from Nobeoka, again towards the mountains, which he had

formerly left. Feeling his position to be desperate, he is said to have addressed his followers, urging them to further valour, and announcing his determination to fight to the last. He, however, advised all those who were not prepared for this to leave him. Thereupon, many gave themselves up to the Government forces, only six hundred remaining steadfast. Having been surrounded by the Imperialists, he, with this small band, succeeded in cutting his way through them, and effecting a retreat among the hills. By one mail, intelligence arrived that he was pursued, his men captured, and that he himself and his chief followers had killed themselves in the method usual in Japan. But by the following mail, we learned that, instead of this, he had made a forced march of about 150 miles, and, with his 600 men, had suddenly appeared before Kagoshima, capturing the Government Stores of arms and ammunition, and sending off the Government officials in precipitate flight. Having established himself, as securely as circumstances admitted, in his own town, which he had left eight months before, he immediately proceeded to the enlistment of fresh recruits for his army, when his operations were disturbed by the arrival of Government troops. He at once retired to a strongly fortified eminence, named Shiroyama, in the neighbourhood of the town, and was there surrounded by a body of fifteen thousand Imperialists. An attack was made on his position on the 24th of September, which ended in the almost complete annihilation of the rebel army, thirty only escaping with their lives. The bodies of Saigo, Kirino, and of four other principal leaders, were found lying together, death having been caused by *seppuku*, or self-immolation. The heads had been cut off and buried, in order to prevent identification, but they were afterwards discovered, and, it is stated, were exposed in the streets of Kagoshima.

Thus has ended, however ill-advised may have been the attempt, a courageous effort on the part of the Satsuma clan to give effect to what, there can be little doubt, is a widespread feeling throughout the country. And so concludes the career of Saigo, than whom no one has taken a more prominent part in the affairs of his country, by whose energy and skill the overthrow of the Shogun, and the restoration to power of the Mikado, was chiefly accomplished, and to whom the present Government is indebted for its establishment in power. A native paper expresses the general sentiment when it says—"The people rejoice at the termination of the civil war, but there is a general feeling of the profoundest grief that so great a hero did not meet a happier end."

The country is now left with its old Government, and with an increased debt of over 38,000,000 dollars, which sum has been extracted from the Treasury for the suppression of the rebellion; with a declining revenue, an inelastic trade, only the most puny means accomplished to utilise its, no doubt, great mineral resources, and with a disaffection throughout it necessitating the maintenance of large forces.

The questions, therefore, now forced on the deliberation of the Government affect very closely the vital well-being of the country.

R. H. BRUNTON.

Reviews.

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A RIDE THROUGH ISLAM.\*

"A Ride through Islam" is, perhaps, an exaggerated title, considering that it is *not* a ride through Islam—Islam is not contained between Poti on the Black Sea and Baku on the Caspian, or between "Enzeli" on the Caspian, and "Jacobabad" in Sind—but rather a ride through part of Islam. However, some portions of the writer's experiences on his journey are interesting at the present time, although written five years since for the Allahabad "Pioneer." His journey was attended with some danger though we were on the best terms with Persia, and on better terms with the Afghan ruler than we have been since the first Afghan expedition. Neither was the journey wanting in boldness on the traveller's part.

The Persian portion of the author's route may be passed over, since many accounts have been written by travellers who had greater facilities for observation than a few hours stay at a halting place, after a tiresome ride, could possibly afford.

Referring to the Caspian Sea, Captain Marsh says (p. 55) "The sea is called by the Tartars 'Ca-Aspian,' or Sea of the Horse Country, meaning Turkistan on the east coast, towards Khiva." Does he expect us to believe that? Did he ever hear a Tartar give that as the definition of it?

While Captain Marsh was on the "Ca-Aspian," he saw some of the Russian fleet taking military stores for Krasnovosk Bay, the starting point of one of the Russian columns for Khiva:—"Many Russian officers came on board," he says, "and, after dinner, while chatting over our wine and cigars, told us they hoped one day to take India from us, as it was their destiny to be paramount in Asia! just what they told Mignon in 1833, when they had taken Georgia."

With respect to the "corps diplomatique" at Tihran, the author says (page 73):—

"The influence of the different embassies at the Shah's court entirely depends on the ambassadors personally. The Russians being able to coerce, and doing so freely, are of course the favoured nation; and through them, I believe, was granted the establishment of a line of railway from Resht to Teheran, and eventually to Bushire, the firm being the great speculator, Baron Reuter. From all I could learn, our influence has of late been *nil*. They understood our system of patting on the back (and thanks to the conduct of a late ambassador, a man of no good repute, and of no personal influence with the Shah), so that we are at a low ebb in point of consideration with the people and the court. The appointments to this mission ought to be for a limited tenure, for men of English blood and birth only, otherwise they become small-minded, and influenced by personal considerations."

The Captain slept one night at Damghan, which place we are informed (p. 81) "is noted for the battle fought between the Afghan Shah Mahmoud's heir, Shah Ashraf, and the afterwards famous Nadir Shah, then a robber chief, in 1729. . . . He was born in 1688, and murdered near Mushud, 1747." Nadir was a little more than a robber chief at the period in question. He had captured Mashad for the Sultan Tamasib, had brought him thither in triumph, and had reduced Hirat; the battle between him and Shah

Ashraf was not fought at Damghan, but at Mihman-Dost; and Nadir was not murdered near "Mushud" nor "Meshed," but in the camp at Fath-abad, two leagues from Khabushan, about 100 miles north-west of the Mashad, which name means a tomb or sepulchre, and Mukaddas not "Mukodus."

Why will travellers, here to-day and gone to-morrow, inflict on the public their profound historical knowledge?—why cannot they leave history alone? It is something new to hear from Captain Marsh (p. 65) that "Teheran was entirely destroyed by the Afghans, and rebuilt by Aga Mahomed about the commencement of the present century." Agha Muhammad Khan, Kajar, merely fortified Tihran; and it is repeatedly mentioned, from the time of their expulsion, up to Agha Muhammad Khan's fortifying it.

Again, we are told (p. 87) that the people of the village of Abbasabad (in Khurasan) "are said to have been the descendants of an Armenian or Georgian colony of one hundred families, planted (there?) by Shah Abbas." The fact is that they are the descendants of a number of Kurd families transplanted from Kurdistan thither; and there are many more of them besides the inhabitants of Abbasabad.

Here is another specimen (p. 127) of travellers' history—a plunge headlong into the mire—Gohur Shah is turned into Shah Rukh's *mother*! She was his wife.

"Kohsan (a few miles west of Hirat) is said to have been a large fort and town, and to have withstood a long siege of *Jenghis Khan*." We need scarcely say, perhaps, that no such place was ever besieged by him, and that he was never at, or west of, Hirat in his life.

Again (p. 131):—"Herat, in 1716, was seized by the Sudozaie tribe of Duranees, and they held it till taken from them by Nadir Shah, after a long siege in 1731. Of its history more anon." Hirat was taken in A.D. 1707, and in A.D. 1727 Nadir finally took possession of it.

Speaking of the ruins on the "two elevations, near the city of Herat," the author says (p. 139) "Both these elevations are covered with ruins and remains of forts; and the former (Mosulla) with the magnificent ruins of the mosque and tomb of Sultan Hussein Mirza Bairam, one of the house of Timour, of the fifteenth century (1498), the elegant minars of which I saw long before I arrived at this city, and said to have been partially destroyed by *Chengis Khan*." Chingiz Khan died in August, A.D. 1227; Timur was born in April, A.D. 1336; and Sultan Husain Bahadur Khan was Timur's grandson, and yet his tomb "was partially destroyed by *Chengis Khan*!"

At p. 142, we are told that the Persians "used to be Sunnis also, previous to Nadir Shah's time, but he turned the nation into Shias." A great portion of the whole population of Persia are Sunnis still (but the Shi'ah is the State faith), and Nadir did *quite the contrary*; he reformed the religion, and abolished the sect of 'Ali or Shi'ahs. Nadir had on several occasions taken written promises from the Shi'ah people of Persia that thereafter abuse and revilement of the three first Khalifahs should cease; and one of the first to fall a victim to his wrath, on suspicion of being a Shi'ah and reviler, was his own eldest son Razza Kuli Mirza, whom he blinded.

One more specimen of Captain Marsh's history

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\*A Ride through Islam. By Captain H. C. Marsh, 18th Bengal Cavalry. (London: Tinsley, 1877.)

before we pass to some of the good points in his book. At page 181, referring to Kandahar, he says: "I could see out of my lofty look out, the hills of solid rock to the east on which was the ancient city of Candahar, first built by Babur in 1522 high upon the summits. . . . The present city in the plains was built by the Duranee Ahmed Shah. . . . Ahmed Shah, the chief of the Suddozaies, at the death of the Emperor (!) Nadir Shah, became Ameer of Afghanistan under the title of Dur-e-Dur-am (*sic*) in 1748. He also died here, in 1773; and was succeeded by his sons—Shah Zeman, Mahmud Shah, and lastly, Shah Shuju, whom we supported," &c., &c.

"Babur" did not build the ancient city of Kandahar; Ahmad Khan, Abdali never became Ameer of Afghanistan, but "Shah"; did not die at Kandahar, but at Murghab; neither Shah-i-Zaman, Mahmud Shah, nor Shah Shuja'-ul-Mulk were sons of Ahmad Shah; and they did not succeed him.

We now turn to other and better parts of this Ride. The author says (p. 185) that "Sher Ali's great fear is that of losing Balkh by means of a raid by Abdool Rahman, secretly helped by Russia," and which, in a foot-note, he says "is equally as true in 1877 as in 1873," and he is quite right. This 'Abd-ur-Rahman is the son of Sher 'Ali's eldest brother, Afzal Khan, who would have succeeded on the death of his father, had not Dost Muhammad nominated Sher 'Ali, his younger and favourite son. Sher 'Ali was however ousted by Afzal, who subsequently gained the supremacy with the aid of his son, 'Abd-ur-Rahman. After this Sher 'Ali again regained the authority with the aid of his son, Ya'kub Khan, to whom we shall presently refer. 'Abd-ur-Rahman eventually fled to the Russians after the death of his father, was pensioned by Kauffmann, of Turkman women and infant slaying renown, married a daughter of the ex-ruler of Badakhshan, Jahandar Shah, another disaffected chief, and is residing in Russian territory ready for any mischief or agitation, à la Bulgaria.

Captain Marsh's ideas of the political situation are generally sound, which arises from the fact of practical knowledge as an Indian officer, not the milk and water ideas of the stay-at-home politicians whose sight is limited to their own contracted horizon. He says (p. 202), writing in 1873: "The Eastern Question will not be settled by the taking of Khiva by the Russians, and *no central zone will protect us from at least the inconvenience of intrigues between Russia and Afghanistan.*"

Since that was written Khiva has been taken and annexed, Kokan gobbled up, the Amír of Bukhára made a mere puppet, a large tract of territory on the shores of the southern Caspian has been stolen from Persia, and the last Muskov move is that they have lately established themselves on the Pámír, which is within 250 miles of our territory and of Afghánistán, and they now look down upon us, while the Secretary of State for India assures the nation, in Parliament, that the Russians are separated from our territory by 1000 miles of the most tortuous and difficult country in Asia.

The names of places are as badly treated as the historical part, in this, as in most books; and it is amusing to compare the writer's names with those contained in the new map of Persia published by the

India Office. Both are incorrect, in most instances, for example; Deynemak, or Salt Village—Dey Namek; Lashgird—Lasgird; Bostan—Bostán (while Bustam is the name of the place); Budusht—Bidast; Subzawar—Sabzawar (for Sabzwar); Mehr—Mihr; Rewayat—Riwad; Zefferanee—Zafarani; Nishapore—Nishapur; Kudmgah—Kadamgah; Turbut Sheikh Hydree—Turbat-i-Haidari; the ancient city of Linger—Langar; Meshed and Mushud—Mash-had; Khaff—Khaf; Subush—Shabush; Khosan—Kosan; Rozanak—Rosanak; Ghorian—Ghurian, &c.; but the Captain gives the names, after a fashion, of several well-known places of which no mention whatever is made in the new map of Persia.

The better parts of the book are where the author gives us sketches of the prominent people, and eschews history. We will quote a few passages:—

"On my being introduced to Yakoob Khan by the officers who had come with me from the frontier, he rose and met me halfway, shaking hands in European fashion. Having seated me on the small but rich carpet that formed his *musnud*, he sat close on my right, near the window that looked out on the large square. The rest of the room was filled by chiefs and officers of his army. He was dressed in a European military braided blue coat, with black trousers, socks, the Heratee sheepskin *kulla*, or hat, and a fine cloth *choga*; and his gold-belted sword lay in front at his feet. He is twenty-six years old; well-bred; has a pleasant, intelligent face; not very fair; middle height (5 feet 3 inches); small hands and feet; slight moustache, with a slightly retreating forehead; good voice. . . . After tea and pipes were brought in, he began to speak to me in broken English about the troubles in his family, saying he was his father's most loyal servant; but the intrigues at Cabul, and the enmity between the Ameer's and his councillors and people, was so great, that although Lord Mayo had done all he could for him in trying to reconcile him to his father, it was of little good. 'I know,' he said, 'the very fact of my speaking to you in your own language will be reported at Cabul, and will be put down to me as hatching some intrigue against my father.' I asked him why he did not come and visit India, like his father. He said—'I should be most happy to do so, and have often desired to go and see the tumasha of India, but do not dare to leave my government, lest in my absence it might be given to my younger brother Abdoola.' He asked me if I had seen his armoury and gun-foundry. On this I tried to explain to him that the duty of a good ruler was not to give all his attention to his army, but also to encourage trade and agriculture, make roads, protect traffic, &c. &c. 'I know' he said in Persian, 'you English desire trade and peace, and that your wealth comes from your good arrangements; but I have first to secure my seat here by force of arms, before I can think of aught else. Herat is very poor, and I can hardly hold my own; but in me you have a well-wisher to your Government, and, if possible, I shall copy their policy.' Here I made him understand about my not being on Government duty, and that anything I said was not of an official description, but only to show my personal friendship. . . . If the British Government do not foster him as he deserves (he is one who will turn out of quite another stamp to his father), they will regret it when too late. Now he is young, with a mind capable of taking good impressions, which ought to be forced on him by the gentle pressure of personal influence. If he should become soured by neglect and unfair treatment at the hands of his father, and we do nothing to uphold him, then we may expect his bitter hatred; and of this I am certain—from his character, and from the accounts of his influence in this part of the country—that he will not tamely submit to be deprived of his natural rights; and, in case of his younger brother, Abdoola Jan, being made heir to the throne of Cabul, if Yakoob does not succeed in taking the country by force of arms, he, at least, will receive such support from his own people that the State of Herat will be again torn from the Kingdom of Cabul. We shall again see Abdool Rahman, Esah Khan, and Co., as candidates for at least a portion of Afghanistan, viz. Balkh and Kundooz (which, however, are not in Afghanistan), and the rest of the country will be in as great a state of anarchy as before Dost Mahomed's time—which God forbid."



The author obtained some news on his way of the Perso-Afghan Mission. He says—

"It was told me by one of Sir Frederick Goldsmid's servants, and the people in these parts all believe the same story:—'I went with my master to Seistan, to the town of the Jooaim, held by Sirdah Mahomed Ali Khan. Another town is Lash, the Governor of which is Sirdar Sultan Ahmed Khan. Shureef Khan Belooch has a fort of his own. Taj Mahomed Khan has another fort, but is now imprisoned at Teheran. The Sahib was six days at Jooaim before the General Sahib (Pollock) joined him. As soon as the General arrived from Candahar, with all his *fonj*, or escort of cavalry and infantry, the Persians refused them any sort of provisions, even for money; so it had to be brought from Furrak, four days off. We all remained here together *four days*, when, not getting any supplies, we marched for Meshed, which we reached in twelve days.'"

The traveller was received like a prince in many places, especially at Kandahar; and his reception is a good specimen how a solitary Englishman was treated just after Sher 'Ali's visit to Lord Mayo, and when the Afghans were beginning to forget our former hostility towards them. How would he have been received now since this Quetta menace? His life would have been in danger, we trow. In winding up his "Ride through Islam" he says: "I consider the occupation of Quetta by our native troops as a false move; but if they were withdrawn and a Political Officer be established permanently at the Court of the Khan of Kelat, we should enjoy all the advantages of a spirited move, without any of its drawbacks."

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STANFORD'S COMPENDIUM OF GEOGRAPHY AND TRAVELS. Based on Hellwald's "Die Erde und ihre Völker." Africa. Edited and extended by Keith Johnston, F.R.G.S. (Stanford, 1878.)

MR. KEITH JOHNSTON has amplified the work of Von Hellwald by dwelling more fully on those parts of Africa which have been explored by English and other travellers, while Hellwald has devoted the largest share of attention to the labours of Germans. The present work has thus expanded until it has reached two or three times the size of the original upon which it is based. It thus forms a complete general view of the present state of knowledge of African geography.

In its present form the book is admirably designed, and Mr. Keith Johnston, who is well qualified for the task, has worked up the details with judgment and ability. Each division of the continent is treated separately, and illustrated by a coloured map, and there are also a number of well-selected woodcuts. No better book could be placed in the hands of the student of African geography, and it will be found most useful as a work of reference. A valuable paper by Mr. A. H. Keane on the philology of the African races forms an Appendix.

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FIFTEEN THOUSAND MILES ON THE AMAZON AND ITS TRIBUTARIES. By C. Barrington Brown and William Lidstone, C.E. (Stanford, 1878.) Pp. 520. Map and 25 Wood Cuts.

MR. BROWN and MR. LIDSTONE were sent out by the Amazon Steam Navigation Company, in 1873, to select and report upon certain territories allotted to them by the Government of Brazil, on the banks of the Amazon and several of its tributaries. The authors were two years in the country and had specially good opportunities of seeing it to advantage. They made good use of those opportunities, and their volume contains excellent pictures of scenes and circumstances as they found

them in the valley of Amazon. They explored several tributaries which are very little known; and to the geographers their chapters on the rivers Trombetas, Jurua, Yavari, and Jutay have special interest.

The Amazon is, undoubtedly, the grandest river in the world. There is no river in Asia or Africa which is worthy to be compared with it; while some of its tributaries are still unexplored. The Amazonian region deserves a far larger share of attention than has hitherto been given to it by geographers, and we therefore heartily welcome the appearance of so excellent a book of travels as that of Messrs. Brown and Lidstone; for their picturesque descriptions of scenery cannot fail to attract more attention to the region they have explored so well.

## Log Book.

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**Hans, the Eskimo Traveller.**—In our next number the publication will be commenced of the Memoirs of Hans Henrik, the Eskimo traveller; during his service in the Arctic Expeditions of Kane, Hayes, and Hall, and of Sir George Nares. The memoirs were written by Hans himself in the Eskimo language, and have been translated by Dr. Henry Rink, Director of the Royal Greenland Board of Trade, and edited by Professor George Stephens, F.S.A., of Copenhagen. Dr. Rink, on perusing these memoirs in the Eskimo original, which were forwarded to him by Mr. Krarup Smith, from Disco, found that he had never read any adventures in the far north, which, relatively to their brevity, were so curious. Besides setting forth many strange and interesting adventures, every line helps us to understand the Eskimo people, by reflecting their ideas and their mental development in the person of the author of the memoirs.

**Mr. Cross in Colombia.**—Mr. Cross, whose valuable Report on the India-Rubber trees of Brazil was published in our numbers for June, July, and August, 1877, is now employed in collecting plants of two valuable species of chinchona plants, namely that known as the "Calisaya de Santa Fé," and the *C. cordifolia*, in the forests of Colombia. He penetrated to the unexplored banks of the river Caqueta or Japura near its source, and having made a good collection of plants of the "Calisaya de Santa Fé," he returned with them to the town of Popayan on the 22nd of last October, having successfully surmounted the great difficulties which such a perilous journey entails. On the 26th he again left Popayan for Paniquita and Sylvia, to make a collection of the *C. cordifolia*, yielding the "hard Carthagena bark" of commerce. He intended to remain in the Popayan district, in order thoroughly to establish the plants, until the beginning of January, when he will return to England, whence the plants will be forwarded to the chinchona plantations in India.

**The Abbé Desgodins on the course of the Brahmaputra River.**—The Abbé Desgodins, in a letter of the 28th March last, gives some interesting information regarding the course of the Sanpu or river of Tibet. This information he obtained by an old lama, who, during his youth, had travelled a great deal in Tibet. This lama stated he had made a pilgrimage along the course of the great river from its

source at or near the Tso-ma-pang lakes in the west of the province of Ngari, to the frontiers of the savage tribe of the Lhopa. He stated that some days' journey east of Lhasa, the river turns southward with a long bend, and traverses the Tibetan district of Hia-yul, a well-populated and rich district, governed by the Kalun Doring of Lhasa, and lying immediately north of the Lhopa. In its course through this country it passes between sharp, steep bare rocks, without any roads, and the only method of passing which is by means of indifferent rope ladders. After flowing for some distance through the Lhopa country, the river falls perpendicularly into a valley unknown to the lama. The height of the fall is so great as to cause dizziness. At this point the river is almost as large as the Kincha-kiang at Bathang or the Mekong at the salt mines. It does not reach the country of the Nahongs or Mishmis, but disappears more to the west near the country of the Lhopa or Abords. This information the Abbé considers is all the more worthy of credit, as it exactly confirms what had previously been told to him by a slave (see our number for January, 1877, p. 15.)

#### Journey through China to British Burmah.

—Lieut. Gill, R.E., has arrived at Rangoon after a most successful journey through China. In February last he left Shanghai and travelled to Hankow by steamer. From Hankow he went to Chung Ching, at the invitation of Mr. Baber, a member of the late Grosvenor Mission, and then a trip was made northwards for a little distance. At Tsi-liu-tsing the fire wells were seen, some 3,000 feet below the surface, and also the brine wells. From Tsi-liu-tsing, Lieut. Gill went to Cheng-tu, from thence to Sung-panting, on the borders of Koko Nor, and on to Liung-ngan-fu. The return to Cheng-tu was made by a different route. Here he was joined by Mr. Mesny, of the Chinese service, and then began their long, perilous, and arduous journey to Burmah overland. Cheng-tu was left on July 10, Ta-chien-lu was reached on the 25th, distant about 291 miles. Here they were most hospitably received by some French priests with whom they remained a fortnight. This station was left for Lithang, which was made in two days. The next station was Bathang, some 307 miles from Ta-chien-lu, and this was reached on August 25. Bathang is almost in the 30th degree of latitude, and quite on the borders of Tibet. From Bathang the travellers went to Atun-tze, a distance of 170 miles, which they reached on Sept. 5. Atun-tze was left on Sept. 9, and Talifu reached on the 27th, a distance of 361 miles being traversed. The next station was Man-wyne, where they arrived on Oct. 24; and Bhamo on Nov. 1. Lieut. Gill speaks of the natives as quiet and far from hostile. But he describes that part of the journey from the point at which he was joined by Mr. Mesny as very arduous, graphically comparing it to "continually going up a staircase." There are no roads, the way consisting of mere tracks through a rocky, mountainous country. In the neighbourhood of Bathang, ranges were crossed some 15,600 feet high. On their way down from Mandalay it is said these gentlemen were struck at the difference between the two political sections of the country—native and British Burmah. In the latter the cultivated fields, smiling homesteads, and contented looks of the people

offered a striking contrast to that obtained in the other.

**New Russian Map of Central Asia.**—The new map of Russian Turkistan and adjacent countries, in 12 sheets, prepared at the Russian Topographical Department in St. Petersburg, embraces a large extent of country from west of Orenburg on the one hand as far as Kobdo on the other, while southward it includes the south-east angle of the Caspian, the basin of the Oxus, the Muztagh Range and Khotan. There is a vast amount of detail in the map, which is altogether an elaborate and careful production. It is the first map we have seen embodying the results of the recent Russian surveys on the Alai Plateau, and in connection with this it is noteworthy that the line denoting the Russian frontier no longer runs along the range between the Little Alai Plateau and the Kizyl-Su, but has been pushed southward, so as to include the Great Kara Kul Lake, and up to a point about 80 miles from its former position. The new boundary forms a huge tongue or peninsula jutting out into the region called the "Roof of the World," and approaching ominously close to Lake Victoria, which formed the terminus of the demarcation line fixed upon in the Anglo-Russian deliberations in 1872. Colonel Prejevalsky's explorations south of Lob-Nor have not been embodied in this map, but there is a good deal of detail inserted there instead, which is, however, of a very unreliable description.

## Correspondence.

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### ON THE KARAKORAM MOUNTAINS.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In answering Mr. Robert B. Shaw's courteous strictures in the *Geographical Magazine* for December last, I beg him to believe that my allusions to "the observer on the spot" were not so much intended to be applied to himself personally as to travellers in general, whose criticisms are too often found by geographical judges to be applied to great objects from observations of insufficient extent.

I hope, also, that he will excuse me for remarking that there is no occasion to raise his general question of "Water-partings *versus* Ranges," because it has been amply elucidated in elementary works, of which Lavallée on *Physical, Historical, and Military Geography*, is an example. The treatise on the Himalaya which has elicited Mr. Shaw's present communication abounds with illustrations of the distinction often existing between ranges and water-partings; and I do not think that this question is involved in the different views which we appear to take on the Karakoram Range.

In my paper on the "Himalayan System," in the *Geographical Magazine* for July last, I have pleaded for the adoption of a distinctive name for the mass which unites the two watersheds of Lake Lob and the Indus. The culminating summits of the south-western slopes of this mass form a lofty range, to the whole extent of which (as defined by the coincidence of the Lob and Indus basins) I have given the well-known name of Karakoram Mountains. This name was originally confined to the most frequented pass across these mountains, just as the names of hills in England are often applied in the neighbourhood only to the roads which pass over them. Mr. Shaw divides the length of this range into two parts. The western part, up to the



head of the Nubra Valley, he calls the Muztak, in reference to a pass of that name which no European has yet traversed. The eastern part he allows to be called the Karakoram, so far as it coincides with the water-parting; but the main range is taken by Mr. Shaw further to the south along a formidable spur which divides the Nubra from the Shyok, and this he calls the Eastern Muztak. It may be well to note that the usual spelling is Mustagh, from Turkish words signifying a snowy or ice mountain. Karakoram means Black Gravel.

I object to Mr. Shaw's method of nomenclature because it fails to define by one name a feature distinguished by the water-parting of two great river basins. I see no reason for substituting the little known Mustagh for the well known Karakoram. It remains for me to explain why I regard as the main range, the mountains east of the Upper Shyok to those on the west of that river and between it and the Nubra River.

If any of my readers are disposed to follow this argument on a map, they are recommended to use Sheet 7 of Major T. G. Montgomerie's Trans-Frontier Maps, which, although only in outline, gives the rivers and glaciers, with the positions and altitudes of the observed peaks. The fourth sheet of Colonel Walker's Turkistan, revised up to 1875, embraces the area on a smaller scale, with hill shading; but the latter, like Mr. Shaw's delineation of the great ranges, cannot be said to aid the research. There is also the quarter sheet of the Indian Atlas, with the hills, including the Karakoram Pass; but the adjoining quarters to the south and east, which are necessary for this discussion, are not finished.

Referring then to Major Montgomerie's map, let me recommend the water-parting to be clearly traced in pencil or colour. Then the question to consider is whether the main range may be deemed to be coincident with it.

The prominence of the range between the Nubra and Shyok Rivers is so remarkable, that Mr. Shaw may well be excused for allowing it to draw him away from the water-parting. But when we find one class of evidence of a conflicting character, it is wise and proper to bring other considerations to bear upon the question. Thus, it will be seen on the map, that although the Nubra-Shyok Range reaches an altitude of 25,000 feet, yet the slope of the mass, as indicated by the fall of the rivers, follows the trend of the range, showing that on the whole, the elevation of the water-parting is superior, and deserves the appellation which distinguishes it as the main axis of the system. In this view we are supported by the maps both of Major Montgomerie, and of Mr. Frederick Drew, late Governor of Ladak, in his work on the Jummoo and Kashmir territories. Instead of ignoring Mr. Shaw's range, as he says, the fact is I treat it, like many others, as secondary. Mr. Shaw asserts that the eastern part of the Karakoram is devoid of bold eminences. I point to observations of 20,673 feet, and 21,638 feet at the head of the Karakash River where my Karakoram Range terminates.

It is necessary to observe that Mr. Shaw's map does not represent the true direction of the Nubra-Shyok Range, as it really extends between those rivers, down to the great bend of the Shyok. This being the case, it may be asked how Mr. Shaw proposes to prolong the range? Authentic materials for that work will be found in Sheet 8 of the Trans-Frontier Maps. It should be remembered that the eastern end of the Karakoram lies between the head-waters of the Karakash and those which feed the lakes and swamps of the Lingzethung Plain, where the Gangri system begins. It is the connection of the Gangri system with the Karakoram that Mr. Shaw is invited to solve, so as to connect his "Mustak" with it in a symmetrical manner.

With regard to the Tibetan Plateau, I have treated its extent as an open question, and have placed the subject before the public in various points of view; one of which, extending the term up to the Southern Himalaya, would comprehend all that Mr. Shaw names. I prefer to dis-

tinguish the Himalayan from the Tibetan Plateau, and also the elevated lacustrine basins of the Tibetan Plateau from the river basins which surround that remarkable feature. Mr. Shaw appears to be confounding physical with political geography, and to be forgetting that Western Tibet is an exploded term as applied to Zanskar and Ladak, which he is well aware have ceased to be Western Tibet since their acquisition by Kashmir. He might as well reckon Alsace to be still a part of France.

Yours, &c.,

TRELAWNEY SAUNDERS.

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THE PALÆOCRUSTIC SEA.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—Previous to the voyage of the 'Alert' and 'Discovery' to the Polar Sea, there was a very widely spread idea that an "open Polar Sea" existed in high latitudes. The term had even been used in an official document. When we discovered a sea covered with the heaviest ice ever met with—through which it will never be possible for any navigator to force his ship—I considered it to be my duty to contradict such former assertions in the most decided manner possible. Hence the adoption of the word "palæocrustic," to designate an unnavigable sea of ancient ice.

As a sailor unlearned in Greek, I have long been expecting the term to be criticised. Other words have lately been proposed, but they are all long and somewhat difficult to pronounce. However, as my object has now been attained, and the belief in an "open Polar Sea" is considerably shaken, if not given up completely, I think that it will be better to drop any special name, and to leave future Arctic explorers the ice alone to combat, without asking them to face the imaginary terrors of a "Palæopagetique" Sea.

Yours, &c.,

G. S. NARES.

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Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

Meeting of 26th November 1877.

ON taking the chair, the President, Sir RUTHERFORD ALCOCK informed the meeting that the two papers about to be read referred to the Continent of South America. The first, on Bolivia, was by Captain MUSTERS, who had resided there for some years, and had obtained much valuable information, which enabled him to correct the errors of our maps. The second paper, by Mr. Clements Markham, related to other unexplored parts of the South American Continent.

COMMANDER G. C. MUSTERS, R.N., then read his paper on

NOTES ON BOLIVIA.

He commenced by stating that one of the least known of the South American States, which were formed after the final overthrow of the Spanish dominion in South America was the Republic of Bolivia, or Upper Peru as it was called previous to 1825. The Republic of Peru borders it on the west, the Empire of Brazil to the north and east, the Argentine Confederation to the south, and Chile to the south-west. It thus occupies the centre of the continent, and includes about 13 degrees of longitude and 16 of latitude. The most important territories of the republic are comprised in the Altiplacina, or table-land of the Andes, and the spurs and valleys of the Eastern

Cordillera, the immense outlying savannahs and forest land to the north and east want development. Commander Musters's experience was confined to the former of these regions, which he compares to a gigantic Switzerland. The maritime department of Atacama may be regarded merely as a distant and rather inaccessible outlet. He described the famous lake of Titicaca (which belongs partly to Peru) and its outlet, Desaguadera River, which, after a course of 200 miles, flows into Lake Aullagas. The latter lake, which receives the downpour from the rainfall and melting snows of the Cordillera, appears to have no outlet, though the Indians speak of a subterranean outlet or whirlpool at the southern end. The chief cities of the republic (Oruro excepted) are situated at the foot of, or among the spurs of the eastern chain of, the Andes, this district being the commercial, political, and social life of Bolivia. The head-waters of the Amazon and La Plata also rise there. After describing in detail several of the cities visited by him, foremost of which was La Paz with a population of 80,000, situated close to Lake Titicaca. Commander Musters pointed out that the mineral riches of Bolivia ought to be her mainstay—gold, silver, copper, tin, antimony and bismuth, existing all over the country. The secret of the poverty of Bolivia lay in her revolutionary spirit which he thought would be remedied by improved means of communication.

Mr. CLEMENTS MARKHAM next read his paper, ON THE STILL UNEXPLORED PARTS OF SOUTH AMERICA, which we give *in extenso*, see page 8.

A brief discussion followed, in which Mr. ALEX. T. BAILLIE, who had lately visited Paraguay, one of the provinces which bordered on Bolivia, said that he was surprised that hardly any reference had been made to the communications already established, and were now being carried out from Bolivia down to Paraguay, and so to the Atlantic. A road was now being made between Corrientes, through the Chaco into Bolivia; and he had met a number of people who were continually passing and repassing between the two countries. This road would afford a means of communication which would take the place of the route to the small port held by Bolivia on the Pacific coast.

Mr. MATTHEWS was sure that Captain Musters's notes and maps would be of great service in throwing light upon a country which had not hitherto received the notice it deserved. He first made acquaintance with Commander Musters in Bolivia, and had great pleasure in bearing testimony to the accuracy of his observations. One or two points of the paper, however, he wished to refer to. He did not know if Commander Musters had given the latest boundary between Bolivia and Chile. By a treaty ratified in 1875, Bolivia had given up about a degree of coast line, which was a very serious loss. He was sure the Meeting would join with him in regretting the absence of Colonel Church, the indomitable pioneer of the opening up of Bolivia by the eastern route of the Amazon. Perhaps he himself was the only Englishman who had ascended the rapids of the Madeira River. Several had gone down them, but the ascent was a work of five or six times as much trouble, on account of the time it occupied. The two principal affluents of the Madeira Mr. Markham had so fully noticed that it was unnecessary for him to refer to them, except to mention that a great deal of gold was found in the districts between Bolivia and Peru, and most of the streams descending to that region from Brazil had auriferous sands. He agreed with Commander Musters that there could be little doubt that Bolivia was the most highly metalliferous country in the world, but he also claimed for its importance as an agricultural region. The road across the Gran Chaco, he thought, could never be made available for any great amount of traffic, because during six or eight months of the year it was perfectly impassable, going through vast swamps. The northern provinces of Brazil would, however, afford a ready market for the agricultural produce, and that industry,

if developed, would in a great measure quiet the country and prevent the revolutions that were so frequent there, as the financial poverty of the country, which arose from the turbulent spirit of the people, would be removed when they had work to do.

The PRESIDENT said the conclusions which might be drawn from what had been told them were, first, that the rising generation of geographers need not weep because they had no unexplored regions to discover, for there was abundant scope for all their energies for 50 or 100 years to come; and secondly, that those who had visions of a Malthusian nature might learn that there were vast territories abounding in mineral and agricultural resources, which would supply any increase in the population for the next 1000 years.

#### Meeting of 11th December, 1877.

Sir RUTHERFORD ALCOCK, President in the Chair.

The business of the evening consisted in the delivery of the first of the three lectures on Physical Geography, which it was decided should be given during the present session.

The lecture was delivered by Professor P. MARTIN DUNCAN, F.R.S.

#### ON THE FORMATION OF THE MAIN MASSES OF THE LAND.

The lecturer commenced by saying that some years since a very suggestive sentence was frequently spoken by Sir R. Murchison—namely, "Being a geologist, I am an ancient geographer." The phrase enunciated his belief in the sisterhood of the sciences of Geography and Geology. It bound the present and the past in a great philosophy, and was a protest against the assertion that the face of Nature had been unchanged, and that the great features, the study of the geographer, the delight of the traveller, the charm of the artist, and the contention of races, were formed at once and were without any relation to the distant past. The opinions and theories involved in the brief sentence of Murchison's were common to the most educated geologists many years ago. Advanced thinkers held that as the present aspect of nature on the globe was foreshadowed in the past, so each successive mutation of the surface was evolved in the womb of time, and retained impressions of its ancestry. Lyell, following his great master Hutton, insisted on there being a close connection between geographical and geological science. He thus defined his favourite branch of knowledge:—"Geology is the science which investigates the successive changes that have taken place in the organic and inorganic kingdoms of nature; it inquires into the causes of these changes, and the influence which they have exerted in modifying the surface and external structure of the planet." Hutton, a century since, inculcated the slow progressive changes of the surface of the earth under the influence of the same agents which produce changes now, and taught that geographical knowledge in its widest sense must precede geological study. "The ruins of an older world," he wrote, "are visible in the present structure of our planet, and the strata which now compose our continents have been once beneath the sea, and were formed out of the waste of pre-existing continents. The same forces are still destroying by chemical decomposition or mechanical forces even the hardest rocks, and transporting the materials to the sea, where they are spread out and form strata analogous to those of more ancient date. Although loosely deposited along the bottom of the ocean, they become afterwards altered and consolidated by volcanic heat, and then reared up, fractured, and contorted." From the days of Hutton downwards there has been a clear scientific light shining through the intelligence of the great teachers of advanced geology, which has relieved the dull monotony

of geography, elevated it to its proper position in natural science, and environed it, as the outcome of the past, with a philosophic causation. "The geologist is an ancient geographer," and his highest aspirations are to be able to restore the animate and inanimate nature of each of the chapters of the great book of Nature, and to prove that the great land-masses are the sum of all the geological changes of the past within and without the earth. The great land-masses were in the midst of deep oceans, and arose from the floor very abruptly in some localities and less so in others. The old nautical rule of the deep sounding being close to the highest coast line held good in the main, but more soundings in abyssal waters were required before any relation as regards depth and the east and west of continents could be enunciated satisfactorily. It was evident that if the whole of the land-masses were considered as upward and the ocean floors as downward curves on the service of the globe, the sum of the depressed areas was vastly greater than that of the land. The relation of land to sea floor was as 51 to 146 in millions of square miles, and the average height of the land was not more than 900 feet, the average depth of the water being about 15,840 feet, or as 1 to 153.6. The idea that the continent sloped very gradually to the profound depths of their limiting oceans must be abandoned, and it was evident that marine erosion of the coast, assisted by sub-ærial denudation, would alone account for the partial shallowness of the sea in some places near land, and not for the sudden dip to great depths. Some parts of continental areas had not the stability of others, and slight, slow elevation and corresponding subsidences of considerable tracts have been recorded. There was hardly a coast line which did not present either a raised beach or a sunken forest, and did not contain the remains of creatures or plants whose species existed in the sea or on the land close by. The great land-masses were composed of mineral substances, the origin, contents, position, age, and changes of which were the peculiar study of the geologist. These substances were arranged, for the purposes of easy study, into sedimentary strata, rocks of an eruptive origin, and those which apparently underlie all others, the hypogene and eminently crystalline. Most of these strata collected in water, as washdown of earth or as gradual deposit of dead things, and a relatively small number accumulated on dry land or in the lakes, rivers, and swamps. There was a regular order in the succession from below upwards of the strata, and they were grouped in great vertical series into so many formations. A stratum might be considered a leaf of the history of the world, and the formation as a chapter. Each chapter was a physical geography *per se*, and illustrated a fresh landscape or sea view." Having investigated and illustrated the subject at great length, the lecturer concluded as follows:—"Clearly, all the mutations of the great land-masses have been under law, and the vicissitudes of the surface have resulted in the present geographical distribution of land and sea. The great factors of surface denudation belong to other energies than those which upheaved and modelled the land, but the action of all has been continuous and harmonious. The mysterious energy of life, incarnate on the ever-varying globe, has ever evolved new forms, partly under the influence of consecutive changes in its physical conditions. Thus this old earth, so varied in its landscape, so diversely ornamented with an abundant flora, so characterised by its interdependency of animal life, owes all its beauties to a process of development ruled by the mysterious environment of the Creator. The geography of every great land-mass has been inherited. The older its ancestry, the greater is the beauty and diversity of the surface; and the more frequent the geological revolution, the more charming the valley, the upland pass, and the distant hills shelving to the plain. On the other hand, the greater the long periods of quiescence in the past,

the more monotonous is the present land surface, and the more antiquated are its flora and fauna in appearance. In the first instance, variety in nature and its characteristic geography favour civilisation and all that is æsthetical; and in the last, the image of the former geography is impressed upon man, beast, and flower, and monotony and barbarism reign supreme."

The PRESIDENT remarked that it was unnecessary for him to point out the comprehensive character and scope of the instructive lecture to which they had listened. Professor Duncan had maintained the scientific character of the courses of lectures instituted by the Council, and had fully demonstrated the intimate connection between geology and geography. Some of the very startling things that they had heard would give them food for reflection for a long time. The present aspect of nature was the outcome of all the past geographies, and it was impossible to feel interest in the surface of the earth as it now existed without having also a very deep interest in knowing how it had been produced, and what had been in various ages the successive geographies of which there were palpable traces in the geology of the earth. Among the many things in the lecture which had surprised him was, that what was facetiously called the New World appeared to be the oldest continent, and in all probability had existed before Europe itself. The President concluded by moving a vote of thanks to Professor Duncan for his very interesting lecture.

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#### FRENCH GEOGRAPHICAL SOCIETY.

*November 7th, 1877.*—M. LEVASSEUR presiding. A letter was read from the Governor-General of Algeria, enclosing two letters from the Jema'a of Insalah, strongly opposing M. Largeau's projected journey through the Insalah territory. The PRESIDENT stated that, in consequence of these difficulties, M. Largeau would seek to reach the Niger River by another route. Announcement was made that Lieutenant de Semellé proposed to start soon for the mouth of the Niger, with the intention of ascending it as far as the confluence of the Benue. From thence he intends to travel up the latter river to its source, and then to work across eastward to the Shari, and having explored this last river pretty fully, to make for the Lakes Albert and Victoria, and finally to strike the east coast about Mombasa or Malinde. M. de Semellé had obtained the necessary permission from the War Minister, and the President offered him the best wishes of the Geographical Society for the success of his expedition, which is undertaken at his own expense. M. Vaux, French Consul at Mogador, forwarded a set of three months' meteorological observations at that town, and furnished a brief account of a visit paid by him to the Canary Islands. Regarding Dr. Crevaux in Guiana, it appeared, from a communication from the Minister of Public Instruction, that he had been detained virtually as a prisoner in the Buis country, and that the natives had tried to starve him, but that in spite of this and of bad attacks of fever, he had made an examination of the mineral resources of the country, and hoped soon to push on to the Tuma-chumac Mountains. The International Society for the formation of a Canal across the Isthmus of Darien sent a report on their exploring labours, and stated that Lieutenant N. B. Wyse would start on a fresh expedition on the 7th November last, to complete his previous work, which had been broken off by the rains. Announcement was made of Dr. Harmand's return from Cochin China.

M. HAMY gave an account of certain unpublished narratives of Spanish travels in the sixth century, and M. HAYAUX DU TILLY read a paper on the results of Lieutenant Cameron and Mr. Stanley's African explorations. M. DELESSE presented a work on the levelling operations in the department of the Nord. The entire cost (including that of the map) was 156,000 francs

(6240L.), of which the Department paid about three-fifths, and the State the remainder. The total united length of the series of levels is 4,788 kilometers. The map is on seventeen sheets, which are sold separately at one franc apiece. The department of the Nord comprises an area of 568,387 hectares, and its density of population (*i.e.* 255 inhabitants to the square kilometer,) is four times as great as that of France generally.

*November 21st, 1877.*—M. LEVASSEUR presiding. The President announced that the next general meeting was fixed for the 19th of December, and that papers would then be read by M. VILLAIN on the ascent of Illimani, by Dr. HARMAND on Cochin China, and on the ascent of Cococatapett by M. D. CHARNAY. He also stated that Lieutenant de SEMELLE whose expedition to Africa had been mentioned at the previous meeting would start for Africa on the 15th January.

M. MAUNOIR, the Secretary, read a letter from M. Ch. de Ujfalvy, giving notes on the district of Kuldja, formerly the Chinese district of Ili. He describes the climate as very mild, the duration of winter being only two months. It is admirably suited for colonisation, but the Russians have refused permission to intending settlers, as they calculate on handing the territory back to the Chinese. The valleys of the Ili and its affluents are very fertile and produce rice, cotton, wheat, and all sorts of fruits, but owing to the long succession of wars and rebellions through which the country has passed, the population has decreased from 2,000,000 to barely 130,000.

M. G. GRAVIER gave an account of the Congress of Americanists—a Congress convened for the study and elucidation of the history, archæology, and ethnology of the American continent. The session was held in the town of Luxemburg, under the patronage of the King of Holland; and the different meetings, which amounted to seven in all, were devoted to series of papers on the ancient pueblos or town-builders, by Mr. Edwin Barber; on the mound-builders of America, by Mr. Robertson, these mounds being large structures somewhat like the Cæsar's camps in England and France; on the colonisation of North America in the fourteenth century; the colonies of Markland and Estotiland; the discovery of the Mississippi by Cavalier de la Salle; the travels of Christopher Columbus, Vespucci, Verrazzano; the various voyages of discovery made to the shores of North and South America; and the antiquities and remains of Central America, Greenland, &c.

Dr. HARMAND gave a brief account of his travels along the Mekong and its affluents in Cochin China, and M. SIMONIN read a paper on the distribution of gold and silver over the face of the globe.

#### LYONS GEOGRAPHICAL SOCIETY.

*Annual Meeting of 29th November, 1877.*

M. LOUIS DESGRAND, President, in the chair. The President referred to the changes being carried out in the method of stamping letters passing through the post, by which all letters will be stamped with the name of the department, as well as that of the town from which they emanate. Several railway companies had agreed to furnish, at each station, geographical particulars respecting each locality, and the Eastern Company had taken the initiative in this direction as regards the line between Paris and the Mediterranean. Reference was made to the discussions which had taken place in the monthly meetings of the Society regarding the projected line of railway from Algeria to the Niger River. M. DUPONCHEL, an engineer of note, had been commissioned by the Government to investigate the scheme.

Dr. LORTET then read an exhaustive paper on the coast of Syria and the towns situated thereon, from Alexandretta to St. Jean d'Acre.

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#### IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

*November 26th (December 8th), 1877.*—M. DE UJFALVY gave an account of his travels along the upper course of the Zarafshan and in other parts of Ferghanah. He started in January last, journeyed for nearly a year, and succeeded in making a large collection of archæological remains and ethnological details regarding the different tribes inhabiting the country.

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#### HAMBURG GEOGRAPHICAL SOCIETY.

*November 1st, 1877.*—Dr. KIRCHENPAUER presiding. Herr EDWARD LIPPERT gave an account of a four weeks' sojourn in the diamond fields of South Africa, and Professor EISENHARDT read a paper on Mr. Gladstone's Homeric researches.

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#### ITALIAN GEOGRAPHICAL SOCIETY.

*December 3rd, 1877.*—Il Commendatore CORRENTI presiding. The PRESIDENT delivered a brief address in which he referred to the Italian Expedition to Shoa, the Gessi-Matteucci Expedition, and to the formation of an Italian Committee under the presidency of Prince Humbert, in connection with the International African Association. Announcement was made that Count Telfener had placed a sum of 40,000 lire at the disposal of the Society, to encourage the study of commercial geography.

Il Commendatore NEGRI read a paper on Scientific Geography. He referred to the great strides which this branch of knowledge had made, especially since the Napoleonic wars, and, noticing the progress made by Italy, called special attention to the hydrographical surveys executed in the Adriatic, off the Ionian islands, and the Tyrrhenian Sea; the approaching triangulation of Sardinia, the marine investigations and surveys off New Guinea, Patagonia, and Japan, and minor works of the same class. A brief exposition of the Darwinian theories was given by the author; but the larger part of his paper was reserved for publication *in extenso*, the extracts read being simply those deemed of most general interest.

## NOTICE.

*The Office of THE GEOGRAPHICAL MAGAZINE is at 57 & 59, Ludgate Hill, E. C.*

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*Letters and Articles intended for insertion should be written on one side of the paper only, and must be accompanied by the name and address of the writer; not for publication, but as a mark of good faith.*

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To my friend Mr. E. L. Brandreth, late of the | They are as follows:—The Lao, on the River  
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ted by the Government to investigate the | *E.C.*

THE  
GEOGRAPHICAL MAGAZINE.

FEBRUARY, 1878.

LANGUAGE-MAP OF THE EAST INDIES.  
II.

FURTHER INDIA, AND THE INDIAN ARCHIPELAGO.

IN Map I., which appeared in our number for January, although seven families of languages were exhibited by colours, we described in detail only the first five, reserving the description of the last two (which re-appear under the same colours in Map II.) to be dealt with this month, together with the eighth great family, the Malayan. This last is held to include all the islands from Madagascar on the extreme left (which by a conventional fiction is introduced into the map) to Formosa on the extreme right, which, though politically in the kingdom of China, is, as regards its indigenous inhabitants, within the linguistic area of Malaisia. To the south a sharp line is drawn to separate those islands of Polynesia, which belong to the Papuan, as distinguished from the Malayan family. The above provisional classification must be accepted, bearing in mind that, in this magazine, the subject is treated geographically and not linguistically.

It will appear at once, that we are dealing with provinces, some of which are independent and unsurveyed, some only partially explored, and others totally unexplored. Our information as regards these regions is in the state, in which our information as regards British India was a quarter of a century ago, when the map showed large unexplored tracts. With regard to the Indian Archipelago the sources of information were so scanty that I was induced to make a special expedition to Leyden in Holland to be instructed by Professor H. Kern, and Professor Veth, the President of the Dutch Geographical Society; and to the courtesy of these distinguished scholars I am indebted for the degree of accuracy, at which it is hoped that this map has arrived.

The authorities consulted are as follows:—

1. For the Tai Family, the works of Bishop Pallegoix, the late Lieutenant Garnier of the French Navy, Colonel Yule, Dr. Anderson, Rev. Mr. Cushing, and the late Dr. Logan.
2. For the Mon-Anam Family, the works of the late Dr. Logan, the late Lieutenant Garnier, Dr. Bastian, M. Aymonier, and the late Mr. John Crawford.
3. For the Malayan Family, the works of the late Messrs. Crawford and Marsden, Captain Newbold, Mr. Wallace, and the personal instructions of Professors Veth and Kern, of Leyden.

To my friend Mr. E. L. Brandreth, late of the

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Bengal Civil Service, I am indebted for the careful superintendence of the entries of the two first families in the map, prepared by Mr. Stanford, of Charing Cross. Professor Veth has placed me under a heavy obligation by his having entered into the scheme with alacrity, and by placing his rare knowledge of the subject at my disposal. He was good enough to fill in the rough map, which I forwarded to him, and to forward a long autograph note, which enabled me to control my previously collected materials.

And yet the compilation of this map is calculated rather to bring into prominence the extent of our ignorance of this great subject than of our knowledge. In no one portion of the field has the subject been systematically inquired into, far less exhausted. The linguistic boundaries are in every case uncertain, as, even in the case of the islands, the interior is generally occupied by inhabitants of different race and language from those who dwell along the shore. With the exception of Java there is no such a thing as a survey, or even a perfect exploration of the tract. One or two excellent grammars and dictionaries have been published of individual languages, but no attempt made to prepare a comparative grammar of any family, or sub-family. Many languages are totally unknown, except the fact of their existence. And yet the Spanish, Portuguese, Dutch, English, and French nations have occupied portions of these regions for more than three hundred years, meddled in their politics, and monopolised their commerce.

Four families of languages are exhibited by colour:—

- |                                 |                              |
|---------------------------------|------------------------------|
| 1. Tibeto-Burman— <i>Blue</i> . | 3. Mon-Anam— <i>Yellow</i> . |
| 2. Tai or Shan— <i>Purple</i> . | 4. Malayan— <i>Magenta</i> . |

Of these, the first was disposed of in the notice attached to Map I.; but a portion re-appears in this map from physical necessity, being intermingled with Tai and Mon-Anam. A portion of Mon-Anam also, in three separate enclaves, appeared in Map I. Again, of the Tai or Shan family, a portion appeared in Map I. in four small enclaves, surrounded by the Tibeto-Burman family. The exigencies of cartography have not allowed all these to be reproduced in Map II.: it is necessary, therefore, to lay the two maps together to follow the remarks, which will now be made.

1. The Tai or Shan family comprises one great literary language, the Siamese, and four smaller ones, less developed, but all so far advanced in polish as to possess separate, though kindred, alphabetic systems. They are as follows:—The Lao, on the River

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Mekong, subject to Siam; the Shans who are subject to Burmah; the Shans who are subjects of the Chinese Empire, known as the Tai Mow; and the Khamti, who are partly within the Province of Assam, in British India, and partly just beyond its north-east frontier. Connected with these last were the Ahom, who in former years overran and left their name in the Assam valley. They are all Buddhists. The singular geographical extension of this family due north and south from Bangkok, on the Gulf of Siam, up the Rivers Menam, Salween, Upper Mekong, Upper Irawaddy, even to the banks of the River Brahmaputra, fourteen degrees of latitude, with essential uniformity of linguistic features in spite of difference of circumstances, has been the subject of remark. The Siamese is spoken by a population of two millions, independent of foreigners, and domineering over their weaker neighbours, the Malay and Cambojans of separate linguistic families, and the Lao of their own, who are reckoned at a million, and are also Buddhist. The Shan subjects of the Burmese Empire live intermingled with other races, and of their number and of the number of the Chinese Shans, we have no approximate knowledge: these last occupy that debatable land between China and Burmah, and in one of their towns Mr. Margary was killed. The Shan subjects of British India are recorded in the census at 1500: the number of these outside the frontier is uncertain. The Shans, who appear in the Census of British Burmah to the number of 36,000, are alien immigrants or refugees. Within the area thus assigned to the Tai family are 50,000 domiciled Peguans of the Mon-Anam family, refugees from Burmah, a streak of population which it is not possible to delineate in the map, any more than the motley crowd of immigrants from China and the western world that throng the ports and cities of British India; but there are also within the limits of the Shan family wild races, speaking other languages, and Pagans, the aborigines of the country before the Shan immigration from the plateau of Tibet, of whom we know little or nothing, except the fact of their existence and their names, and perhaps a brief vocabulary, without an identified locality; and Crawford reckons these at 50,000. Again, as we proceed down the peninsula into Lower Siam, we approach the region of the Malayan family, and in the province of Ligor, marked by purple and magenta stripes, we enter a debatable land, occupied by a ruling race of Siamese Shans, a subject race of Malayan Malays, and a mixed race of Samsams.

2. The Mon-Anam consists of three great languages, and one of less importance. The great languages are the Mon or Peguan, the Cambodian or Khmer, the Annamite or Cochinchinese: the smaller one is the Paloung. The peculiarity of the family is the isolation of the different members by the intrusion of the great Tibeto-Burman and Shan families, who must have descended at a later period from the plateau of Tibet, and occupied the ground of one of their weaker rivals, or hemmed another into a small enclave. The whole of the Mon-speaking population, all that has survived the tyranny of the Burmese, with the exception of expatriated refugees, are subjects of British India, and occupy the delta of the Rivers Irawaddy and Salween, Buddhists, civilised, and in number by the last census of about 181,000. The Cambodian popu-

lation occupy an analogous position in the delta of the River Mekong; they also have suffered oppression at the hands of their more powerful neighbours, the Siamese of the Shan family, and the Annamite of their own family, and were on the point of political extinction, when their nationality has been saved by the interference of the French nation, and at the present moment a population of one million and a half speakers of Cambodian are divided between the kingdom of Siam, the independent kingdom of Cambodia, and the French colony of Saigon: they are the heirs of an ancient civilisation, and Buddhist. In the most southerly province Annamite and Cambodian are both spoken. Of the Cambodian we have certain recognised dialects, but on ascending the stream of the River Mekong we come upon wild tribes, Pagans, of uncertain names and dwelling places, speaking languages, kindred to, if not dialects of, Cambodian, as far as an opinion can be formed from the scant vocabularies supplied by Garnier and Bastian. Where vocabularies are forthcoming, and the name of the tribe has been inserted in the maps of the above-named travellers, I have entered them, but have reserved all other for fuller information. The third great language is the Annamite, spoken by the people of the kingdom of Annam or Cochinchina, who are Buddhists, and amount to six millions and a half, along the coast of the China sea, and in the basin of the River Sangkoi, up to the confines of China. Another million of Annamite-speaking people are subjects of the French colony of Saigon.

We pass on into the Malayan family, and with the exception of Lower Siam and the peninsula of Malacca, leave the continent of Asia, and enter a new world, with new physical, religious, and linguistic conditions, for the facilities of navigation supplied for many centuries to the adventurous superior race have enabled it to leave its mark in nearly all the islands of the Archipelago. We find two races, stamped by their colour of brown and black, and character of their hair, straight or frizzly, as separate; and, when we classify the Archipelago as Malayan, we must reserve the question, as to the character of the languages of the Negritos, until such time as we know very much more about this than we do now. How low in the scale of civilisation even the superior brown race have fallen may be evidenced by this fact, that one branch possessing a literature and an indigenous alphabet, still practises cannibalism. Uncertain as were my footsteps on the mainland, they are still more uncertain now, and it is only by holding on by the right hand to the learned professors of Leyden, and by the left to Mr. John Crawford, that I can hope to thread my way with any security from island to island in this unsurveyed linguistic ocean.

A different method has to be pursued. Islands do not supply good linguistic boundaries: if large, like Java, Sumatra, Celebes, and Borneo, they may comprise many distinct languages: if small, they may be included in part, or entirely, in the language-field of a more powerful neighbour. All islands are liable to the linguistic difficulty of their littoral being occupied by a superior seafaring and commercial race, either continuously or in campongs, while the interior and unexplored mountains become the refuge of the shy and uncivilised indigenes. In some cases there is a well-settled language, if not literary, at least uniform



and notorious; in other cases there is a score of ill-defined, mutually-unintelligible languages, without any specific name, lumped together under the general name of Alfures, or not attempted to be defined at all. I have tried, by the device of conventional pecked lines, to break up the Archipelago into enclaves, so as to render the description intelligible. In some cases tribes speaking separate languages communicate with each other in a form of Malay more or less pure, which has thus become the *lingua franca* of the Archipelago. Any approximation at the amount of population is in many instances impossible, and the tribes, which are not stated to be Muhammadan, are savage Pagans.

The Malayan family is provisionally divided, for purposes of geographical enumeration, into nine groups:—I. Lower Siam, Malacca, and Sumatra; II. Java; III. Celebes; IV. Borneo; V. The Philippines; VI. The Spice Islands; VII. Timour; VIII. Formosa; IX. Madagascar. These names represent groups. Negritos are totally absent from Java, Sumatra, Borneo, and Celebes, but are known to exist elsewhere.

The first group, consisting of the islands of Sumatra, Banca, Billiton, the Rhio-Lingga Archipelago, Lower Siam, and the Peninsula of Malacca, is the home of the people, who speak Malay in different degrees of purity: they are Muhammadan, civilised, and are reckoned at two and a half millions, including one million of Siamese subjects, which seems far too low an estimate. In the island of Sumatra there are four other languages spoken by distinct populations: the Achinese; the Batak, with three dialects; the Rejang; and Lampung. The first-named are Muhammadan; the second are Pagan cannibals; the two last are Pagan. Some of the islands on the west coast are stated to have a language akin to, if not identical with, that of the opposite coast; that of the Enganoë island is totally unintelligible to persons from the greater island. In the interior of the Peninsula of Malacca is a Negrito race, the Samang; and the Jakun, who are physically Malay, generally known as Ourung Binwuh, savage Pagans: the language of these is quite distinct, but little is known. The Peninsula of Malacca is held by Malay chieftains in a doubtful dependence upon Siam, and the British Government, which has settlements on the islands of Penang and Singapore, and on the mainland at Malacca and Wellesley. In the rest of this group the influence of the Dutch is paramount, so far as they are strong enough to make it felt.

In the island of Java there are three distinct and well ascertained languages; the Sundanese, with a population of four millions; the Javanese, with a population of thirteen and a half millions; and the Madurese, including the island of Madura, with a population of one and a half million: all are Muhammadans, and the whole island is subject to the Dutch.

In the island of Bali the surviving professors of the Hindu religion, to the number of a half a million, reside, and speak Balinese; they are subjects of the Dutch. The Balinese language and population has spread to the littoral of the adjoining island of Lombok, to the amount of twenty thousand, who are Hindus; but the interior is occupied by a distinct people, who call themselves Sassak, and speak a lan-

guage essentially different: they are Muhammadans, and amount to three hundred and eighty thousand, but are subject to Balinese chiefs. This is, perhaps, a unique instance of a Muhammadan population being subject to a very much smaller Hindu nationality. The whole island, however, belongs to the Dutch.

The large and peculiarly-shaped island of the Celebes is divided into four portions, all more or less subject to the Dutch: the inhabitants of the south speak the Macassar language, and are Muhammadans: the inhabitants of the island of Bouton speak a language of sufficient individuality to be classed separately; to the north of the Macassar is a population, also Muhammadan, who speak the Bugi language; the north of the island is occupied by the miscellaneous tribes called by the Portuguese term Alfures, who speak numerous and distinct languages, of which only that spoken near the Dutch settlement of Minahassa is known: they are savage head-hunting Pagans.

Of the interior of the large island of Borneo still less is known: the littoral is occupied on different sides by Chinese, Malays, Bugis, and Javanese. There are a great variety of unknown dialects in the interior, but it is considered that they may be grouped in two sections: one of the Dhyak, and one of the Kyan. The sovereignty of the island is divided between the Dutch and the independent Sultan of Brunu. The indigenous population is of number quite unknown, backward in civilisation, and varying from downright Paganism to a mongrel Muhammadanism.

The great group of islands, called the Philippines, are known as the Spanish possessions, but large portions of the interior, and of the more remote islands, are independent. For linguistic purposes I have divided it into three enclaves: the population of the most northern, chiefly Roman Catholic, amounts to more than one million, speak the Tagal language; this, however, includes dialects, which may, on further inquiry, amount to languages, such as the Iloko, Pampanga. The middle enclave is occupied by a population who speak Bisayan. In the southern enclave is a group of distinct and unknown languages, spoken by the independent inhabitants of islands, many of whom are Pagans, and some Muhammadans.

In the Spice Islands, or Moluccas, the population appears to be Pagan, with a sprinkling of Muhammadans; and in two enclaves, the language of the Malay immigrants has superseded the indigenous languages, which have, however, in some cases been studied by Dutch scholars.

The Timour group presents the greatest difficulty for a correct enumeration. It consists of the long stretch of islands from Sumbawa to Tenimber, or Timour Laut. Of the number and degree of civilisation of the population it is impossible to speak, except in the vaguest terms. On some of the islands are Dutch settlements, such as Koepang, in Timour, and of these Malay is the language: on the same island is Dili, the sole surviving settlement of the Portuguese in these seas, and the language is also Malay. On the island of Flores is a Bugi campong. With this exception, the enumeration of languages of this group is but a string of names, represented only by imperfect vocabularies, and the list is by no means exhaustive. In the west of Sumbawa the same language is spoken as that of the Sassaks, in

Lomboc. In the east of Sumbawa and the west of Flores the language is Bima. In the centre of Flores the language is Endeh; in the east of that island and the group of the Solor and Allor Islands in the same enclave, are kindred languages. The languages spoken in the island of Sumba are imperfectly known, but seem to be akin to those of Flores. The language of the west end of the great island of Timour is called the Timourese: that at the east end is called the Teto. Among the languages of the islands of Serwati, the best known is the Kissa. The languages of the islands of Savoe and Rotti have a distinct individuality, and there is a great ethnical difference between their inhabitants. In some of these islands the population is distinctly Negrito. The influence of the Dutch is paramount nominally, or effectively, throughout.

To the north of the Philippines is situated the island of Taiwan, or Formosa: the west littoral is occupied by Chinese from Amoy, and the island is part of the Empire of China; but the indigenous inhabitants of the east coast and the interior mountains speak a language of the Malayan family. They are Pagans, either demi-civilised, and called Pepukwan, or downright savages, called Yukan.

Far away in the Southern Indian Ocean, and near the coast of Africa, is the great island of Madagascar, the inhabitants of which, subjects of an independent kingdom, and Pagans, speak the Malagási, in three or four distinct dialects. The population is about two and a half millions, and are in a promising state of civilisation. Thus the Malayan family extends from the coasts of China to the coasts of South Africa.

No one is more aware of the inadequateness of this sketch, and the imperfection of my knowledge, than myself; but a first step must be taken, and this is but the work of an amateur, and I solicit the corrections and instructions of the specialist; and I have appended my address to this notice, in the hope that the man who is strong in Bugi, or who has passed an examination in Pampanga and Iloco, and knows all about the dialects of the Upper Mekong, will kindly and candidly put me in the way of amplifying and correcting my defective knowledge. Copies of these maps will be sent to every one of the provinces of British India, to Colombo, Singapore, Mandalay, Bangkok, and Saigon. My kind friends at Leyden will be supplied with copies, and no doubt I shall hear further from Batavia. I shall find some means of forwarding a copy to Manilla. In these days of international science I do not despair of arriving in a few years at a level of knowledge worthy of the subject.

It may be added that I have a work in the press, to which copies of these maps will be attached, in which the subject is treated from a *general* linguistic point of view. In the *Journal of the Asiatic Society* of this quarter the Language-Map of British India has been utilised by Mr. E. L. Brandreth to illustrate a *special* comparative treatment of the Non-Aryan languages of India. Under the orders of the Government of Bengal a scholar has been commissioned to prepare a comparative treatise of the Kolarian family. The attention of the Governments of Assam and Burmah has been called to the languages of the basins of the Brahmaputra and Irawaddy, not without good hopes of

success. The Aryan and Dravidian families have been disposed of in a masterly manner by Mr. Beames and Bishop Caldwell. The Mon-Anam family may be left in confidence to the distinguished French scholars, of whom M. Aymonier is the representative at Saigon; and the Malayan family is being exploited by a cluster of Dutch scholars and missionaries, at the head of whom we may name M. Van der Tuuk, at Batavia. The Tai family alone is at present unprovided for, but I have commended it to a gentleman residing at Bangkok, and a second Pallegoix may perhaps be forthcoming from among the devoted Roman Catholic missionaries.

I am collecting materials for a Language-Map of Africa, which will be ready at a date not very remote. In the meantime, I invite the attention of competent scholars to the preparation for this magazine of a Language-Map of Europe, which will exhaust the Aryan family; a Language-Map of the Semitic family; a Language-Map of Non-Aryan Russia, Turkey and Hungary, or, in other words, of the great Altaie family. This last would be of surpassing interest, and I commend the preparation of it to the schools of geographers and savans at Buda Pest, Helsingfors, and St. Petersburg, and the execution to the enterprise of Herr Petermann, of Berlin. The time would then come to publish Dialect-Maps of England, France, and Italy, and an Atlas of Linguistic Geography would be gradually compiled worthy to be placed side by side with those, in which the world is treated from a physical, political, or ethnological point of view.

ROBERT CUST.

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## MEMOIRS OF HANS HENDRIK

(*The Arctic Traveller*).

[THE following narrative, by Hans Hendrik, the Greenland Eskimo who served in the Arctic expeditions of Kane, Hayes, and Hall, and in that of Sir George Nares on board H.M.S. 'Discovery,' was written by himself in the Eskimo language. It was translated, with an Introduction, by Dr. Henry Rink, the Director of the Royal Greenland Board of Trade, and author of *Tales and Traditions of the Eskimo, Danish Greenland, &c.*; and edited by Professor George Stephens, F.S.A., of Copenhagen.]

### INTRODUCTION.

(*By the Translator*.)

A COUPLE of months ago I received from my friend, Herr Krarup Smith, who resides in Disko Island, a narrative written last winter in the Eskimo language by a native who had shared in several Arctic expeditions. Herr Smith, who is Inspector of the Northern Danish Settlements in Greenland, supposed that parts of the MS. might be fit for publication in some journal. He therefore suggested that I should make such extracts as might suit this purpose. But I had hardly run over the pages before I had made up my mind to publish it entire, just as it was. What I have struck out is not worth mentioning. My reason was, that I had never read any adventures in the far North so curious relatively to their shortness. On translating specimens to others I was corroborated

in my opinion, and especially we agreed that, besides setting forth striking vicissitudes, every line helps to describe the inhabitants of the Arctic regions, by reflecting their ideas and their mental development in the person of our author.

I was led to undertake the difficult task of translating the MS. into English, not only by the desire to render it accessible to the widest circle possible, but also from a special regard to our author's fellow-travellers in England and America. My doubt whether I should be able to render the sketch tolerably well in English was overcome by my friend, Professor G. Stephens, offering to give it a final revise.

This peculiar record requires some explanation, both as to the author himself, and as to the renowned travellers whom he accompanied.

#### *Birthplace and Nationality of the Author.*

In Southern Greenland, on the border of Davis Strait, is the small trading establishment, Fiskernæs. Its latitude is not more northerly than middle Norway, but its climate is more severe than the northernmost coasts of Norway and Iceland. It has been proved by experience that, nowadays, only the present natives are able to live even in the most favourable tracts of Greenland, without being supplied with their chief necessaries from more genial countries. Our author belongs to that remarkable Eskimo race which is spread from Greenland to Behrings Straits, and is able to procure a comfortable existence in countries where men of our race only have been able to stay for a couple of years by the help of the numerous and expensive resources of modern civilisation.

It is well known that the capability of the Eskimo to brave their climate depends on their ingenuity in catching and making use of the seal. When they find no better materials, they build a comfortable house merely out of snow, both light and heat it with their seal-oil lamps, manufacture excellent garments out of sealskins, and have the most suitable food for a cold climate in the flesh and blubber of the same animals.

Our author affords a striking example of the independence of his nation, of the climate within their vast territories, as well as of aid from foreign nations. When a young man he was suddenly removed from his home to a country about 1000 miles nearer the North Pole, and found himself so attracted by its amenities, that he did not hesitate to settle down there. Furthermore, in his birthplace his countrymen are accustomed to have in their immediate vicinity a shop where they may barter their produce for all sorts of European articles. In Greenland we divide this merchandise into what is necessary, useful, or a luxury. But he proved the whole to be nearly superfluous, for he settled amongst a tribe not only in a state of perfect seclusion, but which had scarcely seen a white man before.

Fiskernæs comprises the trading post of the same name and the Moravian missionary station, Lichtenfels, upon an island, some 3 miles from each other, and numbering both together 240 inhabitants. For more than 100 years Lichtenfels has been the residence of from two to four missionaries, who are recruited from Germany. But the natives here are very poor, and the community has decreased nearly one-half in the last thirty years. The most obvious feature in their impoverishment is their want of boats

for their travelling life in summer. This roaming is necessary not only with regard to their hunting and fishing, but also for their health. It counteracts the deadening influence of the climate, and the isolated situation of the dwelling-places. The natives of Lichtenfels only exceptionally have been farther than 20 miles from their home, and many, perhaps, never leave it. I note this expressly to throw light on the condition of our author when he was engaged by the foreign travellers.

Seal-hunting by kayak is still continued by the Greenlanders in the same way as by their ancestors a thousand years ago. The strangers who settled in their land have not taught them the least improvement as regards this chief means of subsistence. For this reason, and as they have kept their language unaltered, the Greenlanders maintain a certain independence, notwithstanding the general supremacy of foreigners. They know that they must wholly rely upon themselves; and their peculiar life under numerous hardships and dangers develops from early youth a faculty of self-help not so often found in civilised societies, where division of labour prevails. For the same reason, poverty has a less depressing influence than elsewhere. The hunter will always keep up a certain degree of mental vivacity contrasting with his impoverished state. The dangers besetting kayak-hunting are especially bracing.

The Greenlanders have also taken well to school instruction, and skill in reading and writing is as common amongst them as in any other country.

The same contempt with which white men look down upon people of other races has amply manifested itself in his intercourse with the Eskimo. It has been asserted a hundred years ago, that in Greenland the worst Dane was considered better than the best Greenlander; and this may be so even occasionally now. If a man brought up as a native seal-hunter takes service with foreigners, many of whom consider him an inferior being, and who can only speak with him imperfectly by interpreters of the superior race, he at times must feel himself misunderstood and wronged. A native like Hans, who was taken from his quiet and solitary homestead and had to live with so many strangers, could not help at times being placed in this condition. What he says on such occasions will therefore be found a natural part of the picture he gives. However, thoroughly to understand the strange suspicions exhibited in some parts of his statement, we must consider the traditions still living amongst the Greenlanders about atrocities formerly committed in their country by foreigners, as well as their indistinct ideas of the wars and military discipline of the white men.

But we see that the instances of feeling himself aggrieved were exceptional. That mutual satisfaction was the rule, is also evident from his taking employ so often. As regards his superiors, I shall only remark that the first of them, Kane, praises him as a very useful and active fellow, on whose energies as a hunter the supplies of the travellers often depended; and the last of them, Sir George Nares, says in his official report: "All speak in the highest terms of Hans the Eskimo, who was untiring in his exertions with the dog-sledge and in procuring game."

Hans Hendrik is now boatswain and labourer at the Greenland settlements. From the fees he received

during his Arctic travelling life he has saved what amongst his present comrades, may be considered a good deal of money, the interest on which makes a relatively considerable addition to his scanty wages. These servants having a pretty long time in the year for their private business, I suppose he continues the occupations by which he has earned both money and reputation, namely, sledging and seal-hunting,

I have said that the present account gives an idea of how a native Greenlander feels and thinks, and how he is able to express his sentiments. He left his home at the age of eighteen, and spent six years amongst the heathen natives in Smiths Sound. From his home he brought, besides some skill in reading and writing, his religious ideas, and especially that firm belief in a merciful God which has strengthened him in braving so many hardships. In other respects, notwithstanding his intercourse with the foreigners, he has maintained his nationality. I leave it to the reader himself to form an opinion of Hans and his countrymen, the Eskimo, from his own words.

In reading his pages I have asked myself how the narrator, if he did not keep a diary, could retain within his memory such an amount of details. In some places, especially in the last part, there are some indications of his having written notes during his travels; and his friend and late superior, Herr Rudolph, has told me that he received from Hans some papers in which he had described the country about Smiths Sound and its inhabitants. However, there is no doubt that the greater part of the narrative has been compiled from memory. For this reason, it is not to be wondered at if inaccuracies or confusion of details occur here and there; but, on the whole, such irregularities, if found, will be of very little weight.

The manuscript is written in tolerably plain and intelligible Greenlandish. But, as this is still a difficult language, as the writer is an unlearned man, and as I had nobody at hand to assist me, some words here and there remained inexplicable or doubtful, and some sentences unclear. These instances I have indicated by marks of interrogation. I have retained the curious spelling of foreign names, and the use of "thou" instead of "you," which has nothing corresponding in Eskimo speech. The denomination "Tuluk," English, here sometimes means English and American, sometimes the former in contrast to the latter. "Kavdlunak" properly signifies foreigners of in European race, whites, but here sometimes "Danes" opposition to other white men. Words such as "Tartikene" and "Tart Eise" show how imperfectly the author has understood English. I have guessed that they are formed out of "Doctor Kane" and "Doctor Hayes," but could not make out exactly what is meant with them. Explanations by myself are inserted in brackets: [ ].

For various reasons I have here and there omitted a few lines, and made the text a little less diffuse in form. But I have added nothing. H. RINK.

COPENHAGEN, November 16th, 1877.

In looking over Director Rink's version, I have altered as little as possible. I thought it best to let Hans Hendrik write in the naive way to be expected from such a child of nature. G. S.

## THE TALE OF MY TRAVELS TO THE HIGH NORTH.

Written by Hans Hendrik.

### I.

[The Author's Home, his Voyage with Dr. Kane, and settling down at Smiths Sound.]

To relate how the northern part of the big country came to be explored, I write this—I, Hans Hendrik, who first lived at Kekertarsuatsiak [Fiskernæs], belonging to the Germans [Moravians], but have now removed north, to Kangersuatsiak, belonging to Upernivik.

I was born in the German [missionary station of] Kekertarsuatsiak, which had three priests, and my father served the priests. He used to go to the other stations to lead divine service there on the great holidays. His name was Benjamin. My mother had the charge of the church lamps. Her name was Ernestine. She had come from the south, from Agdluitsok, from the end of the country [Cape Farewell]. Thus my dear parents at first lived far from each other, my father being an inhabitant of Kekertarsuatsiak, while my mother was born at the end of the land. My father's children by his first wife were seven altogether, three sons and four daughters; but by my mother he had five children, four sons and a female child, scarcely to be mentioned, because she died as an infant. I was next to the eldest, this female. I left my brothers still children, I was just growing a real kayaker, having got a few seals by harpooning. My next brother was only a small kayaker, his name was Simion. But next to him was Joel, who was trained up at Nouk to become a teacher, and he stayed there two years. Our youngest was named Nathaniel. The year after my father's death I departed, this first time joining Arctic travellers, an American sailing vessel.\*

I heard that they were looking for a native companion, and that his parents should have payment during his absence. Nobody being willing, I, Hans Hendrik, finally took a liking to join them, and I said I would go. The ship's Master tried to get one assistant more, but did not succeed. I went to inform my mother of my intention, and she gainsaid me and begged me not to join them. But I replied, "If no mischief happen me, I shall return, and I shall earn money for thee; but certainly I pity my dear younger brothers who have not grown food-winners as yet, especially the youngest, Nathaniel." At last we started, and when I left my countrymen and relatives, to be sure it was very disheartening. Still, I thought, if I do not perish I shall return. How strange! This was not to be fulfilled.

We left Kekertarsuatsiak and first landed at Maneetsok, but without anchoring, only trying to get some reindeer skins. Leaving this place, we met with a kayaker far out at sea, although a gale was blowing from the north. On asking him who he was, he said he was Amase from Nouk. The man I knew very well, as I had seen him often, a first-rate seal-catcher, now going to hunt reindeer north of Maneetsok. But proceeding northward we finally landed south of Upernivik, at Kangersuatsiak, and there remained pretty long, I have forgotten how many days. We went also to Upernivik in a boat, the ship sailing at the same time, but we reached it first.

\* Dr. Kane's Expedition, 1853.

At Upernivik we engaged as our companion a Kavdlunak [European], Carl Petersen, whom the natives called Naparsisortak [the new cooper]—a very good Kavdlunak he was, and he took care of me. When we came to Upernivik, I was invited to eat in the great house, as he lived in the merchant's house. He was married to the midwife, and she and their children all treated me kindly. Leaving Upernivik we went very far to the north, and we landed at a desert north of where people lived—it was not far from an abandoned winter station. When we had landed we fell in with the carcass of a white whale. Although pretty fresh, the birds had eaten the upper part of the skin, but the lower part was still untouched, and Naparsisortak and I got a store of *matak* [edible skin]. Here we stayed, I think, for three days, and boiled the oil out of it.

Then again we started, but, meeting with heavy drift-ice, made the land, and came to a native house, the northernmost of the many wintering stations thereabouts: its name was Anoritok. As a strong southern breeze drove the ice a little from the shore, we went on thence. A strong gale was blowing; on one side of our craft the gunwale went under the sea. Finally, they could not help running against the ice, the ship's prow being lifted on its top. Not until it grew calm could they get off again. This was the first collision of our vessel with the ice. We continued between the shore-ice [ice-foot] and the drift-ice, and our ship at last ran aground. We then fastened it with a rope from the mast to the shore-ice, and when high water set in we proceeded behind the drift-ice and along the shore-ice. In this way we at length reached open water, inside of which we found a fine wintering-place, frequented by both hares and reindeer. But when I went out to shoot hares, I only got a few, sometimes one, sometimes two or three, and, although I searched for reindeer, I could not get sight of any. When winter set in we used to go ashore, two Tuluks [English] and I, to look for any sort of game; but we only met with hares and a few reindeer, the latter very shy, but the hares easy to get at.

In the first beginning of the winter a boat set out to the north, manned by nearly all hands. Only I and one Kavdlunak, with the cook and two sailors, remained. They stayed away for a long time, but I have forgotten how many days. At last, when the sea was frozen, they returned, walking over the ice, and having left the boat frozen up.

Then it really grew winter and dreadfully cold, and the sky speedily darkened. Never had I seen the dark season like this, to be sure it was awful, I thought we should have no daylight any more. I was seized with fright, and fell a weeping, I never in my life saw such darkness at noon time. As the darkness continued for three months, I really believed we should have no daylight more. However, finally it dawned, and brightness having set in, I used to go shooting hares. One day, when thus returning from a hare-hunt, I saw a crowd of people near the ship. Only think! they were the northern natives whom here I saw for the first time. On approaching the ship, two natives came running towards me. The foremost of them, when he had reached me, accosted me in a very civil manner: "Art thou a native?" I answered: "Yes, I am a native." He: "Hast thou got any

hares?" I: "Yes, I have got three hares." He: "With what sort of weapon hast thou got them?" I: "Look here, my gun." But when I spoke thus, he did not comprehend, but examined it, how it was. I said: "It goes very far, taking hares, reindeer, ptarmigans, and Natsek-seals." On hearing this he started. When I arrived at the ship, I could hardly get along for the people, who would know what I said, but did not understand all my words. So, as I could scarcely get on board, the mate gave me a hand's turn, the natives, for mere civility, being unable to assist me.

When first I saw these people, whom I knew nothing about, and nobody had examined, I feared they might perhaps be murderers, as they lived apart from any Kavdlunak; but, on the contrary, they were harmless men. In the evening they went to sleep on board the vessel. The Tuluks offered them something to eat, bread and beef, and such like, with tea, but they did not relish them, they only tried some little bits. They said: "We cannot eat it;" and added, that they should like to have some hare-meat. But our Commander was careful of our hares. The next day, when they left us, our Master gave them wood, needles, iron, and matches, and they went off very thankful and cheerful.

After their departure the [frozen up] boat was found broken asunder . . . and the sails in patches [?]  
—only think! a native had fallen in with it, and being unable to make out what this thing was amidst the ice [?] he had broken it into pieces. Our Commander, Kaine, grew angry, as he knew not who had done it. Later on, a native arrived on foot, named Majok. When I returned from hare-hunting I saw him shut up in the ship. The Master ordered me to examine him as to who had spoiled the boat. He said: "I don't know, I have not done it." The Master said he would shoot him if he did not confess. On hearing this I took fright; at once pitying him, and afraid to look at him, I uttered: "He says he will shoot thee if thou dost not tell." He replied: "I have not done it, I don't know it." Finally, unable to overcome him, they grew silent. Our Commander said to me, that he intended to shoot him. I answered: "What a pity!" We went to sleep, while he was kept prisoner. In the beginning of the night I heard a noise. I went out and saw him running off speedily. I wonder how he managed to get out, the hatch-way being very high. After his departure no natives made their appearance more, I think they were frightened.

Towards spring I began hunting Utoks [seals resting upon the ice], and usually got some, but I do not know how many, as I have not counted them. I also got four reindeer and several foxes. When they started on their first sledge journey, the sledge was dragged by men, and stayed away for many days. I afterwards set out to join them; I travelled by dog-sledge, and did not know the road, but had a map of the country. While still I went on, I saw a great bear coming straight up against me. I could not master my dogs any longer and was obliged to cling to the sledge lest I should fall off. But the bear took to flight, and I pursued and came up to him before I could loosen the dogs from the sledge. He was just going to reach an iceberg on the edge of an open water into which he dropped, whereupon my dogs

stopped and some of them got free. I fired and hit his muzzle, but, as he crept upon the iceberg, I missed him.

I again gathered my dogs, and travelling farther I saw another bear, but I prevented my dogs from perceiving him; again I saw another blackish one, the natives yonder call them "A;" hunting them is very dangerous. I travelled and stopped at a large promontory, the distance from the ship being 100 English miles. Here I slept, and in the morning I started, travelled the whole day; in the evening I lay down to sleep upon the ice. The next morning I set out, and finally towards noon I met with the men I sought for. When I came to them they were upon an island and had got a bear. They were busy cooking, and regaled me with bear's meat.

Here I slept, and the next morning the others started in order to return, but I got a companion and continued northward. This companion was named Mister Morten. We passed a great glacier, proceeded the whole day, and did not reach land before next morning. Again we went on, and fell in with a large open water. We followed the shore-ice [ice-foot], but when this ceased we were obliged to stop. The next day we took a walk along the beach, carrying the dogs along with us, and saw a big bear running across a plain towards the hills. We called the dogs, and when they arrived I showed them the bear by running towards him, whereupon they stopped him. I then ran to them, but waited for my companion, in order to get a rest for my gun, whereupon I fired, and shortly after the bear tumbled over, quite dead. But the cub was killed by merely pelting it with stones.

We carried off the flesh of the cub, but only the skin of its mother. When we reached the shore we left our burdens and continued our trip to the north. Again we discovered a bear, but he escaped by plunging into the sea. Not far from a steep cliff I rested, waiting for my fellow; on his arrival we turned back and came to our stores. We had them dragged by the dogs, reached our tent, and being very fatigued got a good sleep. The next afternoon we ascended the hill to build up a beacon, showing the point we had reached, and we marked the rock.

The following morning we set out to return to the ship, and travelled, I do not know how many days, the surface of the ice becoming covered with much water. At last we reached the ship, open water being still four miles off, and remaining so the whole summer, as the ice did not break up. I used to catch hares, the country abounding with them. We also discovered bones of musk-oxen, and their crooked horns, but no living one.

In autumn, when the new ice was forming, some of our party set out for Upernivik [the nearest Danish settlement] in a boat. Naparsisortak joined them. I should have liked to do the same, but our Commander forbade me, saying they would be frozen up, and be unable to reach Upernivik. To be sure, as it had grown winter, Naparsisortak came back by sledge with one companion. They had left the others not so very badly off, but, beginning to run short of provisions, the natives used to send them meat as gifts.

In this way they came back, the natives carrying them to the ship by sledge. They looked very emaciated and were dreadfully voracious, but the Master bade them not to eat too greedily, fearing it might be

hurtful. The next day his people, of their own accord, tried to cook meat in the native fashion, imitating the native lamps in their room in the ship. During this time I happened to go outside, and observed that our ship was taking fire. I shouted at once to those inside: "Our ship is on fire!" They then hurried out, and, drawing salt water from a hole, succeeded in quenching the flames. Our Master gave me many thanks for my quickness.

When spring came round, we started for the north on foot, dragging our sledge. After several days' travelling we put up our tent upon the ice. Having discovered many of their footprints I went out in search of bears. I fell in with a big one, who stood upright, but on my approach he squatted on the ground. While still drawing nearer I came to a large iceberg and heard a sniffing sound. I looked upward and discovered close above me another big one, who just emerged and disappeared. While I proceeded towards the first, which still was a little beyond rifle-shot, all of a sudden he took to galloping towards me. I fired at his head, but without hitting it properly. I was seized with fear when I had fired, and he tottered; but, before I had loaded my gun again, he went off, stooping. I followed to finish him, but fired without hitting and lost my game.

As I was fatigued I rested on the top of an iceberg, but before I could manage to load my rifle I perceived something sniffing. Looking downward I saw another bear beneath me. I fired and he took to his heels, following the track of his companion. When I had rested I turned back to our tent and found all my companions asleep. In the morning we set out [for the bears, thinking that?] they were in a dying state. We discovered a large bear, but, although the ice was quite level, he disappeared . . . we heard their yelling . . . [?] as my rifle did not go off, I fired at him with my fowling piece, but he scampered off, and then we saw no bears more.

In this place I only write down a little of what I ought to relate; so many years having elapsed I have forgotten so much. In winter, when daylight had commenced, they tried to go to the west side on foot, dragging their sledge; but, without reaching the shore, they turned back. I believe there were three Tuluks frostbitten. Naparsisortak and the Kavdlunak, carpenter, left their companions [and came back?]. We then directly started, taking with us the Kavdlunak, although he had just arrived and was perfectly exhausted. When we had eaten, he lay down upon the sledge, and we started dragging him, and having with us our Commander, Kain. We travelled the whole night, and finally reached them. Here we slept in the tent, feeling pretty cold, and when we awoke we returned, placing them upon the sledge. On the road we halted, almost unable to pull the sledge on account of the heavy load, four frostbitten men. But, proceeding on, we came to the vessel. A few days after our cook died from severe frostbites, also one of the sailors died. One of our officers, whose feet had been attacked by the frost, recovered; also the other officers recovered.

When spring set in the Master and I used to make excursions; he was very clever in not despising native food. Once, in the beginning of autumn, when we travelled by sledge over the new ice, we fell through. We carried my kayak with us, and the dogs having



scented the footprints of a bear, we were unable to keep them back. On setting out upon the new ice the dogs fell through, and so did our Master, close by the sledge, only his head appearing above the water. I immediately stretched out my arm to give him help, but he forbade it lest I should also fall in. I rested upon the kayak, which was placed upon the sledge that had dropped into the water. My companion swam to the dogs and climbed up the ice by taking hold of the dogs. I succeeded in crawling from the sledge upon the ice. As we were unable to manage the sledge, we merely cut the thongs by which the dogs were tied, and took to running towards the ship. I feared my companion would have been frozen to death, but we succeeded in reaching the brig safely, by a forced run, I think, of about four miles.

One day also I started for a reindeer hunt. I returned to the ship after having stayed away for several days without having seen a living thing, excepting a hare. We also tried a trip across the sea to the west coast, but did not reach the large house [?], which was our goal, the heavy ice making it difficult of access. Also once I made an excursion with another to visit the natives, and, by the way, in kindling a fire to boil some water I chipped a stock and happened to wound my right hand, nearly cutting off my thumb. However, we proceeded in search of the houses, though ignorant of their site, and luckily we fell in with a sledge track, which led us to two houses. On our arrival we were received with kindness. When I held out my hand they pitied me, and bade us directly go inside; they would take care of the sledge and dogs, they said.

When we entered we found it very hot. I examined the house and found it wholly constructed of stones, even the very ceiling. Looking upwards, the large slabs seemed ready to fall down the next moment. We were instantly invited to eat and regaled with walrus-meat. They also ordered in some rotches [small auks], and when these were brought we found them quite fresh—only think! Now daylight had begun, and yet they had preserved during the whole winter the provisions gathered in autumn. To be sure those natives had an abundance of game, walrus, rotches, hares, and foxes. We even tasted white whale skin. These courteous people said, that the next day they intended to go walrus hunting, and would like to take my companion, the Tuluk, along with them. When I asked him, he complied, but I remained, as my hand ached dreadfully, being cut between the fore-finger and the thumb, so as almost to sever the latter. They returned with one walrus, my companion having got one of its big paws for his share.

We slept here two nights, and returned in one day to the vessel, my companion taking charge of the driver. On approaching the vessel, our Commander, who had observed that I did not drive the sledge, came towards us, and when, soon after, we had come on board, he said that he would cure me fairly, and added, that if I obeyed him the wound would soon be healed. He began curing me by cutting away a part of the inner flesh. To be sure it ached dreadfully when he took out the bad flesh, but it was soon healed.

After I had recovered, the Master and I repeated the visit, but on our way home he fell sick. After-

wards I once again called on the natives in order to take part in a walrus-hunt. I got one walrus. Eventually my companions began to think of abandoning their vessel and repairing to Upernivik. I did not believe they would be able to reach it. At the same time I happened to visit the natives in order to get hares. The day after I had come to them I set out for the chase in a gale from the north. A heavy squall suddenly carried me off, hurting me against the hard frozen snow. My native friends led me by the hands to the sledge, and carried me back to their houses, where I recovered during a stay of several days. As those men behaved so kindly towards me, I began to think of remaining with them. Spring came at last. When they were going to abandon the ship, I proposed to our Commander to visit the natives in a boat, and, as he complied, I went off to them, and intended to come back. But they began persuading me to remain. My companions would never reach Upernivik, they said, and they would take me along with them when they removed.

A pity it was that our Master behaved with haughtiness towards his crew. Also, once he treated me in a similar way. The occasion was as follows:—I had cut the head off a reindeer-skin of my own catch, intending it for a sledge-seat. I went to the Kavdlunak [Dane], who was just taking a walk, and said to him: "The Master intends to shoot me for having cut the head from a reindeer-skin; that is the only reason." The Kavdlunak replied: "Don't be afraid, he will never shoot thee, I am going to say to him: we have another king." While he repaired to the ship, I stayed upon the ice, expecting I should be fired at, but perceived nothing at all. This Kavdlunak, on coming out again, said: "There is no reason for thee to be afraid, only remain with us, I will be thy protector."

From this moment I thought more and more of leaving them when they started for Upernivik. Finally I said to him [Kane] that I should like to visit the natives, and when he complied I departed. It was my intention to return, but I began to envy the natives with whom I stayed, who supplied themselves with all their wants and lived happily. At length I wholly attached myself to them, and followed them when they removed to the south. I got the man of highest standing among them as my foster-father, and when I had dwelled several winters with them, I began to think of taking a wife, although an unchristened one. First, I went a-wooing to a girl of good morals, but I gave her up, as her father said: "Take my sister." The latter was a widow and ill-reputed. Afterwards I got a sweetheart whom I resolved never to part with, but to keep as my wife in the country of the Christians. Since then she has been baptized and partaken of the Lord's Supper. But I was greatly delighted at taking along with me one of the unchristened, when I returned to a Kavdlunak settlement.

#### *A Talk about the Unchristened Natives in the North.*

In the days of yore their ancestors used to visit Upernivik, for which reason they still speak of "Southlanders." Those northern people had for their merchandise walrus-teeth, for which they got wood, whereas the Southlanders had wood to barter with. Their ancestors also possessed kayaks. One

man, named Kassuk, when undertaking a journey southwards was told not to visit the Southlanders, because they used to kill their guests when they were going to depart. But he was an Angakok [wiseman, magician], and went off with his wife and children. He came to people who received him very kindly. But when invited to another house, the inmates accosted him as follows:—"Our neighbours used to kill their guests when they are going away, thou wilt not escape them." When they had spoken so, he again entered to his hosts, whom he found all asleep, except one young fellow who had to keep watch. This wretch he bewitched, making him fall asleep too, whereupon he went out and cut asunder the lashings of the other sledges and harnessed his dogs. Then he entered and asked his wife to follow him directly; he was going to put to the dogs, he said. So they set out over the ice before anybody had come out; but, when they gained some distance from the shore, a crowd of people made their appearance. They were seen collecting their dogs, but on starting their sledges broke down. Only one sledge continued to draw nearer, accompanied by a dog of a frightful look. But, when this dog had come abreast of them, he shot at him with his bow and, hitting his side, killed him at once. Now, first, his dogs took to run speedily, and left the pursuer behind. In this way the traveller with his wife escaped, and from that time no other journey has been undertaken to the south.

It is a great pity that people there in the north have no idea of a Creator. Only by me were they informed about the Maker of heaven and earth and everything else, of all animals, and even of ourselves. Also, about His only begotten Son, who came in the flesh for the sake of sinful men, for the purpose of saving them, teaching them faith, and performing wonderful deeds amongst them, and afterwards was killed on a wooden cross, and arose from the dead on the third day, and will come down again to judge the living and the dead. On hearing this the Northlanders were rather frightened as to the destruction of the world in their life as well as in their death [?]

#### *How the Men yonder in the North subsist.*

They pursue the white whales along the edge of the ice, using four hunting bladders in connection with one line, but on the big ice only one bladder. They get the seals which lie near their breathing holes upon the ice, by creeping up to them and harpooning them. They pursue the walrus by the aid of two hunting lines, both ends of which are furnished with a harpoon, and their spears are headed with a Tok [chisel]. As soon as the line becomes tightened [pulled by the stricken animal], they thrust this into the ice to hold.

They also catch seals by having many breathing holes at once occupied by men. One man then generally catches a great number, while the others only get a few, as the seals, when at the point of choking, have recourse to a few holes without leaving them.

Bears they kill by spearing them, after having brought them to bay by the dogs. They capture foxes in traps of four different descriptions. For hares they use nets made of sealskin thongs. For birds they also use an implement like a catcher.

Hunting seals at the breathing holes, during day, they call Marpok; during the night, Nirparpok. I

also remember the following words of their language: sirlla pirmerkariarnarkark irnurk pirniarkark irgijarnarkark pirnirkark arllirnarkark narparpurk karpurpurk pirniarlune arllarpurk sarnivarpurk irmirnirk narnurnijarpuk kirmursirgarpuk tirmirsarnut karllurpurk. Some of their words I have forgotten, as I left them after a few years' stay.

## II.

### MY SECOND NORTHERN JOURNEY.

[*Under Command of Hayes.*]

Once during my stay at Kip John [Cape York?] in the beginning of autumn, we got sight of a ship. When drawing nearer they came close in from off us, lowered a boat and pulled towards us. When close by I recognised two gentlemen in the stern, the doctor and the astronomer, both of whom I knew were my friends. Before reaching the shore they shouted, calling me by name. I said: "It is I," on hearing which they were greatly pleased; I, too, was very glad to see these gentlemen, who liked me. They asked me: "*Ju* Hans Hendrik?" I answered: "Yes, I am it." They were also accompanied by three natives [of Greenland, Eskimos]. When they landed they said, that they wanted me alone to go with their vessel. I answered that I wished to take my wife along with me. They said: "Better let her stay behind, next winter thou canst go to fetch her." I replied: "I don't like to leave her, I pity her and her baby." They added: "Well, then, bring her." I said, likewise: "I will carry my tent with me." I then left the other tent to the parents of my wife.

We set out for the north, and while we sailed the wind freshened strongly, my dear wife soon fell sick, and so did I. After a little while we stopped to land. We went out after hares, because my wife was unable to live upon merely Kavdlunak food. I got two hares, the others got nothing. On coming on board I gave one of them to my wife, and earned many thanks from her. We stayed here for several days, and when we left we touched at the northernmost wintering station in an island called Pikiulek, but only on account of the heavy ice we met with. As the ice soon after spread, we went on, but were blocked again, and returned to a station called Eta. Here we got sight of reindeer on the hills, and we landed towards evening, carrying our guns. I got no reindeer on account of my gun being a breech-loader, which I did not know how to handle, but one of the Kavdlunaks got one deer. As it became dark very soon, we returned to the ship, and went to fetch the reindeer the next day.

I felt very happy that now I had got something to hunt for. When I started in the morning I used to return at noon, sometimes with two, sometimes with four deer; in the afternoon I pursued the same sport. There were also a great many hares. In the beginning of winter, when the sea was frozen over, I used to go hunting alone. To be sure, I had three natives as travelling helps; but two of them were engaged with various labours on board the ship, and the third with some carpenter's work.

In the beginning of winter one of these natives turned a Kivigtok [fled from human society, to live alone up the country]. We were unable to make out



what might have induced him to do so. The only thing we remembered he had uttered was—"What does J— say when he whispers in passing by me?" When he asked me this, I answered—"I don't know at all." Also of the others he inquired in the same way, but we were quite ignorant of what he meant. Once, when the sea was frozen, he went outside towards tea-time, as we supposed, without any particular purpose. But fancy! all of a sudden he had run away. After tea, on going out, I said to my wife—"Hast thou not seen Umarsuak?" She answered—"He went out after having handled his bag. I thought he was going to take his tea, but he said, 'That is the only awkward thing, to understand neither Danish nor English.'" As soon as he was missed, some of the crew lighted torches and set off in search of him. At last I found his foot prints going to the hills. I followed them and shouted to him, but got no answer. When I had reached the top of the hills, also there he had still run farther. But, as I grew exhausted, and his track disappeared in the darkness, I gave him up wholly and returned to the ship, where the rest had now arrived. Although we still kept up a faint hope of his return, he was quite lost, and his memory left a deep impression upon me, he being the only friend whom I loved like my brother.

In winter, just before Christmas, the astronomer and I undertook a journey by sledge to look for natives. We crossed [passed by?] the great glacier and travelled the whole day [of course only twilight, there being continual night] without meeting with any people. A strong wind sprang up from the north and caused a thick drifting of snow, while we made our snow-hut and went to sleep. On wakening the next day it still blew a gale and the snow drifting dreadfully, for which reason we resolved to return. While we proceeded homewards the ice began breaking up, so we were forced to go ashore and continue our drive over the beach-ice [ice-foot]. We arrived at a small forth, and crossed it, but, on trying to proceed by land on the other side, it proved impassable, and we were obliged to return to the ice again. On descending here my companion fell through the ice, which was nothing but a thick sheet of snow and water. I stooped, but was unable to seize him, it being very low tide. As a last resort I remembered a strap hanging on the sledge-poles, this I threw to him, and when he had tied it around his body, I pulled, but found it very difficult. At length I succeeded in drawing him up, but he was at the point of freezing to death, and now in the storm and drifting snow he took off his clothes and slipped into the sleeping-bag, whereupon I placed him upon the sledge and repaired to our last resting place.

Our road being very rough, I cried from despair for want of help; but I reached the snow-hut and brought him inside. I was, however, unable to kindle a fire, and was myself overpowered with cold. My companion grew still worse, although placed in the bearskin bag, but with nothing else than his shirt. By and by his breathing grew scarcer, and I, too, began to feel extremely cold, on account of now standing still after having perspired with exertion. During the whole night my friend still breathed, but he drew his breath at long intervals, and towards morning only very rarely. When, finally, I was at the point of freezing to death, I shut up the entrance

with snow, and as the breaking up of the ice had rendered any near road to the ship impracticable, and the gale continued violently, I set out for the south in search of men, although I had a wide sea to cross. My nine dogs pulled quickly, and, by catching hold of the sledge-poles and running, I began to be revived. I passed by a great number of walrus breathing-holes. Before I could reach the opposite shore my dogs stopped from exhaustion. I was obliged to stay, and tried to sleep, but the cold kept me awake. At length I let loose the dogs, and set off on foot in search of a house I knew, thinking it might be inhabited. But by the way I tumbled down, and could only proceed by creeping. When I reached the house I found it empty; I made an attempt to sleep, and after a miserable slumber rose and fell down again, but at last succeeded in getting a little warmer by walking.

When I came to the sledge the hounds had almost consumed my store of provisions. I went back to the house, and then fell truly asleep. The next day I set out for another house I knew, but, before I reached it, my dogs again stopped from weariness. Then I threw myself down in front of a high cliff, awaiting my death. When here I lay prostrate, I uttered, sighing—"They say that some one on high watches over me, too;" and I added—"Have mercy on me, and save me, if possible, though I am a great sinner. My dear wife and child are in such a pitiful state—may I first be able to bring them to the land of the baptised!"

I also pronounced the following prayer:—

"Jesu, lead me by the hand  
While I am here below,  
Forsake me not.  
If Thou dost not abide with me, I shall fall,  
But near to Thee I am safe."

Thereafter I rose, and set off again on foot, after having loosened the dogs. I came to the house, and found it partly unroofed. However, by aid of the blubber I carried with me, I boiled some water, and slept. When I awakened I went to the sledge, put to the dogs, and proceeded. I crossed an inlet also on foot, because of the snow being too deep. I made for the station called Natsilivik, thinking there might be people. On approaching it I fell in with snow-bare ice, and sat down on the sledge again. I came to Natsilivik, but found also this place uninhabited, and thought that if the next station, Itivdlek, was so too, I should die. I cleared out the house . . . my hounds ate [?] . . . I slept here, and when I wakened I set off for Itivilek. On this road the ice was tolerably free of snow; but nevertheless, when I tried to sit down on the sledge, the dogs were not able to pull me along. I again took to walking, and when I had passed what is called Sermiarsuk, before I had discovered human footprints, the dogs got scent of them, and began running quickly.

I then sat down again, the dogs quite altered by following the footprints, and, how lucky! I discovered the light of a window. On coming nearer I fired my gun in order to warn them. At the same time people appeared, and it was to me as if I had reached my home. These folks were very kind and hospitable. When I entered the house and began to take off my clothes, the fox-skin of my jacket was as soft and moist as if newly flayed. My outer bearskin-trowsers

were not so very wet. When I took off my hareskin-gaiters, they stuck to my stockings from being frozen together, and I could not get them off but by cutting open the boots. Had I used sealskin-gaiters I think I should have frozen to death. Here I stayed for many days, being unable to return alone. At last I took it into my head to fetch the parents of my wife from the farthest off wintering station, although I was greatly concerned about my dear wife and child, who lived solitary on board the vessel with no female companion. Our little daughter was still a baby, and they longed for me as their only support.

At last I travelled southward with two companions to a place called Agpat. We crossed [passed by?] a great glacier, and, after having slept once, arrived at Agpat, where I found my foster-brother, married to the elder sister of my wife, and now I came to him he was to me like a true brother. Here I remained for a great part of the winter, as it was difficult to make my return journey during the great darkness. Finally, when daylight re-appeared, and the weather was fine, I sent off the husband of my wife's sister to convey my parents-in-law from the southernmost station, and I left him my dogs for the journey. After remaining away for many days he returned to my great pleasure, as now I got companions for my passage to the ship and felt very anxious. After a stay of three days we set out for the north, accompanied by other sledges, intended for a walrus-hunting station called Kejatar-suak. It took several days to reach this place, where we gave our dogs one day's rest. One sledge continued its course northward to the ship, so that when we arrived there, after three days' journey, the first sledge already had announced our coming.

But on board they would not believe in him who brought the first message; they thought he was telling untruths, and that I was dead. When they heard the news of my companion, the astronomer, having fallen through the sea and been frozen to death, they conceived suspicions, thinking our deaths might be owing to some crime committed by the natives, although, notwithstanding their being unbaptized, they abhor manslaughter. On my arrival I found my dear wife tolerably well; but I could not be happy since I left that friend of mine who had loved me so kindly, and who also, some winters before, when we spent three years together, had treated me with such goodness, Our Commander, Ese [Hayes], was gladdened by my arrival, as he had believed me to be lost. He enquired where I had left my friend. I replied: "On leaving him I covered him wholly with snow, now I will soon go to fetch his corpse." But he said: "When the days grow longer thou mayst go for it, better now first try to get some reindeer, we are longing for reindeer meat."

I then remained for several days to await a brighter season; the first day I went out shooting I got a large rein-buck. Afterwards I hunted every day, sometimes bringing home two deer, sometimes three. At last, when bright sunshine had begun, a sledge arrived which was engaged to accompany me. We also got the ship's mate for our companion. When we arrived we dug among the snow, and brought forth the dead man still enveloped in his bag. I feared the foxes might have eaten the body, but even the bag was quite untouched. We deposited him on my sledge, the mate followed with my comrade, and we came

back to the ship in the evening. They brought the corpse into the Captain's cabin for him to thaw. The next day, when I saw our Commander, he said: "I thank thee for thy having taken care of him."

Now the bright season had set in, I gave all my time to hunting reindeer and hares. I also tried walrus-catching, and got a very large one, but being quite alone I merely fastened it [to the edge of the ice], after having killed it. The next day I returned with the sailors, an officer and two natives, to haul it up on the ice. But as it proved too heavy, we cut it up in the water, severing the head and a part of the flesh. What a size! I had never seen one like that during my sojourn there in the north. The natives as well as myself were used to catch walrus, but we never met with its match. When first I discovered it, it did not stir, and when it had dived I proceeded to the water's edge to watch it. At last I began to hear signs of its rising again, and as it emerged I harpooned it with the help of a very long line, furnished at each end with a harpoon. As it dived after being hit, I fastened the other end to the ice, and hauled in half the line; and when it emerged the next time I struck it with the other harpoon, so as to make my line become double, and then I killed it with the spear. When we had cut off its head and some of the flesh we returned.

After this I again took to hunting the reindeer; only once more I went in search of walrus, and got a small one, but then I chiefly followed reindeer-hunting, they being so plentiful. However, I happened to get nine hares also, and of the reindeer I killed two with my fowling-piece.

In the beginning of spring a man arrived by sledge, named Amalortok. He was accompanied by his son. They came in search of medical assistance, both of them suffering from a swollen throat, and at the same time to visit their relative, my mother-in-law. After a stay of several days they left us. On their arrival, the same men had told us that diseases of the throat and of the stomach were raging among the natives, of whom several had died. After their departure my mother-in-law also fell sick, got still worse and died. This was a hard blow to me, as she had behaved towards me like a tender mother. The amiability of these unbaptised people is to be wondered at; they are never false, but always loving towards each other.

While I was hunting reindeer in the beginning of spring, I once got nine deer, although I remained standing on the same spot. Later on, when the sledge parties prepared to go, our Master ordered me to remain, and collect reindeer for provisions. When some natives had arrived—three men, with their wives—the sledge party started, with Jensen, and the Captain, Mister Karmek, and Kemart—I have forgotten how many they were. Three days after some of them came back, having found it impossible to proceed. Some time after we went to fetch the boat, and brought it in one day. Later on I departed, carrying along with me my tent, and followed by the natives, whom the Master intended as my porters, to carry to the ship the haunches and legs of all the deer I happened to kill, whereas he asked us to eat only the saddles. During several weeks I collected reindeer; I did not count their number. At spring-time my father-in-law left us, in order to visit his

eldest daughter. A little before he started he was unable to walk, on account of his leg paining him, but as soon as he recovered he left with his son. This parting was very sad to me, as I could not expect to see him any more. All of us fell a-weeping. I had lived with him and his wife for several years, and they were to me like parents. Had she not died, both of them should have followed me to Upernivik.

We afterwards sailed, and touched at the island of Pikiulek, where our cable was injured, and we lost our anchor by a gale from the south. Our craft scraped the ground, but soon after came afloat again. I went ashore with some others, who got several reindeer; I only got a young rein-dee, a very small one. I also came to a place where the walruses use to creep up on the ice, and saw many of them, but only had at hand my gun. I shot four young ones of that year's brood, but their mothers rolled them into the sea. The next day I repaired to the same spot with my large hunting-line, followed by the sailors, and got four walruses. We brought them to the ship, hauled them up on the shore-ice, flayed them, and set to cooking at the same time. Here were also lots of eider-ducks, and we got plenty of them.

When we left this place we touched at the West-land, and, starting thence, steered for Upernivik. When we had anchored at Upernivik, and I came on deck the next day, the Master summoned me to the stern, and when I came to him, he thus accosted me: "People say that thou hast caused Pele to run away, him who turned Kivigtok during the winter?" I answered: "I have not made him run away, who says that I have done so?" . . . Thereupon the crew collected around the Master. One of them, Carl Emil Olsvig, passing by me, said: "Don't fear, I will help thee and speak in thy favour." When they had finished, Doctor Rudolph [the trade-agent, who had come on board] said: "Farewell! to-morrow thou and thy wife come ashore and stay at Upernivik, I will take care of thee."

The next day we landed, to our great delight, and were lodged in the house of Julius. The Captain came too and proposed to convey me to Fiskernæs, but I answered that I wanted to remain at Upernivik, and he consented. Our Master now appeared to be quite changed, full of love towards me, and liking me as he did in former years. He gave me a gun, which I took, but another rifle, which likewise he offered, I refused, as it did not shoot straight. He also added tea and other provisions and pork, and a wage-sum of 72 dollars [Danish?]. Doctor Rudolph proposed that I should settle down at Augpilagtok; the trader of this outpost would take me there; no station was equal to Augpilagtok, he said. I spent three winters there, one at Upernivik, and one at Kingitok. At last I removed to Kangersuatsiak, and was engaged by the trade as a labourer. While living at Augpilagtok I had work at Upernivik every summer. At Kingitok I taught the children, the clergyman having sent me there for this purpose. In spring I went to Upernivik, when the merchant wanted me to work there. Doctor Rudolph was so kind towards me and my little wife that I could not refuse him. Finally, when taken in regular Government employ, I settled down at Kangersuatsiak.

(To be continued.)

### A VISIT TO MYSORE IN THE FAMINE YEAR.

THE first week in October we left Ootacamund—the pleasantest of Indian hill-stations—and proceeded to Mysore, taking the Seegoor ghât road. The scenery on the ghât is fine; but travellers dare not linger long to admire it, for it is a district where even natives suffer terribly from jungle-fever, and which to Europeans is deadly. The descent is between 8 and 9 miles of steep, and, at this season, very muddy and slippery road. Twelve miles more on the plain brings one to the Tippacadoo river, on nearing which the road lies through a quite ideal teak-wood forest, belonging to the English Government. But here, too, amidst the fine trees, grassy glades, and flower-besprinkled undergrowth, lurks the treacherous malaria, and we hastened through it.

The bridge over the river was partly carried away by a flush during the first burst of the South-West Monsoon, and, its reconstruction being still in progress, we crossed on a raft. From here we sent the horses, upon which we had ridden thus far, back to Ootacamund, and found, on the other side of the river, a bullock-coach waiting for us, in which we were to travel for the rest of the day and through the night towards Mysore. In this part of the country, district officers use these conveyances very generally. They are a cross between a small omnibus and a bathing-machine—on two wheels. During the day a front and a back seat accommodate two persons without much discomfort; and, for night travelling, boards from under the seats are brought forward, also the cushions, and a bed is thus formed upon which one can pass the night with a fair amount of ease.

It is somewhat galling to an Englishman to find the vastly superior condition instantly assumed by the road on its leaving English and entering the Mysore territory. Such is, however, the case; and, indeed, throughout Mysore the roads are admirable.

We left the river at quarter to 11 A.M., and, in spite of heavy rain and a good many hills, jogged along at a very fair pace, and reached Gundelpett, 18 miles from Tippacadoo at a quarter past 3 P.M. Here we were to dine, and afterwards to resume our journey with our coach converted into a bed. The whole distance between Ootacamund and Mysore is about 72 miles.

At this place (Gundelpett) was a small Famine Relief Camp and Hospital, both of which we visited, accompanied by the Inspector, a quiet, civil-spoken Eurasian, and the Dresser, an "advanced" native, who had passed through the Medical College in Madras, and seemed well up to his work. It was the hour for the evening meal, and all the people were squatted on the ground in two long rows facing each other, the men and boys on one side, the women and girls on the other. Each one had a tin pannikin or dish before him, and they were all warmly clad, either clothes or blankets, or both, being given them on their arrival in the camp according to their need. Terrible objects many of these poor creatures were; but the saddest sight was that of the very young children (many of them orphans), who resembled animals more than human beings in the perfectly fleshless state of their bodies, and the listless, apathetic, expression on their countenances. It was heart-rending to see some

of these poor little creatures—mere babies of 3 years—with hands and arms like birds' claws, picking up grains of rice, one by one, but with hardly strength enough, it seemed, to carry them to their mouths. In a short time the cooks appeared, bearing large cauldrons of steaming rice, and a sort of soup made with dhāl (a kind of pulse) and condiments. The allowance for each adult, per day, was 1 lb. of rice, and 3 pie (1½ farthings) worth of condiments. This was divided into two meals, and the amount of rice for the one we saw distributed, was, two large hand-fuls, with two or three ladlesful of the soup. A very generous meal it appeared for starving people whom one would have expected to be grateful for the merest crust. But the native of India is a strange being, and the more one sees of him, the less one understands him. As we passed down the lines, many who had just received their portions, held them out to us, and vociferated loudly in grumbling tones. On inquiring what they were saying, the Inspector laughed, and answered: "That happens at every meal; they want to have mutton every day, and only get it on Sundays!" These same people, had they been left alone, would in all probability have died in their villages or by the roadside, and they would have accepted their fate, *as their fate*, with the calm stolidity characteristic of the Hindu. But Government having interfered with Providence, and determined to keep them alive if possible, was bound, they seemed to think, to do it in luxury! Probably very few, if any, of them had been accustomed to eat meat every day in their own homes.

The hospital contained more inmates than the camp, for there were no relief works here, and the camp was principally of service for drafting those who were too weakly to work in the larger camps at some miles distance, and for sufferers coming from the Wynaad district on their way to Mysore. The hospital was built of reeds and dry grass, and was orderly, cleanly, and admirably ventilated. The patients were for the most part suffering from famine diarrhœa, dysentery, or dropsy. For cholera, smallpox, and other infectious disorders, there was another small hospital isolated from the rest of the camp.

For the hospital patients the dresser was allowed to order such diet as he considered necessary—spoon-meat, milk, arrowroot, &c. The same grumbling, however, went on here as in the other part of the camp, though, in many cases, there seemed to be more food than the patient could get through. Altogether, after visiting three or four Relief Camps in different parts of the country, and hearing about their inmates from those in charge, one's estimate of the character of the lower class of native is considerably lowered. Deceit, avarice, and ingratitude seem general. And yet no one could behold these miserable objects without feeling that every effort must be made to help them. It is a curious fact that whereas a European would be, for a day or two at least, unable to move before dying of starvation, a native of this country will almost literally die walking, that is, he will walk on until he drops by the roadside and dies. Many of them, too, were so far gone when admitted into the camps that, after eating their first meal, they expired as though it had contained poison. This, however, is not surprising; for it would, of course, be impossible, in a camp containing hundreds, to bestow

upon individuals that constant attention required by a starving person when first restored to food.

We travelled through the night in our bullock-coach, and at daybreak reached a village about 10 miles from Mysore, where a carriage had been sent to meet us, which brought us to our journey's end at about 7.30 A.M. next morning.

There is not much to interest a traveller in the city itself. The palace is curious; but resembles the palaces of most native princes, with its intricate passages, unexpected stairways, and small dark rooms opening on to verandahs which look out upon court-yards. There are, however, some few things well worth seeing here, such, for instance, as carved ivory and embossed silver doors, carved stone pillars, and a very fine collection of arms and murderous weapons of Southern India, belonging to the times of utter barbarism.

Our visit was happily timed, for the day after our arrival was the first day of the festival known here as the Dasserah, in Bengal called the Daseerah, and in religious parlance, the Doorga pooja, or worship of the goddess Doorga. (The Dasserah simply means "the ten days" during which the feast lasts.) On this afternoon, therefore, the throne upon which the Maharajah was to be seated, and the jewels which he was to wear at the next day's durbar, were to be prepared, and we accompanied his guardian and Mr. Runga Charlú, the Comptroller of H.H.'s household, when they went to the palace to see these things taken out of the strong-room.

A crowd of officials assembled, and the bit of rag in which the padlock was wrapped, being unsealed, and lights brought, they proceeded to produce from recesses in the strong-room, boxes upon boxes, and cases upon cases, of jewels. Many of these were only brought out that we might see them, and others were the gala and bridal ornaments of the Ranees. One box contained gold ornaments of great beauty and value, though generally of rude workmanship, which were huddled together in a careless heap, as though of no consideration. With one or two exceptions, the ornaments were of native design and setting; and, in some instances, this was to be regretted, for one felt that the jewels would have had greater justice done them had they been cut, and, in jeweller's phraseology, "had the light let in." But, as a rule, I doubt whether any but an Indian jeweller could make flat, uncut stones appear to so much advantage, and with so rich an effect as that produced in the greater number of these ornaments.

The jewels to be worn by the Maharajah on the following day were two magnificent necklaces of pearls, with pendants of emeralds and rubies; armlets, earrings, and turban ornaments corresponded, and for the four corners of the canopy above the throne were tassels of about half a yard in length, formed of strings of magnificent pearls—literally "ropes of pearls." One quite regretted that more care should not have been taken to preserve their colour, which was not good. Perhaps the most beautiful of these many beautiful things were the carpet and cushions used by His Highness at private durbars. The material was cloth of gold, embroidered with pearls, and encrusted with a mass of rubies and diamonds. The effect was wonderfully rich and beautiful, and the value of the carpet, round

bolster, and two small square pillows, must be enormous; for the jewels are valuable stones, and the pearls particularly beautiful, whereas those which one is accustomed to see in masses upon the horse-furniture and trappings of native princes are for the most part rough stones and very inferior pearls.

Early the next morning all the English officials at the Mysore Court attended the durbar held by the Maharajah on the first day of the Dusserah. He is supposed not to leave the fort during these ten days, and every day sits for a certain time in the open gallery of the palace, which looks upon a large public court-yard, where he is seen by his people: a somewhat severe trial this for a lad fond of polo, cricket, and other outdoor sports and amusements. In the afternoon, we, by H.H.'s permission, accompanied his guardian to the palace whilst he was thus enthroned, holding a public durbar of native gentlemen, and watching the sports in the court-yard.

In the beginning of time the Doorga pooja was simply a festival held in honour of the goddess Doorga, one of the marvellous creations of Hindu mythology, who, formerly known by other names, became possessed of that of Doorga in consequence of her conquest over the mighty and tyrannical giant Doorgu, after fabulous struggles on both sides. In common with most Hindu festivals, the worship of this goddess was attended by every species of license and obscenity. After awhile, it became the occasion for mustering the troops, reviewing the army, and, in the days when India was divided into many states governed by chiefs, each one of whom was a sworn foe to his neighbour, with the result that at the end of the feast the army was frequently led out to war. In later times the remains of this appeared in the tournaments and mimic battles which formed, during the festivities, part of the amusement of the native courts, and scenes from which are favourite subjects for the pencil of native artists. Now, however, with no standing army, and only enough soldiers to supply the necessary guards for His Highness, the "show" at Mysore has sunk into insignificance so far as it in any way represents a military parade.

We were received in the court-yard by some of the court officials, relatives of the Maharajah, and by them conducted upstairs to the gallery where His Highness was seated cross-legged on his throne, with rose-leaves strewn and piled around him, surrounded by his court, and with a crowd of native gentlemen either standing by, or seated on the floor of the gallery, watching the games in the court-yard. Sadly bored and weary the poor lad looked, and right glad must he have been when the lengthy ceremonies of the first day came to an end. After being presented, we were seated upon chairs placed at the Maharajah's right hand, whence we also watched the proceedings. There were one or two good wrestling matches, but the scarcity of food had told upon the wrestlers, and they did not exhibit, we were informed, their usual strength and skill: moreover, the best men reserve themselves for the last day of the feast. An open square was formed round the court-yard by the guards, who at intervals held their spears aloft and shook them, producing a wild ringing sound, and then ran round the square amongst the crowd in a mazy figure, which had a very picturesque effect.

As it grew dark the torch-bearers appeared, and

uttered the "Salutation of the Torches," in loud tones. This, we were told, takes place every evening at lamp-lighting in the palace, but we could not learn either its origin or import. It is provoking to one seeking for information to have his questions so often answered by "It has always been so"—"there is no reason for it"—"it is the custom of the country."

Presently the state-elephant, with his forehead and trunk brilliantly painted, and wearing anklets of silver and wreaths of flowers, was brought into the court-yard to perform his salutation under the gallery. He was followed by the state-horse, cream-coloured, and decked out like the elephant, with flowers and gay trappings. Then began fireworks, some of which were very good; and then, what is more interesting, and, so far as I know, never seen out of India, fire-games. Men with poles, which have at either end a large ball of flaming rags, whirl and twirl them about with extreme dexterity in all manner of figures. Some carry two poles, and on seeing the four large balls of flame, from which portions are constantly dropping, moving so rapidly in all directions, it seems marvellous that the man, who is clad in nothing but a cotton shirt, should escape being burnt. Others had flaming wheels, in the centre of which they stood whilst twirling them rapidly round and round.

The scene at this time was extremely picturesque, the moon, and the blue-lights burnt at constant intervals, rendering it nearly as light as day, and causing the varied costumes and bright colours worn by the crowd to become clearly visible. We soon after took our departure, having first had wreaths hung round our necks, and been presented with flowers and attar of rose by the Maharajah, in the graceful Indian fashion.

I must not leave Mysore without mentioning an institution in which Mr. Runga Charlú takes much interest, and which we visited the next morning. It has been established during the famine, and is a School of Trade, where every boy who is being brought up by the State is taught some trade, so that on going out into the world he may not have to seek a livelihood, but be prepared to gain one through his own exertions. All kinds of trades are taught, and taught thoroughly—printing, carpet-making, weaving, carpentering, pottery, and similar useful works. The object being to teach the boys well, and not only to make articles for sale, the work, though with beginners rough, is always strong and good. One could not help wishing there were more such institutions in the country; for in India, as elsewhere, handicraft is degenerating, and the aim and object of young India is to acquire a certain knowledge of the English tongue, and then to occupy a clerk's desk in some public or or private office. More's the pity! A. M. C.

#### THE INLAND TRIBE OF GREAT NICOBAR.

IN a paper on the Nicobar Islands, in this Magazine (February 1875), I mentioned that there were tribes of inland people in the Great and Little Nicobars. Since writing that paper I have had an opportunity of visiting these islands, and that visit, with its results, is the subject of the present article.

We have old reports of inland tribes at the Nicobars, and ethnologists came to the conclusion

that they were Negritos, although no one had actually seen them. As the Andamans are peopled by such curious dwarfs, and as they are also found in the Malay Archipelago and Philippine Islands, it was considered desirable that a link should be found at the Nicobars connecting the Andamanese with the other Negrito tribes. The inland race, being likely to be of a lower stamp than those who had driven them away from the coast, were set down as being Negritos, and had been spoken of as such so often that it had nearly come to be considered as a fact that Negritos were to be found at the Nicobars. That there were people *inland* was quite certain. The Nicobarese spoke a great deal about them. The Rev. Mr. Rosen made the last attempt at colonising these islands in 1831-34.

In 1846 the Danish corvette 'Galathea' visited the Nicobar Islands, on her voyage round the world, and among the parts explored was the river (or creek) that opens out into the Galathea Harbour, in Great Nicobar. The expedition heard a great deal from the coast-people about the tribe living in the interior, who were said to be Orang-utangs;\* it was also reported that they had neither huts nor canoes, and that they eat snakes and frogs, caught by magic spell. Although it was quite evident that the coast-people gave a very exaggerated description of this unknown tribe, they had, however, succeeded in awakening so much curiosity that an exploring party was formed to go up the river (creek), and, if possible, to communicate with them.

The expedition started on the 19th February 1846. The boats of the corvette were used, manned by European sailors. It was with great difficulty that progress was made, for every fallen log had to be got rid of, and the hot tropical sun was very trying to the men, so that the rate of progress in eleven hours was only from 16 to 20 miles. The narrative† records that they reached a spot "where the river turned at a right angle easterly, and where a large jungle-covered hill steeply overhangs the river. Behind this hill the river forms a little bay, and in this we found three or four canoes, fastened near the land. Having landed, we climbed the hill slope, and found the place carefully railed off from the river side. Inside this rail, which enclosed the whole hill, lay seven or eight empty huts. On the hill slope lay a fallen log, with its crown resting on the other side of the valley, where the canoes were lying, like a bridge in the air. From the care with which the place had been railed off, one might suppose that these poor savages were afraid of being attacked, and had kept this line of retreat open." [This alludes, I believe, to the fallen log.] "But of whom were they afraid? Who were their enemies? Captain Aschlund, who had visited the same spot the day before, had found that it had been just evacuated, and that fire was still burning on their cooking-places. They could not possibly know of our approach, so that it could not be us they feared.

\* This means simply men in the forest; and I think that in this case the name is not inappropriate, and need not be taken to mean monkeys. It must be remembered that no individual could speak the language of the coast-people, and that the Malay language, which was used, was a foreign language to both parties.

† *Corvetten Galatheas Jordomsøiling Kjøbenhavn, 1849, vol. i., p. 342.*

It was hardly either against the coast-people that they wanted to defend themselves, for it was quite apparent that these two peoples, although living on the same island, which is only 28 miles long, and 12 to 16 miles wide at its broadest part, were quite ignorant of each other, so that the coast-people spoke of the inland tribe as forest-demons, who lived in the trees, ate frogs and snakes, which they caught by supernatural means, and altogether resembled very much the animal whose name they gave them, namely, Orang-utangs. They assured us that they had neither houses nor canoes, but the first things we met were canoes and houses. Against whom were they thus keeping on the defence? Was it possible that war, with its wretchedness, had found its way into the centre of the jungles of this little island, and that the couple of hundred people who live here should try to destroy each other in this little place? All these questions and conjectures forced themselves on our minds as we wandered about in this little deserted village, whose only inhabitant we found enclosed in a sort of prison, formed of a couple of logs, with sticks between. This was a pig, who seemed famished, and, to judge from this fact, the inhabitants had probably not been there for several days. That this establishment had recently been formed was evident from the fresh state of the palisading, and the poles on which the huts rested. We all agreed that the inhabitants must be in a higher state of civilisation than our friends, the coast Nicobarese, would allow them to be. It is true that the huts were the most wretched specimens we yet had seen; there was hardly space in them for two people to sit, much less to lie in; but yet they were huts, and built on the same principle as those of the coast-people, namely, raised from the ground on poles, which mode of construction is always used by Malays when in swampy places. Several were merely small sleeping-platforms, with one side supported by the trunk of a tree, and roofed over with dhunny and rattan leaves or sheets of bark. Such a sheet of bark also formed the substance of their cooking-pot, which stood on a stand formed of four little sticks, with cross sticks, under which the fire was laid. . . . We found some wooden spears, and some pieces of cloth pressed from the cettis bark, but they were very ragged. On the ground were thrown some used caldeira fruits, and in one of the huts we found a piece of prepared pandanus bread. Finally, we found in the forest, close to the railing, a big tree that had newly been felled, from which we concluded that their tools must be pretty good. Everything seemed to show that the inhabitants of this establishment were of the same kind of people as the coast Nicobarese."

Shortly after landing a most terrible thunderstorm overtook the expedition, and the violent rain, the noise of the thunder, the lightning, and the crash of falling trees, all combined to make the visit to this village an event not easily to be forgotten by the Danes, and many of them suffered very severely from jungle fever when they got out to sea. In February no rain can be expected, as it is the height of the dry season. The above visit of the Danish officers to the abandoned village was the only authentic information that existed of the interior of Great Nicobar, and it remained undecided who the owners were of these huts.



In January 1871, on duty in H.M.S. 'Dryad,' I visited the Galathea Bay; but as the work of erecting a flagstaff and taking possession was performed in a day, and the Commander could not delay our departure, I had no chance of visiting the above-mentioned village. Ever since that time I have been most anxious to get another chance to visit Great Nicobar, and solve the mystery of the inland people. From the Nicobarese, near Nancowry Harbour, I had made all sorts of inquiries, but without any great result. They had all heard about these people, but had never visited them in their homes. Their name is Shom-Baeng. Shom means tribe; e.g. Shom-pu, a man from Car Nicobar. Their specific name is thus Baeng or Beng.

In 1872 some coast-people on a trading visit to Nancowry came to my house, and among them was a young man who was said to be by birth a Shom-Baeng, and who had lived with them from boyhood, the only connection he had kept up with his family being an occasional meeting with his mother in the jungle. As he knew his own tongue I was very anxious to get as many words from him as possible. This, however, was no easy matter, for never having before seen a European, he was very much frightened. What especially disturbed his peace of mind was our old elephant, who was bathing when he landed. For a time I succeeded in quieting him, and we proceeded very satisfactorily until sunset, but he and his friends could not be prevailed upon to remain any longer; nor did he ever return. He was a big, strong youth, nearly of the same build as the people of Nancowry, but perhaps a shade lighter in complexion. The most prominent feature was, however, his small oblique *Mongolian* eyes, and the circumstance that the back of his head had not been flattened, it being customary among the coast-people to flatten the heads of their little children. It struck me at once when I saw him that he resembled the men from Schowra, a little island to the north of Nancowry. Although I was convinced that these people had spoken the truth with regard to the boy, still I was very anxious to verify this curious discovery that *the inland tribe at Great Nicobar is of Mongolian and not of Papuan origin.*

At last, on the 1st April 1876, at 4 p.m., I started on my trip southwards from Nancowry, in a fine open cutter, with a strong convict crew—eleven lifers—and four free policemen as a guard, and with two Nancowry guides. It was rather late in the season, for the S.W. monsoon might be expected in a few days, and clouds had occasionally warned us. We had no compass, but steered by the stars, and my two guides had to take turn with me at the helm. It was a lonely night, the temperature mild and agreeable, and above us was the clear, starry sky, and a little moonlight. The convicts, whose life in these parts is such that they could tell their friends afar off many a wonderful tale, sat for a long time staring at the new islands we were approaching, till they gradually fell asleep. The wind was very steady, so that after a while our steersman was the only one awake. During the night we passed the little islands Meroë, Track, and Treis.

Early in the morning, Captain Johnson (our guide) brought us to anchor in a sandy harbour on all sides surrounded by coral reefs, near Little Nicobar. As

the cutter could not land we had to fire a gun, which very soon brought a couple of canoes to our assistance. It is customary in the Nicobars, where inns are unknown, that the stranger selects a house as his home; and whenever he returns to the village he invariably goes to the same house, and is treated with the greatest hospitality. This house is his *gni lancije*, and his host will claim the same privileges, if he comes to his place. In every village I have visited I have such a host of friends, who are at all times prepared to receive me, and I should give great offence were I to go into another man's house.

After having chosen my host (*gni lancije*), we settled in his house, and in an hour everything was snug ashore, and the men set-to cooking. Then arose a difficulty, which threatened to put a stop to our expedition. Before starting I had filled four water-casks at our well in the settlement, because I was afraid that bad water might give the men fever, and this I had done by Brahmins. Now, the men refused to use the water, declaring it to be against their caste to do so. This, I felt pretty certain, was a trick. We found some little waterholes in the jungle, and I had to give the men leave to use this water, although it looked very nasty.

In the afternoon, I paid a visit to the little island Treis, one of the places where the magnificent Nicobar pigeon breeds. Next day we repeated the visit near sunset, as the pigeons are more easily got at about sunset and sunrise. After shooting, we all slept in the cutter. Next morning we returned, and made ready for the journey to Great Nicobar. My guide advised me to go to the little island Pulo Condul (*Nic Lamongshe*). We spent the night on the way, and a charming voyage it was. Current and wind, stars and moon, all favoured us, and we arrived early in the morning at Condul refreshed by a good night's rest. Our reception was enthusiastic, and the natives crowded on board, and in a very short time a house was cleared for my reception, and another for my men. As my crew consisted of convicts I had always to be very careful that they did not seize the boat and escape, and for this reason a sentry had to be placed over the provisions day and night. Meeting with such a cordial reception I at once profited by it, and told my host that I had come to see the inland tribe, at which they pulled very long faces; whereupon I at once declared that I did not intend stirring until I had succeeded. On hearing this, my hosts retired; and after a long consultation, told me that they were willing to do their best. There was at that time a man and his son near the coast, where they came to barter for tobacco. They assured me that he would be so frightened at seeing me that he would run away, but they would send some messengers before me with presents to prepare him. Accordingly some men set off at once with some tobacco and red cloth as peace offerings, and after taking breakfast I set off with my host and another man. Just as we were departing, my orderly, a fine Sikh, came up to me and begged to be allowed to follow me, saying that, as he was responsible for my personal safety, he would like to be with me in case the savages attempted my life. So he was allowed to come, but we went without any guns. A journey of six miles in a canoe, with a tropical sun over the sea, when it is quite smooth, and there is no breeze, is very trying; consequently, we all had to

take our turn at the paddles. I tried to while away the time in repeating some of their fairy tales, which my savage friends enjoyed very much. They repeated each sentence, and explained the meaning to each other. They are like children, and I had to repeat one of the stories twice. The sun was very hot, and the last part of the journey we were silent. We passed some large, steep rocks, in which are found edible swallow nests, and small valleys, where cocoanut trees and casuarinas gracefully grow on the alluvial soil behind the green bushes on the coast. At last we entered the Ganges harbour. A little rock island surrounded by coral reef forms the breakwater to this small but very safe harbour, and here I noticed paddy birds (*Demi egretta sacra*). Inside the harbour were still visible the marks of a violent earthquake that happened here in 1846. The last remnants of the trunks of trees, which with their soil had sunk into the sea, still showed above water, and as we wound our way quite noiselessly between the dead trees into the bay, it made a very dismal impression on my mind. At last we touched at some rocks, where we found the canoe of our ambassadors. My host now produced a red cloth to put over my dress, otherwise I would frighten the Shom-Baeng; he then insisted on my taking off my hat, shoes and stockings, and although I tried to dissuade him, he would have me do it. As I had knickerbocker socks on, you may imagine that I was in a most uncomfortable position, a burning sun above, rocks covered with little sharp-edged oysters below, and surrounded by sandflies and mosquitoes. Quite silently we wandered along the rock edges, and when we reached the inmost part of the bay we came to a mud bank laid bare as it was low water. We waded across. On the other side was a little shed, if a little roof made of dhunny leaves on four poles may be so called. There we found the men that had gone before me, and they told us that the man had recently been here with his son, but had run into the jungle. I begged of them to run after them, as I felt this to be a most cruel disappointment. My host, however, told me to sit down, and proceeded a short distance into the jungle. Presently I heard him calling out in all directions. After a while somebody answered, and then followed a long parley, of which I did not understand a word. I dared hardly breathe, for I had made up my mind that, whatever happened, I *must* see this people, and now I was so near them, and, perhaps, yet so far from accomplishing my wishes. At last my host called out to me—"Come quick, and bring some presents." I rushed off wildly in my eagerness, but it was through a pandanus copse; a lot of the sharp-pointed leaves lay on the ground, which cut my legs badly as I ran. In one hand I carried a packet of tobacco, and a piece of cloth in the other. I came upon them near a little stream. The Shom-Baeng stood on the other side of the water, and was still doubtful in his mind. However, we prevailed on him to come across, when he snatched the presents out of my hand as a wild animal snatches food. My host walked off with him, while I went into the stream with an old man of our party, who came up to dress my little wounds, caused by the pandanus leaves. We remained here purposely for some time, to give Shom-Baeng time. When I returned to the hut, I found him leaning against one of the poles, staring at me, and watching my every

movement, as if he feared that I was going to throw myself over him. He was, as I had expected, a Mongolian, with small oblique winking black eyes, such eyes as the frightened beast has. The coast-people have brown eyes. He could speak slightly the dialect of the coast-people, and they a little of his language, and also the Nancowry dialect, and so we got up in this roundabout way a conversation. He denied that his son was with him, at which I said nothing, although I knew that the boy could not be far off. He stood 5 ft. 8½ in.; and, for comparison, I may add that a full-grown Nancowry man stands 5 ft. 6 in. to 5 ft. 9 in., an Andamanese Negrito 4 ft. 9 in. to 5 ft. 1 in. From this it will be seen that he was by no means a little man. He was slenderly built, and had a well-formed head. His mouth was very different from that of the black coast-people, who have enormous protruding front teeth, that increase in size on account of the quick-lime and chavica-leaves which they eat; *his teeth were small, but black, his lips small and well formed.* He told me that his people chewed betel nuts (areca), betel-leaf (chavica), and quick-lime; but that, as they did not know how to burn lime, they had but very little of it. This was, I suppose, the reason why his teeth were not bigger. He was greatly amazed at seeing me write, and had evidently never heard of such a thing; for when it was explained to him that I was putting down what was said, he laughed, and gradually recovered from his first fright. He told me that his people neither eat the python nor monkeys. I asked about this, because the coast-people invariably asserted that they did. He related that they had gardens, and that the women wore a skirt made of bark. *His head was not flattened* behind, and his jet-black hair fell wildly over his face, cut straight off near his eyes. His forehead was high and well formed; his nose hooked, but flat below. He told me that they did not know how to make pottery, but used vessels made of betel bark, and he showed me such a one, which stood on two little stones, in which lay the remains of his last meal, viz., two half-grown paddy birds, which he assured me tasted very well. His people did not know how to make canoes, and he had bought the one he had from the coast-people. He told me he had got the paddy birds from the little rock, which I noticed at the entrance to the Ganges Harbour. This proved to me that he could paddle a boat. While we were talking, a pig came up and stood quite close to us. It seemed quite at home, and he told me that it was a pet of his; it had followed him all the way from his village—two days' journey. The pig looked like those found near the coast. He told me that his people do not use bows and arrows, but that they used spears. I begged of him to take me to his village, but my host and the other people opposed, and made him afraid. They were evidently themselves afraid that I should take them there. The Shom-Baeng promised, however, that he would go to his place, and bring me a spear of each kind, some produce of his garden, and a piece of cloth, as the women use it. He said that he could not make the journey in less than four days, and so four knots were made on two little sticks; we kept the one, and he the other. We then departed, and when we returned to Pulo Milo, my guide was very much displeased at the arrangement. Captain Johnson shook



his head, and declared that we should have had weather before we returned. As this possibly was my only chance, I would not throw it away, and made up my mind to wait the four days. From this time, however, everything went contrarily; my stores were out, and we had only fowls and rice to live on.

The four days were spent in collecting insects, shooting, visiting the villages; and when the 9th of April arrived, we were all very glad to depart. I bought a new canoe, and presented it to my guides, who were delighted with it. We proceeded in the early morning towards Ganges Harbour, and anchored the cutter behind a point, and went up to our friend in our canoe. As it was high water, we were able to come right up to his hut. The first thing that met my eyes was his pig, which stood at the landing-place, and I saw the Shom-Baeng peeping out from behind a bush. He received us very friendly, and had brought his little brother with him. He gave me three spears, one made entirely from areca wood, exactly like the one found by the Danish expedition in the village on the Galathea river, and two spears, with small iron heads, very badly made, and quite different from those used by the coast-people. He also brought a piece of the cloth which the women use, made from the celtis bark, which is beaten out, and really resembles cloth. I have often met with it in the other Nicobar Islands, and was always told that it came from Great Nicobar, where it was made by the Shom-Baengs. He also brought me an enormous yam and some gunia, the size of the former proving a high state of agriculture. He told me that he had spoken with his people, and informed them that I wanted to visit them, which they were willing to allow, providing I brought my wife. I explained to him that this might happen some day, but I also told him that she would have to be carried there, as she could not walk such a distance. I gave him some presents for himself and his wife, and we parted as friends.

I learnt from the coast-people that there were three tribes of these Shom-Baengs, one at the northern part of Great Nicobar (the man whom I met belonged to this one) another on the west coast. This tribe, I was informed, did not live very exclusively; but they often visited the coast-people, and had even come on board ships in quest of tobacco, of which they are very fond. The third tribe lived near the Galathea river. The coast-people also asserted that they did not understand how to make canoes, but had little huts. The coast-people did not know anything about the 'Galathea' Expedition, and thus confirmed in every detail that the village visited really belonged to the Shom-Baengs. The result of my visit was as follows:—I met a man of the northern tribe, that he produced a spear like the one found on the Galathea river, that he cooked in such a vessel, made of bark, as was found there, thus identifying himself as belonging to the same people. He was a tall man of about the same height as the coast-people, but a shade lighter in colour. His Mongolian eyes and prominent cheek-bones were remarkable. The possibility that this inland race should be a mixed one of Negritos and coast-people is not however proved. I asked him most particularly whether there were any men of such a description among them, which he denied.

He was not of any mixed breed related to Negritos. I mention this possibility because we know of such mixed races elsewhere.\*

Thus, I hope, by what I have seen and what I know, together with what the 'Galathea' Expedition relates, to have exploded the theory of Negritos being found in the interior of Great Nicobar.

In the account of the 'Galathea' Expedition, Admiral Bille mentions that he found boats at the village of the same construction as those of the coast-people, and he makes this an argument in favour of supposing that it is the same race, separated by some mysterious enmity. This argument is, however, not conclusive; for it is quite certain that the two peoples have a little trade together, and that the coast-people are very jealous of this trade. One might, therefore, suppose that these boats were bought from the coast-people; or, that the people at the Galathea Harbour had in them brought their women up to the inland tribe to hide them from the people of the man-of-war. Many a village have I seen where no woman was visible. They were all concealed in the jungle. Admiral Bille also wonders at the rail around the village; but when we take into consideration that there is a wild pig in the forest, and that the people are agriculturists, then the rail appears to me a very natural precaution. The expedition shot birds on its way up the river, and the report of guns drove the people away in such a hurry that they forgot to let the sole inhabitant (a pig) mentioned out of its prison. There is, therefore, no reason to suppose, as Bille hints, that they fled for anybody else. In another paper I hope to lay before the readers of this Magazine a report of another tribe of the Nicobar Islands, and the relation to each other of the different tribes on the islands.

After having seen the Shom-Baeng a second time, we directed our course northwards, but ill-luck followed us steadily. A violent current kept us back; and, sailing and pulling, we only advanced very slowly, and had at last to put in at a village (Ol-en-tji) on the east coast of Little Nicobar. The people of the village were celebrating a feast for the dead, and a number of friends had collected from far and near. Twenty-four big swine had been killed, which fact can give an idea of how great a feast it was. The palm wine (toddy) had circulated freely, and the whole of the assembled crowd were more or less under its influence. We were, however, received very friendly, and were brought into the different huts to see the fun. The huts and the boats on the sand below were decorated with green garlands of palm leaves and flags, among which I noticed a Danish one. In the huts we found the killed pigs, and the women were busy cutting them up. The faces and hands of all the people were smeared with pig's blood, and a confused singing met my ears from every corner, which was unbearable. In the graveyard the wooden monuments had been decorated with gaily-coloured rags, and the ground was covered with palm leaves, and in the centre I noticed a group of women, who distributed betel and toddy to all comers. Around one of the fresh graves the relatives of the deceased were collected, and they did their best to drive away the

\* Jagor (*the Philippine Islands*). Señor Ynigo Azaola (letters published by St. Bille).

evil spirits by beating a cracked gong. The whole affair was more or less a drunken riot, and I was very glad to retreat to a quiet corner in the jungle, where we cooked some fresh eggs; and it was a relief when, towards sunset, the tide turned, and we could proceed on our journey. At parting, following the custom of the place, we fired a couple of guns, and on our way met a couple of big canoes filled with guests desirous of partaking of this savage happiness.

At two o'clock in the morning we arrived at our old camping-place on the north coast of Little Nicobar, the men rather knocked up with pulling.

Next day we rested in the forenoon; and after a meal, we started on our long journey home. We paid a visit to the Island of Treis, and after firing some shots at the Nicobar pigeons, started, near sunset, for Nancowry. Before leaving we saw, far off, the hills of Katchall and Nancowry just as the setting sun shed light over them. The wind was light and favourable, and we hoped next morning to end our little journey in a pleasant way. At 8 p.m. a black cloud rose on the northern horizon, and grew rapidly; the wind changed, and blew fresh; and after a while, a frightful tropical squall broke over our heads. We had the canoe of our guides in tow; but the cutter laboured heavily, and we soon lost all sight of moon and stars.

Drenched to the skin, the men pulled away, and we hoped that in a few hours all our troubles would be ended. Near midnight, however, the skies cleared for a moment, and we caught sight of the moon, but, to our horror, discovered that we were working southwards instead of northwards. We put the boat about, and again worked away. Towards sunrise the sky cleared again, and, to our joy, we discovered our islands not very far off, and were all delighted, for we were thoroughly drenched, cold, hungry, and miserable. The rain, however, commenced again; the sea rose, and a dense mist surrounded us. Black and white clouds drove past us, and no clue could we anywhere find as to where we were steering. Bitterly did I rue that we had ventured out without a compass. Many thoughts crossed my mind, and I was now prepared to find that we would not reach our destination. At noon, however, we caught sight of the islands, but far off. The sea was high, but the wind having nearly died away, we set to again, pulling for our lives, and after ten hours' hard work, in which I had to take my turn at the oars with the convicts, we at last anchored off our establishment at Nancowry. During the bad weather we had cast adrift the canoe of our guides, at which they were very much displeased. They said that the wicked, powerful sorcerers of the Shom-Baeng had brought this bad weather on us; but I fear it was the monsoon that broke a little earlier than usual, and I leave to the readers to decide for themselves which explanation they will adopt.

FR. AD. DE RÖEPSTORFF.

## Reviews.

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### WESTERN PLANTING.\*

It is somewhat humiliating that this original treatise of Old Hakluyt's should have lain hid for nearly three centuries, and that we should be indebted to foreigners, and in part to a happy accident for its present publication.

The manuscript can be traced back no further than the sale of the library of Sir Peter Thompson, of Poole, in Dorsetshire, who died in 1770, and was bought by Lord Valentia, who wrote in pencil, on a blank leaf, "This unpublished manuscript of Hackluyt's is extremely curious. I procured it from the family of Sir Peter Thomson. The editors of the last edition would have given any money for it had it been known to have existed." Mr. Henry Stevens purchased it at Lord Valentia's sale, and from Mr. Stevens it passed into the great collection of Sir Thomas Phillipps, who gave 44*l.* for it. In this collection it might still be reposing almost unknown and wholly useless, had not the learned Dr. Leonard Woods, of Maine, in the United States, projected a visit to Europe in 1867. The Governor of Maine furnished him with a commission authorising him to procure materials from foreign archives, libraries, and collections for the early history of that State. Dr. Woods had already heard of this manuscript from Mr. Stevens, but what he heard made no impression on him, and had he not been led to the Phillipps' collection, in pursuit of the Gorges manuscripts, Mr. Stevens's information would have remained barren and unfruitful. Having ascertained that the Gorges papers were in the possession of Sir Thomas Phillipps, Dr. Woods procured the assistance of Mrs. Everett Green, who was already acquainted with the Phillipps' library, and she undertook to examine all the manuscripts in the collection bearing on the history of the State of Maine, the principal object of this communication being the Gorges papers. Mrs. Green reported, "The Gorges papers turn out a sad disappointment; on the other hand, the Hakluyt Discourse is, I think, curious and valuable." Led thus to the Hakluyt manuscript, Dr. Woods at once perceived its value, and was enabled by the liberality of Sir Thomas to have it copied. This was done with the utmost care and accuracy; and, on his return to North America, Dr. Woods proceeded to edit his precious discovery for the Maine Historical Society, to whom we are indebted for its publication. Before Dr. Woods's work was completed it was arrested by the destruction of his library by fire, and before it could be again resumed ill-health prevented his applying himself to any literary labour whatever. Fortunately the Hakluyt Discourse had been stereotyped at Cambridge in Massachusetts before the fire, and some of Dr. Woods' notes, and his Introduction were saved.

This Introduction is the result of much research and learning. Dr. Woods, on strong grounds, iden-

\* *A Discourse concerning Western Planting, written in the year 1584.* By Richard Hakluyt; now first printed from a contemporary manuscript, with a Preface, and an Introduction. By Leonard Woods, LL.D., late President of Bowdoin College. Edited, with Notes in the Appendix, by Charles Deane. Cambridge. Press of John Wilson and Son, 1877.

tifies the Phillipps' Manuscript with one presented by Hakluyt to Queen Elizabeth in the autumn of 1584, in return for which she granted him the next vacation of a prebend in Bristol—"a thinge of very small valewe." Dr. Woods considers that the Phillipps' Manuscript, which is not in Hakluyt's handwriting, was one of three or four copies of the original work which he retained for himself, one copy being presented to the Queen, one to Walsingham, and another to Sir Philip Sidney; and he decides that it was not written for the press. This is pretty clear, as, though Hakluyt lived thirty-two years after he wrote the *Discourse*, he never printed it, and the object of its composition was a special one. In the title-page (added after the presentation to the Queen) he states that this *particular discourse* was written "at the requeste and direction of the righte worshipfull Mr. Walter Raghly, nowe Knight, before the comynge home of his twoo barkes." We may conclude that Raleigh's object in directing this work of Hakluyt's was to induce the Queen by all the arguments that one so competent as Hakluyt could urge from economical, religious, political, and patriotic motives, to give her support and help to Raleigh in carrying out his scheme for colonising North America under the patent he had already obtained from her.

We need hardly remind our readers that in Hakluyt's time to *plant* expressed the same as to *colonise* does with us. So Bacon entitles his essay "Of Plantations," which he places "amongst ancient primitive and heroical works."

Hakluyt brings all his learning to bear to prove the title of Elizabeth to North America from 30° in Florida to the Arctic circle. He includes the coast from Florida to Cape Breton under the indefinite name of Norumbega; and enlarges on the wonderful richness of the country and its productions, following the early explorers and writers, who, in their anxiety to magnify the importance of their discoveries, enlarge the list of useful and precious objects to be found in North America by the addition of many which are certainly of eastern origin. They must have had recourse to imagination who claimed to find in the Western Hemisphere such products as furquoises, cinnamon, cloves, rhubarb, oranges, or "silkwormes in marevelous number, a great deale fairer and better than be our silkwormes."

England at the date of the *Discourse* swarmed, according to our author, with idle persons.

"Wee (he says), for all the statutes that hitherto can be devised, and the sharpe execution of the same in poonishinge idle and lazye persons, for wante of sufficient occasion of honest employmente, cannot deliver our commonwalthe from multitudes of loyterers and idle vagabondes. Trueth it is, that through our longe peace and seldom sickness (twoo singuler blessinges of Almightye God) wee are growen more populous than ever heretofore; so that nowe there are of every arte and science so many, that they can hardly lyve one by another, nay rather they are readie to eate upp one another; yea many thousandes of idle persons are within this realme, which, havinge no way to be sett on worke, be either mutinous and seeke alteration in the state, or at leaste very burdensome to the commonwalthe, and often fall to pilferinge and thevinge and other lewdness, whereby all the prisons of the lande are daily pested and stuffed full of them, where either they pitifully pyne awaye, or els at lengthe are miserably hanged, even XXti at a clappe oute of some one jayle."

These, together with "the frye of the wandringe beggars of England that growe upp ydly, and hurte-

full and burdenous to this realme," he recommends for transportation to the proposed colony.

Perhaps the most interesting portion of the *Discourse* is the contempt with which Hakluyt writes of the Spaniards. Spain he calls a poor and barren country, hardly able to sustain its inhabitants. Of Philip II. he says:—

"For this Phillippe already owinge many millions, and of late yeares empaired in credite, bothe by lacke of abilitie of longe tyme to pay the same, and by his shameful losse of his Spaniardes and dishonors in the Lowe Countries, and by lacke of the yerely renewe of his revenewe, he shall not be able to wage his severall garrisons kepte in his severall frontiers, territories, and places, nor to corrupte in princes courtes, nor to doe many feates. And this weyed, wee are to knowe what Phillip ys in the West Indies; and that wee be not abused with Spanish braggs, and made to beleve what he is not, and so drawn into vain feare, suffer fondly and childishly our owne utter spoile. And therefore we are to understand that Phillippe rather governeth in the West Indies by opinion, than by mighte; for the small manred of Spaine, of itself beinge alwayes at the best slenderly peopled, was never able to rule so many regions, or to kepe in subjection such worldes of people as be there, were it not for the error of the Indian people, that thincke he is that he is not, and that doe ymagine that Phillippe hath a thousande Spaniardes for every single naturall subjecte that he hath there."

It should be noticed that this was written four years before the Spanish Armada, and three years before Drake's destruction of the Spanish fleet at Cadiz.

As an additional reason for colonisation Hakluyt proposes:—

"That by these colonies the north-west passage to Cathaio & China may easely, quickly, and perfectly be searched out as well by river and overlände as [by sea].—"I thinke it not amisse," he says, "to alleage those testimonies tendinge to the proove of this longe desired north-west passage, which, with no small care these many yeres, I have observed in my readings and conferences concerninge the same matter."

The editor has strictly followed the original manuscript in every essential particular, and his book is thoroughly well got up, and reflects great credit on the Historical Society of Maine. We are unaware what facilities there may be for procuring it in this country, but we recommend all of our readers who are interested in early geography, and all who enjoy Hakluyt's vigorous and racy style to endeavour to procure a copy.

#### LAKE NYASSA.\*

MR. YOUNG, of the Royal Navy, had spent much time in Africa with Dr. Livingstone, and commanded the "Search" Expedition sent out by the Royal Geographical Society on the report of Livingstone's murder in 1867. It is no wonder, then, that when the Free Church of Scotland was desirous of honouring the memory of Dr. Livingstone, Mr. Young should have been requested to give them the benefit of his experience; nor that the plan proposed by him should have been adopted. This plan was based on Dr. Livingstone's settled opinion, that "Lake Nyassa, the lake of his own discovery, with its water-way from the coast, was *the* position of all others in his estimation

\* *Nyassa: A Journal of Adventures whilst Exploring Lake Nyassa, Central Africa, and Establishing the Settlement of "Livingstonia."* By E. D. Young, R.N. Revised by Rev. Horace Waller, F.R.G.S., with Maps. Second Edition. London: John Murray, Albemarle Street. 1877.

which should be gained at any cost to annihilate the Portuguese and Arab slave-trade of the East in the first place, and to render it possible for missionaries to engage in their sacred calling." When the Free Church had decided on founding a mission station on Lake Nyassa, they were joined in their undertaking by the other Scotch Presbyterian Churches, and Mr. Young was placed at the head of the expedition. A person better fitted both for planning and executing the project could not have been found; nor did Mr. Horace Waller go too far in saying at a meeting of the Royal Geographical Society, "That, if this Nyassa enterprise had been led by a man less experienced and less beloved by the natives, in all probability it would have added one more to the list of failures."

Our readers are already familiar with the history of the foundation of the United Scotch Mission Station of Livingstonia, and a letter from Mr. Young appeared in our number for July, 1876, they will now doubtless welcome the published narrative of his exploration of and adventures on Lake Nyassa. The book has already reached a second edition. Mr. Young has much to tell, and he tells it naturally and pleasantly without having recourse to *padding*. His heart was thoroughly in his work; personal discomfort and sacrifice he made light of; and difficulties were not overlooked, but overcome.

The first idea of a steamer on Lake Nyassa was Livingstone's; he tried it and failed. Mr. Young profited by past experience and designed a screw steamer constructed of steel plates screwed together, which, when unscrewed, could be taken to pieces and carried by native porters past the cataracts of the Shiré. In the construction of this vessel two points had to be considered; it was necessary that this steamer should be of sufficient power to resist the frequent and violent storms of Lake Nyassa, and yet not too deep for the navigation of the Zambesi and the Shiré. It turned out that both rivers were so low when the expedition passed up them, in August and September 1875, that it was with difficulty the vessel, called the 'Ilala,' after the district in which is the place of Livingstone's death, reached the falls of the Shiré. Mr. Young gives very good reasons against attempting the ascent of these rivers when their waters are high. He looks forward to the time when there shall be a steamer of twice the 'Ilala's' size on the lake, and another smaller and of shallow draught, built on the American principle, with "hind-wheel" propulsion, for the navigation of the rivers, and the difficulties of the portage along the cataracts shall be lightened by the construction of a good road. The portage past the cataracts was skilfully managed, and Mr. Young showed the same judgment in the selection of the site for the mission station as he did in the arrangements for reaching the lake. The spot selected is Cape Maclear, the end of the promontory which divides the southern end of the lake into two parts—a fine position with an almost constant cool breeze from the lake, and free from mosquitoes, though not entirely from fever. Dr. Stewart, in a letter, dated February 27th, 1877, which appeared in our number for last August, expresses a fear that there is tsetse fly in the district; but as Mr. Young makes no mention of this pest, we trust it may not be the case. In making his selection Mr. Young made use of the experience of

his predecessors, Bishop Mackenzie and his companions, and handsomely acknowledges his obligations to them.

In November and December, 1875, the 'Ilala' surveyed and circumnavigated the lake. This vast inland sea has no particular name in the native tongue. "Endless confusion has arisen, and will arise to the end of time, owing to the habit the natives have of speaking of any large piece of water in general terms as *the Nyassa*. Of course this will vary with different dialects. On the Zambesi that river is the *Nyanja*; here we had *Nyassa*; Speke and Grant had *Nyanza* for the Victoria lake, and so forth." Livingstone called it the lake of storms, and justly, for it is so swept by storms, sometimes without the slightest warning, that its navigation must always be a work of danger; the 'Ilala' was sometimes in peril, and with a less competent and watchful commander would have been lost. The scenery is described as beautiful: the waters abound in fish. The population is continually diminishing from the effects of the slave-trade. How many must have inquired what becomes of the thousands of slaves annually captured from this district! Five thousand, Bishop Steere calculates, marched along one road only. One author tells us that they are bought by the fierce and warlike tribes to the south of the Zambesi, and the west and south-west of Tette. The women are added to their wives and concubines; the girls following the fate of their captive mothers; the boys drafted into the tribes; grown men are not taken.

It is to be wished that those who are entrusted with the expenditure of other people's money often showed the same conscientious thrift as Mr. Young. He assures us that the cost of the 'Ilala' and two boats, passage to Africa, salaries, provisions for many months, barter goods, and, in fact, everything up to the date of the lake's exploration did not cost as much as £6000! We trust his employers have given him the credit he deserves for his economy.

In taking leave of Mr. Young we must express our hopes that he may yet pay another visit to Lake Nyassa and see with his own eyes the success and prosperity of his settlement.

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#### BOTANICAL REMINISCENCES IN BRITISH GUIANA. By *Richard Schomburgk, Dr. Phil.* (Adelaide. 1876.)

THIS valuable little volume of ninety pages ought not to be overlooked by geographers. It is written by Dr. Richard Schomburgk, director of the Botanic Gardens at Adelaide, and is a narrative of his travels in Guiana many years ago, when he was attached to the expedition of his brother, the late Sir Robert Schomburgk. During these travels Dr. Schomburgk navigated the River Barima from its mouth in the Orinoco, crossed the Savannas, and ascended the Roraima Mountains. He gives an interesting account of the noble Indian tribes of Guiana; but the chief value of his narrative is derived from his full and accurate descriptions of the vegetable kingdom in the different zones from the banks of the Essequibo to the Roraima plateau. From this plateau rises a sandstone perpendicular cliff to a height of 1500 feet, like a wall, its highest summit being 5000 feet above the sea. The ascent was found to be an impossibility, so that what botanical treasures are contained on the stone wall itself, and how many are secreted on the top of it, is still unknown. The rock consists of a fine-grained

red sandstone, and rises out of a forest teeming with new and interesting plants. Dr. Schomburgk longed to have passed a year in this botanical El Dorado. He concludes his volume with a valuable account of the general flora of British Guiana.

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**LEHRBUCH DER ALTEN GEOGRAPHIE.** Von *H. Kiepert*, Erste Hälfte, Einleitung, Asien, und Africa. Berlin, Verlag von Dietrich Reimer. 1877. (London: Trübner and Co.)

HERR KIEPERT has compiled with his usual care a work of considerable value. A handbook of ancient geography, based on the authorities of every epoch, from the monumental records of Egypt down to Ptolemy, was a great desideratum; and the manner in which the author has extracted, digested, and arranged the enormous mass of geographical data furnished by the authorities consulted, is worthy of all praise. The plan of the work (of which, by-the-by, the present volume is only the first half) is excellent. We are first given a brief review of the chief sources of information, comprising the Chinese historians, the Zend Avesta, the Egyptian, Assyrian, and Persian inscriptions, and the whole roll of writers and geographers from Anaximandros (550 B.C.) downwards. Then follows an ethnographic chapter and a brief definition of the extent of the geographical knowledge of the ancients and their general ideas regarding the distributions of land and sea. We then arrive at the pith or kernel of the work, which consists of a detailed, but at the same time concise, description, treating of each country according to its ancient name in geographical sequence. In the study of comparative geography and the identification of ancient names, however, there is a large field for discussion, and we cannot help thinking that Herr Kiepert is a little too positive in some of his theories regarding such debatable ground as Ophir, Imaus, Tchina, &c. In several important particulars, too, we find him opposed to an acknowledged authority on the comparative geography of Asia—we mean Baron Von Richthofen. At the same time the greater part of the ancient geography of Asia and Africa, as here expounded, does not admit of dispute, and the masterly manner in which Herr Kiepert has worked it up has imparted a high value to the present work. We should much like to see it translated and adapted (by very slight condensation) as a manual of ancient geography for the use of our public schools and universities.

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#### INDIAN ARCHÆOLOGY.

Two Archæological works of importance are being brought out in England, under the auspices of the Indian Government. The first is a complete work by Mr. Jas. Fergusson and Professor Burgess on the Rock-cut temples of Western India, based upon the researches of the latter during the last three years in the Bombay Presidency. It will appear uniform with the "Tree and Serpent Worship" by Mr. Fergusson, and be profusely illustrated with photographs and lithographs. The second is a detailed description of the remarkable Stûpa of Bharhut, situated 120 miles south-west of Allahabad. The elaborate sculpture on this monument has been carefully photographed, and the details will be reproduced in the report. They afford a very complete illustration of Buddhist legends and history in the third century B.C., and are contemporaneous with Alexander the Great. The report and illustrations are by General Alexander Cunningham, R.E., C.S.I., Director-General of the Archæological Survey of India.

## Log Book.

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### Captain Markham in the Indian Territory.

—The territory reserved for the Red Indians, between Kansas and Texas, was visited by Captain A. H. Markham, R.N., during the late autumn of 1877. He was provided with escorts, horses, and provisions by the officers of the United States army, who were most hospitable. The country is a rolling prairie devoid of timber, except on the banks of rivers and creeks, and for miles and miles there is one vast expanse of long, low undulations, frequented by abundance of buffaloes, deer, and turkeys. The south-west portion of the Indian territory is in the gypsum region, and the eastern part is a well-wooded tract covered with luxuriant vegetation.

Captain Markham saw a good deal of the Indians, at one place visiting a large camp containing 8000 men just starting on their winter buffalo hunt. For more than twenty days he was never out of sight of buffalo, and must have seen from ten to twenty thousand a day, all travelling south into Texas. He and his American companions killed 62. His journey took him right through the heart of the Indian territory until he struck the railroad at Dodge city.

Except on the lines of railroad the positions on the official map of the Indian territory are only approximate, being placed by officers, frequently from jottings made during long and hurried marches whilst on scouting expeditions after hostile Indians.

### An Italian Officer in the Swedish Arctic Expedition.

—The Commendatore Cristoforo Negri, President of the Italian Geographical Society, has suggested that an Italian naval officer should accompany the Swedish Expedition which will attempt the North-East Passage next summer. The Swedes have cordially consented, and the matter is now arranged. The officer selected is Lieutenant Giacomo Bore, of the Italian Royal Navy, a young man aged 25, who has already seen service in India, Borneo, and Japan, and whose health and professional attainments fit him for the work. He is a good marine surveyor. Lieutenant Bore will proceed to Sweden, and place himself under the orders of Captain Palander, early in February, as it is desirable that he should take part in the fitting out of the expedition. We welcome the desire which is thus shown by the Italians to take a share in the glorious and useful work of Polar exploration.

**The Welle River.**—The Welle river, of Schweinfurth, and its probable course, form a question of much interest in African geography. Cameron and Stanley agree in connecting it with the Congo system. The former calls it Lue and the latter Auwimi, and in both maps the longitude of the point of confluence lies between 24° and 25° E. of Greenwich, but the latitude differs widely, as Stanley places it between 1° and 2° N. and Cameron between 3° and 4° S. latitude; as, however, the former alone visited the spot, his account must be accepted as the more correct.

The *Exploratore* points out that the Welle was visited in 1872 by Miani, the Italian traveller, in 26° 30' E. longitude, and between 3° and 4° N. lati-

tude, and that its course must consequently be very direct, and unlike most of the sinuous rivers of Africa, if it flows into the Congo-Lualaba at the point assigned to it by Stanley. The country lying between the Welle and the Congo, as far as we can learn from Schweinfurth, Miani, and the Arabs of Nyangwe, is not traversed by a range running east and west, but by a meridional range, called by Stanley the Chain of the Central Lakes, and shutting in Lake Albert on the west. In his journey from Munza to Bakangoi, Miani found that the general trend of the drainage was northward into the Welle, and being the season of the equatorial rains, which had already begun about the middle of April, the streams and marshes were so full as sensibly to hinder his progress. During his two months and a half sojourn at Bakangoi (from July 3rd to September 16th, 1872) Miani acquired some interesting geographical information from the Sultan and his subjects, and embodied them on a sketch map, which has been seen by the writer in the *Exploratore*. South and south-west of Bakangoi, there appears on this map two lakes in the place where, according to Stanley's account, the Congo cuts the Equator; the former Miani calls *Ghango*, the second he does not name, but states that the Zaire (Congo) and the Ogowai issue therefrom. Among Miani's notes, published\* in 1875 by the Italian Geographical Society under the title, "The Journey of Giovanni Miani to Monbuttu;" there are but few details relating to his sojourn at Bakangoi, but one is of importance. The Sultan of Bakangoi being pleased beyond measure at the present of a looking-glass, volunteered the following information to Miani regarding the countries to the south and west. He explained that beyond the Amakara tribe, which lies west of his kingdom, there are three rivers, one of which is very large, and called Birma-Makongo. Then comes the Babua tribe, and beyond them the Niam-Niam-Makaraka. Away to the south there is a large lake, on the banks of which dwells a tribe called Ghango. In another brief note, Miani speaks of the northern bank of the lake being situated about one degree north of the Equator, in the same place where the natives of Manyuema told Dr. Livingstone that a lake was to be found. These two lakes, north and south of the Equator, are manifestly the Congo, which, according to Stanley, here attains a breadth of 10 miles. But (the *Exploratore* points out) it does not follow from this that the Welle discharges itself into the Lualaba, as, if it did, it must have probably afforded an easy means of access to the Congo, and certainly have been known to the inhabitants of Bakangoi.

A recent letter from Dr. Schweinfurth to the journal mentioned shows that this high authority is by no means satisfied of the connection between the Ghango lake and Birma-Makongo river on the one hand, and the Welle on the other. Assuming that Stanley reached as far north as two degrees north of the Equator (the maps published in the *New York Herald* and *Daily Telegraph* differ upwards of a half a degree) there still remains enough room for another river rising in the mountains west of Lake Albert and running parallel to the Congo. Without such a stream,

\* Some notes of later date have been since discovered, and it is hoped that these may be published at an early date.

indeed, the volume of the Shari could not be accounted for, bearing in mind that the regions to the north are not so plentifully endowed with rainfall as those further south. Some have asserted that the Shari and Lake Chad are both of limited capacity, but this opinion Dr. Schweinfurth considers erroneous. All travellers who have seen the Shari, saw it during the dry season, but all noticed that the banks rose to a height of between 20 and 40 feet above the level of the stream, and they ascertained from native report that the river overflows its banks during the rains. Lake Chad, when full, has a superficial area equal to that of Belgium; it loses about  $2\frac{1}{2}$  centimetres a day by evaporation, and feeds numerous springs and wells to the north-east by the process of filtration.

Dr. Schweinfurth thus sums up his arguments against any probable connection between the Congo and the Welle. Firstly. The natives informed him that the river flows for a considerable distance W.N.W., and that the country it traverses is inhabited by people who wear white clothes and prostrate themselves on the ground when they wish to pray. These people Dr. Schweinfurth points out must be Mussulmen, who are not to be found along the Congo. Secondly. This western direction of the Welle is confirmed by Miani. Thirdly. Those who told Miani of the great rivers to the south would certainly have told him of their connection with the Welle if such had existed.

Dr. Petermann arrives at a different conclusion. In an article on Stanley's expedition (*Beilage der Allgemeinen Zeitungen*, 30th November) he maintains (1) that the Lualaba, the Bahr Kulla, the river of Kubanda, the Bahr Kuta, the Congo, and perhaps the Ayah are one and the same river; (2) that the Welle of Schweinfurth is a tributary of the Congo; (3) that the Arabs knew the Congo in its northern course, certainly as far back as the last century, and followed the same route as now in their quest after slaves and spices; and (4) that Tuckey's information respecting the Congo's course, as far as  $2^{\circ}$  N. latitude, is the only exact information which we possessed up to the time of Stanley's exploration.

In the meantime, Miani's unpublished notes will, when they see the light, contribute materially to solve a question whereon two geographers differ so widely.

**Lieutenant de Semellé's Expedition to Central Africa.**—Lieutenant de Semellé's approaching expedition up the Niger, and from thence to the Equatorial lakes of Africa, promises to fill up a most important gap in our geographical knowledge of the continent, *i.e.* the large blank between the confluence of the Benue and the Niger, in the west, and the great lakes, Albert and Victoria, in the east. In a communication to the Paris Geographical Society, M. Duveyrier remarks of this journey that, as far as the confluence of the Benue, the course of the Niger is well known; but beyond that point, where a Protestant mission was established in 1865, the journey will be one of exploration. Instead of ascending the Benue by boat, M. de Semellé will travel along the southern bank, and traverse the lands of the Akpoto Metshi (who are cannibals), Kororopha, and Kuana. The last known point is the confluence of the Faro and Benue, where the latter, flowing from the south-



east, attains a breadth of 850 yards, although 1100 kilometers distant from its embouchure in the Atlantic. South of Adamaua, about 7° S. latitude, the ass is the recognised beast of burden. The examination of the Benue from Yalo to its source will be a work of great interest, as beyond 8° N. lat. and ° E. long. the river is unknown. The western part of Adamaua is very mountainous; south of the same country is a high peak, which may not improbably be connected with those mountains described by the natives of Barth as lying south of Baya, and may thus be the commencement of a chain giving rise to the Benue. The circumstance that the Benue is at its lowest in March and April and arrives at its maximum in September, as well as the colour of the waters, favours the supposition that the river rises in mountainous regions. The Shari is known as a large river between its embouchure in Lake Chad and Massating, a town of Baghirmi, situated about 10° 30' N. latitude. To the south-east of this point geographical data are wanting, but there is good ground for supposing that the Shari is the lower course of the Welle, a river visited by Schweinfurth and Miani, and rising, probably, in the Malegga mountains. If these suppositions be correct, the entire distance of its course requiring examination would be 2300 kilometers from the Malegga mountains to Massating.

To achieve the most desirable results, it would *primâ facie* be best to journey from the source of the Benue back to the Tuburi swamps, from thence to make for Bugoman, on the Shari, and then to work up stream as far as the Malegga mountains. Should Lieutenant de Semellé's health hold out so as to enable him to reach Magungo, on the east of Lake Albert, he will be able to re-provision himself and party for the journey to Mombasa or Malinde, on the east coast. The entire distance of the route sketched out above would be about 6660 kilometers, and the cost is estimated at about 266,400 francs, basing it on the estimates obtained by the English Committee for the Exploration of Africa.

**Colonel Prejevalsky.**—Colonel Prejevalsky's projected exploration of Tibet has been delayed by a two months' illness, which overtook him on the road to Guchen, and continued during his sojourn there, so as to compel him to return to Zaissan for treatment. He anticipates, however, a speedy recovery, the illness not being serious; after which he proposes to return to Tibet, *viâ* Guchen and Hami, and thence to make for Lhasa, by way of Tsaidam and the sources of the Yang-tse. Count Szechenyi left Trieste on the 4th December, in company with Lieutenant G. Kreitner, topographer, and a geologist and a philologist, for the scene of Colonel Prejevalsky's previous explorations about the Koko-Nor country. The party will travel by way of Peking and Mongolia.

**Mr. Stanley.**—At the last meeting of the Royal Geographical Society, the President, Sir Rutherford Alcock, announced that Mr. Stanley had accepted an invitation to give the Society a narrative of his recent explorations and discoveries in Central Africa. The 7th instant was the day fixed, and the meeting would be held in St. James's Hall. The President also informed the meeting that the Society would entertain Mr. Stanley at dinner at Willis's Rooms on the following Saturday, the 9th instant.

VOL. V.

## Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

*Meeting of 14th January, 1878.*

Sir RUTHERFORD ALCOCK, presiding. Two papers were read at this meeting, the first, by Mr. Henry Seebohm

### “ON HIS RECENT JOURNEY TO THE RIVERS OB AND YENISEI.”

He commenced the reading of his paper with a brief allusion to the days of the discovery of Archangel, where, at that time, merchants from China and Mongolia brought their wares for sale. On the opening up of this port, Russian maritime enterprise failed, and was superseded by English commerce, and thenceforth the inhabitants of Archangel received their tea and silks *viâ* the Thames instead of the Ob and Yenisei; and Mr. Seebohm believed that for 250 years the commercial world had thought the Kara sea was impassable, and that the Kara Gates were closed by impenetrable bars of ice. Attempts had recently been made by Professor Nordenskiöld and Captain Wiggins to re-open this ancient route; and it was on the return of the latter gentleman last year from the River Kurayeeka, where he had left his crew to winter, that Mr. Seebohm had the pleasure of meeting him. Learning that Captain Wiggins intended joining his ship again in a few days, Mr. Seebohm determined to accompany him, in order that he might investigate the ornithology of the regions north-west of Siberia and the Yenisei. Accordingly they left London last March, travelling by rail, except the short distance across channel, as far as Nijni Novgorod, a distance of 2,500 miles. There a sledge was purchased, on which they journeyed some 3,200 miles, passing through valleys, and ascending hills covered with forests. At Yeniseisk the sledge was discarded for two lighter ones, and thence they came upon the Yenisei, which river is said by Russian geographers to be the largest in the world. Taking the Angara as the main stream above Yeniseisk, being much larger than that called the Yenisei, this river traverses about 2000 miles, with a width of about 1½ miles. From Yeniseisk down to Turukansk, following the winding of the river, is about 800 miles, where it gradually widens, until at the Kurayeeka it attains a width of a little over 3 miles. Another 800 miles and the delta of the Yenisei is reached, where the enormous mass of islands begin, and along the last 400 miles its average width is at least 20 miles: thus the river is 4000 miles long with a width of from 20 to 1½ miles. On this river, frozen over with ice, with banks 100 feet in height, and almost entirely covered with fine forests, they proceeded on their sledge journey. The whole district from Yeniseisk to the River Kurayeeka, Mr. Seebohm described as one enormous forest, principally larch, but largely mixed with Scotch fir, spruce-fir, birch, and a very handsome tree, which was called cedar, with wide spreading branches down to the root, and bearing a nut which is eaten as a great luxury.

The Kurayeeka was reached on the 23rd of April, and the ship was found frozen up. The crew were in excellent health, and had passed the winter very successfully, without the slightest trace of scurvy, Captain Wiggins having amply provided them with lime-juice and French dried vegetables, and instructed the mate that daily exercise should be taken. A little lower down the Yenisei, among the Briskofsky Islands, a Russian crew spent the same winter, and, with the exception of the mate, perished to a man with scurvy. No lime-juice nor dried vegetables had been provided, and the crew simply lounged and slept away the winter. This disease was found to be very common among the Russians, owing to their improvident and lazy habits, whilst

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the natives of this part of the country never have the slightest trace of it, doubtless due, Mr. Seebohm believes, to their living in tents, and moving about constantly on the chase. Whilst at the Kurayeeeka, Mr. Seebohm investigated the ornithology of the district, but with little success until the arrival of summer, when he added considerably to his list. A brief account of the several races inhabiting this part of the country was next given.

June came in with all the appearances of mid-winter, and they were beginning to make up their minds for a late season, when a small range of mountains was described upon the angle where the Yenisei and the Kurayeeeka join. These proved to be hills of ice, over 60 feet in height, piled in the most wonderfully picturesque confusion. A portion of the frozen river had broken, and part of the ice had got into the narrow channel, which was formed by the gradual rising of the water between the main body of ice and the shore. The other part had rushed headlong on the precipices at the confluence of the two rivers, and the result was that blocks of ice were piling themselves one upon another until a complete range was formed, as blue as cobalt, and in some places like shimmered glass. Mr. Seebohm described the grand break up as one of the most extraordinary scenes he had ever witnessed. The Yenisei was rising so rapidly that it was beginning to flow up all its tributaries, consequently when the ice began to move it came in the form of icebergs of five or six thicknesses, at the rate of from 4 to 6 miles an hour. Such enormous blocks were utterly irresistible, and they had to cut cable and run with the stream. Sometimes two large floes of ice would squeeze the vessel between them and literally lift her out of the water. Matters were becoming so serious that it was determined to abandon the ship, and all scrambled on to the banks of the river. At that moment a temporary change took place, the river sank 2 or 3 feet, enabling them to get the ship into a little creek, where she was soon run ashore and repaired. For a whole fortnight the mass of ice coming down the Yenisei was carried up and down the Kurayeeeka at the rate of 6 or 7 miles an hour. The Yenisei, 3 miles wide, rose 60 feet perpendicular in height. Ultimately the inner mass of ice, which had gone up the Kurayeeeka, spread out over the country and was lost in the forest. During this time the migratory birds were arriving in thousands, and Mr. Seebohm's time was wholly occupied in shooting them, noting their arrival, skinning, &c.

As soon as the ice dispersed the steamers from Yeniseisk, belonging to Russian merchants, came down with all kinds of merchandise, and proceeded as far as Golcheeka, a great fishing station at the mouth of the Yenisei. At Yeniseisk, Mr. Seebohm bought a small ship, 50 feet long, which he intended should be sent by steamer to Dudinka after being rigged by Captain Wiggins, but owing to the disaster to the Captain's own ship, this arrangement could not be carried out until the completion of repairs. Being unprovided with a pilot, Captain Wiggins was obliged to have recourse to the builder of Mr. Seebohm's ship, who was tolerably well acquainted with that part of the river, and they proceeded early in July down as far as Dudinka, but at about 200 miles from the Kurayeeeka they ran ashore, and the ship became a perfect wreck, and was ultimately sold. They then proceeded to Dudinka in Mr. Seebohm's small ship. Little or no forest was found at Dudinka—mere stunted trees, and after passing that place the "Tundra" was entered—a magnificent, wide, rolling prairie country, full of lakes and rivers, every little valley a complete garden of the most brilliant wild flowers, swarming with thousands of birds, the only drawback being the myriads of mosquitoes. Mr. Seebohm made some interesting ornithological discoveries at Golcheeka; and upon the Tundra, some 500 feet above the sea, he found large beds of sea shells, proving that the country was formerly at a very much

lower level. At Golcheeka the little ship was sold to a Russian captain, and after a few days' stay Mr. Seebohm left in the last steamer to return up the valley of the Yenisei homewards. As the result of his journey, he brought a large number of furs, 1050 skins of birds, and 500 birds' eggs.

In concluding his interesting paper, Mr. Seebohm said that he had no doubt whatever that at some future period, there would be an immense trade carried on with Siberia through the Kara sea; but it must be organised on some systematic plan. It would never do to attempt to ascend the Yenisei in the same steamer as that in which the sea passage was made. It was very easy to get up the river when the stream was running 3 or 4 miles an hour; and if you happened to get on a sand-bank, the stream would very soon get you off; but the difficulty was to come down again with a falling river driving you on sand-banks; and, as a matter of fact there were no steamers drawing more than 32 inches of water employed on the river by the Russians. The only way would be to have a *dépôt*, not at Golcheeka, but at a point somewhere in that neighbourhood, where there would always be cargoes of wheat, hemp, flax, furs, or whatever else may be shipped for England; so that a steamer arriving from England would have nothing to do but load immediately, and return. The little craft which was sold at Golcheeka crossed the Kara sea in safety, made the entire circuit of Norway and Sweden, and arrived at St. Petersburg, being the first vessel built on the Yenisei which had made the passage.

The second paper read was by Mr. F. B. FYNNEY.

ON THE GEOGRAPHICAL AND ECONOMIC FEATURES OF THE TRANSVAAL, THE NEW BRITISH DEPENDENCY IN SOUTH AFRICA.

Our new colony the Transvaal, he remarked, came into our possession on the 12th of April last, on which day the whole of the territory known as the South African Republic was formally taken over by the British Government. The territory thus acquired was as large as Great Britain and Ireland, with an area of 120,000 square miles, and an estimated population of about 200,000 souls,—40,000 whites and 250,000 natives,—but from actual observation Mr. Fynney was of opinion that 300,000 natives would be nearer the mark. The Transvaal lies between 22° and 28° S. lat., and 25° and 32° E. long. It is divided into three divisions, viz., the High, Middle, and Low Veldts. The High Veldt extends over an area of 35,000 square miles, most of which was grazing ground, having an elevation of from 3000 to 8000 feet, well watered, and a fine bracing climate. It was best adapted for the rearing of stock; and wheat, oats, and other products thrived well. Coal, iron, and other minerals were found there. The Middle Veldt contained about 25,000 square miles, and consists of the spurs and slopes of the different mountain ranges. Cattle and sheep do well, especially during the winter months, the grass here retaining its sweetness, when that on the higher land is dry. The Middle Veldt includes part of the rich district of Marico, and "the Garden of the Transvaal" or Rustenberg district. The Low Veldt was the largest of the three divisions, being upwards of 60,000 square miles in extent, with an elevation of from 2000 to 4000 feet, and lies principally in the northern parts of the Transvaal. Owing to its tropical situation and low elevation, it is much hotter than the other two divisions, still it was pleasant and healthy in the higher parts. It contained tracts of country suitable for plantation work, and was also known to be rich in mineral wealth. These three districts, or veldts, were divided into thirteen counties, each of which had its own characteristics and capabilities. After noticing briefly each of these counties, Mr. Fynney proceeded to say that the Transvaal was a country capable of great things, but for the last nineteen years had been kept back from development by the mistaken policy and



“inherent” weakness of the Government under which it existed. Our Government had received from the late Republic a heritage of financial, political, and social difficulties, the overcoming of which would be a matter of time. The annexation of this great and promising country would bring blessings to every inhabitant of the land. The natives residing within the borders of the Transvaal were chiefly of the different Makatus tribes, and were peaceably disposed, docile and fond of hunting. They showed great aptitude in adopting the dress and customs of the white man, and the abundant testimony of the missionaries stationed among them spoke for itself as to their desire to accept the Gospel.

In conclusion, Mr. Fynney drew attention to the effectual way in which this annexation drove the civilising wedge into the very heart of the barbarism of this hitherto savage continent, and the inestimable advantage it conferred of entering the great inland region of South Africa by the natural portal. It was the mere extension onward of the base of Cape Colony and Natal, and it not only cut the Kaffir barbarism of the east from the Bethuana of the west, but advanced by a magnificent stride far onward towards the great central lands, which had become regions of such promise and desire since the achievements of Livingstone, Cameron, and Stanley. The extreme northern point of the Transvaal was within 300 miles of the Victoria Falls of the Zambesi, and from above these falls the great water-way of this river stretched on towards the north-west in unimpeded flow, until its sources interlaced with the head waters of the Congo, and actually crossed the central plateau, where the Portuguese traders from the west met the Arab traders from the east. It required no great geographical insight to see that this was in reality the route by which commerce and civilisation would find their way into the strongholds of African barbarism.

Mr. ANTHONY TROLLOPE followed with a few remarks, observing that the city of Melbourne, which was founded less than half a century since, now contained 275,000 Englishmen, or English speaking people, whereas all this country of South Africa, of which the Transvaal was but a small portion, did not contain half that number of English descent. It was, however, a country in which they had been enabled to place themselves without crushing the ancient inhabitants. That was not the case in North America, in New Zealand, or in Australia; but in South Africa the natives had increased in number under our rule, and had been saved from the cruel government of their chiefs; and this was true even of Zululand, as well as of the Transvaal and the districts where the disturbances had recently prevailed. This only he would add, that he did not think they could make of the Transvaal a British colony in the sense in which that word was ordinarily understood. It could not, he thought, become a colony to which the British labourer could proceed with a hope of earning 40 shillings or 45 shillings a week.

The President, in conclusion, observed that, in his opinion, so vast and fertile was the colony of South Africa, the British labourer could find ample and profitable employment in farming. With all due deference to Mr. Trollope, he had not the slightest doubt that, with such advantages as British rule would give it, it would become a large and important British colony. With reference to Mr. Seebohm's paper, he remarked that the Germans and Russians, as well as the English, believed that an important commerce might be opened up from the Kara sea, along the Ob and Yenisei, not only for supplying the Siberians with goods, but for obtaining from them grain, hemp, and various other articles which abundantly grew there. He agreed with Mr. Seebohm that the only way in which a large trade could be carried on was by the people of Siberia sending their produce to a port on the sea coast, where vessels coming from Europe might disembark their cargoes, and at once reload.

#### FRENCH GEOGRAPHICAL SOCIETY.

*December 5th, 1877.*—M. LEVASSEUR presiding. Colonel CHAMPANHET, of the Lyons Society, communicated a report on the proposed railway from Algiers by way of Timbuktoo to the Niger river. M. de LAURENS presented a translation of the Russian naturalist's (Fedtchenko) manuscript work, “In Khokand,” which the president regretted was beyond the scope of the *Bulletin*. M. DE QUATREFAGES reminded the meeting that formerly the Society used to publish narratives of ancient and modern voyages, many of which might with advantage be taken up. M. DESGODINS sent some topographical notes on Bathang and its adjacent territories. M. DUVEYRIER, the Secretary, read a translation of a Portuguese article on the Cunene, the river forming the southern boundary of the Portuguese possessions of the Congo. M. E. SAYONS gave an account of the expedition of Gonzalez de Clavijo to the Court of Tamerlane (1403-1406.)

#### *Second General Meeting, 19th December, 1877.*

Commander MOUCHEZ, Vice-President, presiding in the absence of Admiral La Roncière Le Noury. M. LEVASSEUR referred to the recent purchase of land for building purposes by the Society, and the election of ninety-six new members during the year under review. Dr. CREVAUX telegraphed from Lisbon to the effect that he had succeeded in travelling right through Guiana, and had reached the Atlantic by way of the Amazons.

M. MAUNOIR, the General Secretary, read his interesting Annual Review of the Doings of the Society, and the Progress of Geographical Events during 1877. Professor C. WIENER gave an account of his explorations in Peru and Bolivia, and his ascent of the Peak of Paris. During this journey he traversed about 15,000 kilometers, either on horse, mule-back, on foot, or by boat. Professor Wiener crossed the western chain of the Cordilleras five times at considerable altitudes, and ascended to the summit of Illimani, a height of 6131 mètres.\* M. Wiener's collections were mainly archæological, and of great interest. They will be accorded space in the Ethnological Museum recently founded by M. de Wasseville in the Palais d'Industrie.

Dr. HARMAND gave a narration of his travels in Annam. He ascended the Me-kong or Cambodia river as far as La Khon (17° 23' N. lat.). After incredible difficulty and opposition on the part of the mandarins, he succeeded in getting bearers as far as the Pu Thays, a people tributary to the Annamite Empire, and on the 18th July reached the first Annamite station, whence he made his way through a closely inhabited country to Hue, the capital.

#### PARIS SOCIETY OF COMMERCIAL GEOGRAPHY.

*Emigration and Colonizing Section. Meeting of 17th December, 1877.*—Count FOUCHER DE CAREIL presiding. A letter from the Abbé Robert was read, in which he combated the theory that an inferior race must always disappear before a superior one, and pointed to the case of the Spanish colonists, who have freely commingled with the aborigines. The President and M. Bionne expressed a different opinion, and observed that where the superior race kept aloof and refrained from intermarrying they always preserved their pristine

\* The *Exploration* claims for its countrymen the honour of having by this feat attained the highest point ever reached on foot; but this is an error. In our number for January 1877, p. 13, it will be seen that in 1874 surveying work was done by a party of the Indian Trigonometrical Survey at a height of 21,000 feet, and a maximum height of 22,040 actually attained on one occasion.

energy. After some remarks on the apparently injurious effect produced by clothing on those unused to it, the President remarked that the Chinese seem to belong to a grade of humanity sufficiently high to be able to resist successfully the weakening effect of contact with a higher race.

Mr. JOHN LELONG read a paper on the colonization of Algiers.

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#### LYONS GEOGRAPHICAL SOCIETY.

*Monthly Meeting of the 6th December, 1877.*—Canon CHRISTOPHE, General Secretary of the Society, read a paper on his researches in connection with the geography of Ammianus Marcellinus; on the geography of ancient Gaul in the fourth century, viz., its administrative divisions from the time of Augustus until its division into seventeen provinces, the difference between the northern and southern metropolises, the moral and physical characteristics of the Gauls, and topographical notes on Cæsar's campaigns.

A paper on New Caledonia was then read. France has been in possession of this colony for four-and-twenty years, and during that time the Europeans have had to contend with an uncultivated soil and a cannibal race. The healthiness of the climate and the fertility of the soil, however, have afforded especial facilities to the colonists, although the growth of the sugar-cane has been greatly impeded by plagues of grasshoppers. The island is estimated to afford means of sustenance for two million inhabitants, though its present population amounts to only 40,000. The paper then touched upon the different localities of importance. Numea, the chief town, is one of the finest harbours in the world. Its water is supplied by a large aqueduct, and trade is thriving. There are coal, gold, cobalt, zinc, silver, copper, and other mines which have been discovered of late years in the island.

The President referred, in conclusion, to the discovery of implements in the island dating from the stone age.

*16th December, 1877.*—Dr. BETHENOD read a paper on the State of Iowa, based on information acquired during a ten years' sojourn there. He recalled the names of the early settlers there—Ferdinand de Soto, La Salle, the French Canadian missionaries under the Franciscan monk La Caron, and the Jesuits who followed them. He traced the subsequent history, and dwelt on the great advantages which the State offers to colonists, although it has certain drawbacks in the shape of frequent conflagrations, wild beasts, venomous reptiles, grasshoppers and locusts, &c. Dr. Béthenod promised to read a future paper on the subject of the Rocky Mountains.

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#### IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

*December 17th, 1877.*—M. SCHWANENBERG gave a detailed account of his journey from the Yenisei to St. Petersburg in a small sailing vessel, the 'Zaria.' The entire distance amounted to 11,000 versts, and took one hundred days to accomplish, four weeks being devoted to navigating the frozen sea of Kara and the Arctic ocean. A series of meteorological observations had been taken at an extreme point of Northern Siberia, and White Island in the sea of Kara had been explored. M. Staritsky reviewed the early voyages of Lieutenants Murof and Pavlof from Archangel to the Ob in 1734, of Ortsyn from the Ob to the Yenisei in the same year, of Chelanrof, a merchant of Archangel, and of others. In 1860, M. Sidorof, a merchant and a warm upholder of the project for opening up a commercial route in this direction, commenced a series of vigorous efforts directed towards this end, and Professor Nordenskiöld and Captain Wiggins followed in the same path.

An account was given of the recent journey of M. Mushketof, a mining engineer, known for his researches in the Tian Shan mountains, who during last summer had visited some unexplored parts of the Pamir plateau and adjacent regions, and had corrected the conclusions of Colonel Gordon, Dr. Stoliczka and others. Announcement was made of the approaching departure of an expedition, consisting of M. de Middendorf, (Agriculturist) and M. Smirnof (Conservator of the Botanical Museum of the Kazan University), which is to devote itself towards studying the agricultural and economic resources of Turkestan.

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#### IMPERIAL GEOGRAPHICAL SOCIETY OF VIENNA.

*October 23rd, 1877.*—Dr. VON HOCHSTETTER presiding. A communication was read from the General Secretary of the Executive Committee of the International Association for the Exploration of Africa, dated from Brussels, and giving particulars regarding the departure of the expedition to Zanzibar.

FREIHERR F. V. HOFFMANN gave an account of Stanley's recent explorations in Central Africa, and Dr. J. E. POLAK read a paper on the best appliances and managements for travelling in hot climates, after which the Society's Librarian, Dr. A. KARPF gave a brief notice of the chief works presented to the Society.

*November 27th, 1877.*—Dr. VON HOCHSTETTER presiding. The resignation of Freiherr von Glanz-Aicha, former Secretary of the Society, and appointment of Dr. Carl Jettal, as new Secretary, was announced. The death of Dr. Erwin von Bary was communicated (the intelligence having been received through the Italian Consul at Tripoli). Dr. OSCAR LENZ read a paper on the dwarf people of Central Africa.

*Annual Meeting of 18th December, 1877.*

Dr. VON HOCHSTETTER presiding. The President congratulated the Society on its twenty-first annual meeting, and delivered his Annual Address.

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#### AMSTERDAM GEOGRAPHICAL SOCIETY.

*Nineteenth General Meeting of 22nd December, 1877.* Professor P. J. VETH presiding. The President expressed his profound regret on the subject of the death of M. Schouw-Santvoort, the head of the scientific expedition to Sumatra, which had commenced to explore Upper Dyambi, by traversing the island from west to east, from Padang to Palembang. The expedition had made a discovery of importance regarding the possibility of transporting the coal from mines in the interior.

M. B. NACHENIUS JZ then gave an account of his journey along the coasts of the Red Sea, and in the interior of Abyssinia, Nubia and Egypt. M. H. Groneman expounded his theory of the Aurora Borealis, and Madame Storm Van-der-Chys gave an interesting description of her visit to Poland.

## NOTICE.

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THE  
GEOGRAPHICAL MAGAZINE.

MARCH, 1878.

MR. STANLEY.

MR. STANLEY'S achievements in Africa have been so great, his services to geographical science are of such extraordinary value, that the occurrence of anything which would appear to detract from his merits as an explorer is much to be regretted. Our readers have been able to follow Mr. Stanley in his wonderful journeys by means of our periodical notices. In our number for December 1875 (p. 369) we gave an account of his proceedings from Mpwapwa to the Victoria Nyanza, and of his circumnavigation of that great lake, the paper being illustrated by a map. In our number for September 1876 (p. 245) we gave some further details of Mr. Stanley's discoveries in the lake region, including the untoward event at Bambireh, and this article was also illustrated by a map of the two lakes Albert and Victoria Nyanza. Mr. Stanley's account of the Lukuga outlet of Lake Tanganyika will be found at p. 106 of our number for April 1877, and we reproduced Mr. Stanley's maps of the Lukuga, and of the Alexandra Nile in our number for May 1877. The first news of the discovery of the course of the Congo was reprinted in our number for October 1877 (p. 275), which was followed by a fuller account, with a map, at page 318 of our number for December 1877.

A strong feeling of disapproval of Mr. Stanley's proceedings at Bambireh was expressed on the publication of his letters in the *Daily Telegraph* in August 1876. We certainly shared in this unfavourable impression; and in our article of September 1876, we characterized the second attack at Bambireh, judging from the account given in the *Daily Telegraph*, as an "act of barbarity," and as a "piratical proceeding," which, "so far as appears from his letter, is without any justification."

The letter in question, which was written hastily and in the midst of toilsome and exciting work, does not describe all the circumstances which led to the attack, and judging from it alone, we did an injustice to Mr. Stanley which we hasten to acknowledge. At the same time the words of the letter certainly justified the unfavourable impression it conveyed to several unprejudiced minds. Colonel Yule has publicly expressed his opinion on this subject; and all who know that illustrious geographer know also that his bias would naturally be in favour of the absent, and that nothing but a strong sense of duty would have induced him to utter a disapproving word against any man. But the additional circumstances, which

have become known since Mr. Stanley's return, place the incident at Bambireh in a different light.

Mr. Stanley was placed in command of an expedition, which was equipped with a view to the use of force in carrying out its objects, if force should become necessary. It may be a question whether private individuals have the right to despatch such expeditions, but this question concerns the employers, not the employed, and no enterprising young explorer would refuse such an appointment if it was offered to him. Mr. Stanley certainly cannot be blamed for undertaking what any other man who was worth anything would have jumped at, if he had had the good fortune to be offered a similar chance. Mr. Stanley, then, must not be blamed for using force. All that could be expected from him was that he should refrain from using force except under circumstances of absolute necessity, and of this he alone could be the judge. In his hastily-written letter, published in August, 1876, no such necessity appeared, and hence the disapproval we then felt and expressed. But we now find that Mr. Stanley considered that there was a real necessity for the second attack at Bambireh. The natives of that island had, after the first attack, massacred six of the Uganda men who had come as Stanley's allies, and according to his information they intended to attack his crowded and heavily-laden canoes on their voyage. These are reasons, of the strength of which the man on the spot, surrounded by perils on all sides, and responsible for the lives of many followers, must be acknowledged to be the sole competent judge. We gladly accept them as sufficient.

Mr. Stanley has not only established for himself a great and enduring name as a discoverer. He will also be remembered as one who conciliated the natives when he believed conciliation to be possible, and who stood by his own servants and followers like a true and faithful friend. The way in which he stuck to his Zanzibar men, and remained with them until they were safely landed in their own homes on the other side of Africa is a noble trait, and one which furnishes strong presumptive evidence that the force he used on occasions was an unavoidable necessity.

It must be a source of great pleasure to all lovers of noble deeds—and there are none nobler than those achieved by geographical explorers—to know that the discoverer of the course of the Congo forms no exception to the rule that brave and intrepid men are ever reluctant to substitute force for conciliation, and always prefer working rather by kindness and generosity than by a resort to their superior power.

## THE CLIMATE AND SOIL OF SICILY.

NOT very long ago, it was a generally received opinion that the south of Europe consisted of old, worn-out, exhausted countries, unfit for civilisation, and where improvement was hopeless. All travellers from the north of Europe were unanimous in their accounts; for in the south they found no green fields, good roads, or hotels, but, in their stead, heat, dust, insects, beggars, and many other disagreeable drawbacks to the pleasures of travelling. In short, everything was different from what they had left at home, and of course worse. It was so pleasant, from the proud height of their civilisation, to look down on the decay of others. Soil and climate, and, above all, history, had created the state of things found in the countries in question; and, in truth, to one furnished with some slight historical knowledge, it was astonishing to find man and soil in such high culture. But few found the time for reflections of this kind, and allowed their judgment to be overruled by the first superficial impressions. I have met hundreds of travellers, during long travels in Southern Europe, and, with few exceptions, all were governed by prejudice in their opinion of these countries. It is only quite of late years that competent men have protested against these opinions. Above all should be mentioned the well-known naturalists, Franz Unger and Victor Hehn,\* with whose opinions I agree in every respect; and I am only now completing their inquiries by my own observations and studies, made especially in Sicily.

We will commence by forming, as far as is possible, an idea of the culture of Sicily, founded on historical information. There is no doubt but that Sicily was once covered with forests, like the greater part of Southern Europe, although there are no original documents to prove this. Italy, as Hehn has proved, was in the Greek epoch a country which, compared with Greece, partook of the characteristics of the north, and exported only corn, timber, and cattle. In the time of the Peloponnesian war, and even in that of Theophrastus, it passed for a wooded country; and this will not astonish any one who knows the south of Italy well, for even at this day it may be called a wooded country. The ridge of the Apennines, from Naples to the Straits of Messina, is covered with forests, descending in some places to the sea-shore. The Sila, which supplied the gigantic mast of the famous galley of Hiero, are to this day, like Aspromonte, opposite Messina, covered with forests, bearing in many places the characteristics of virgin forests, in which are found gigantic specimens of the *Pinus laricio*. But they will not long survive, in spite of their best defenders—the want of high mountains and roads; for the Italian Parliament is about to take them under its protection, and doubtless before many years have passed, they will have disappeared. With the Greek colonies, and with the extension of the Roman Empire eastward, forests were replaced by fruit trees, though it is improbable that the plantations of fruit trees were more extended than they are at present. The borders of

\* F. Unger, *Wissenschaftliche Ergebnisse einer Reise in den Griechenland und in Ionischen Inseln*. Wien, 1862. V. Hehn, *Kultur-pflanzen und Hausthiere in ihrem Ubergange aus Asien nach Griechenland*. Berlin, 1877.

the sea, the plains, the valleys of the rivers, and the lower slope of the mountains were covered with them, in the same manner as to-day the plants peculiar to the Mediterranean vegetation spread themselves. This is, I think, the meaning of Varro (i., 2, 6), when he says—“*Non arboribus causita Italia est, ut tota pomarium videatur.*”

In many of Horace's occasional remarks about cultivation we recognise the Italy of to-day: he often mentions the oak woods, game and hunting, and the elm tree supporting the vine as it does at the present time. But we can find no such mention of Sicily in old days, for if one is allowed to go back as far as the Homeric songs it is spoken of as a land famous for breeding cattle; while in historical times it was noted for its agriculture. The Carthaginians doubtless introduced slave labour, and the same system prevailed among the Romans, and the Greeks, especially the Syracusans. Sicily was the granary of Rome, and is so called by the elder Cato (according to Cicero, in Verrem ii., 5). Nobody knew this country better than Cicero, who governed it as quæstor, and afterwards travelled through it, collecting evidence against Verres. From his orations against Verres we learn the importance of the Sicilian agriculture, and also which were the districts most under cultivation, viz., those west of Etna, along the northern shore, the plain of Catania (the so-called Leontinian fields), and generally speaking the whole island, if one is allowed to judge by the names of towns inhabited by agricultural populations. By the fact that nearly all the land belonged to the towns, the Roman Republic, or to a few rich Sicilians or Roman knights, it is probable the farming system at that time was fully developed. The proprietors lived far from their estates, which were cultivated by the so-called free population and numerous slaves. Though large tracts of country were given up to breeding cattle, Cicero repeatedly says that the prosperity of the island is due to agriculture. The revenue was most favourable, the Leontinian fields yielding tenfold; now they reckon the revenue at elevenfold, but the leases are so unfavourable, that to gain their living the tenants must make fifteenfold.\* The Sicilian historian Palmieri† has calculated the produce of wheat in the time of Verres, at 2,753,659 hectoliters, two-thirds of that of to-day, and he thinks that at that time the whole island did not produce as much as the Syracusan territory in the days of Gelo. It is very rarely that any culture but that of cereals is mentioned in ancient days. We only know that Aragontines cultivated the olive largely, and that the vineyards of Messina, Taormina, and Morgantia were celebrated (Athenæus xii., 159); that in the time of Agathokles, the country round Palermo was called a garden, being full of fruit trees. There were famous gardens near Syracuse in Hiero's days; but the cultivation of fruit trees had no economic importance, nor did it in any way affect the character of the landscape. In the Greek epoch, the only woods mentioned are those round Etna, where Hiero got the timber for his great ship (Athenæus v., 206). Moreover Diodorus (iv., 84) gives a description of the Heræan Mountains (the Madonie): “In Sicily are

\* Caruso *Studi sulla industria dei cereali in Sicilia e la popolazione che la esercitano*. Palermo, 1870.

† *Somma della Storia di Sicilia*, i., cp. 14.

the Heræan Mountains so called by amenity. There are other peculiarities, as if created for a summer residence." It is said that there are many springs of excellent water, mountains covered with various trees, oaks of great size, and fruits double the size of those growing in other places; and that a Carthaginian army starving with hunger, was sustained by the fruits found in these mountains, and this fruit could not have been chestnuts, for at that epoch these trees were not found in Sicily; but very probably it was the fruit of the oak, which in ancient times was much used as an article of food. To this day, the Madonie are very rich in oaks, wild apples, and pears.

We hear, too, of the blooming meadows near Enna from which Proserpine was carried off; and of the plains covered with palmitos, near Cape Passaro, and of the enormous flocks that the Roman nobles pastured in Sicily. Horace praises the Sicilian cows. Turning to Theocritus,\* who wrote in Sicily, or at least treats of scenes in his native land, we learn that in his time the so-called Maquis existed, which is a form of vegetation peculiar to the shores of the Mediterranean. Thorny brooms and rhamnus grow on the mountains instead of trees, the wood-cutters cut heath (*Erica arborea*), rhus cotinus, hawthorn, juniper, scilla maritima, cytissus (which is eaten by goats), pistacia lentiscus, arbutus unedo, and wild roses. These are the shrubs that grow in the pasture grounds of the goats, and are comprised in the Maquis, and the picture we so form to ourselves of the past, is not very different from that of to-day. Though less favourable now, there are wheat fields, cattle, and fruit trees, cultivated on a small scale, instead of vast flocks of goats, the Maquis extending everywhere, while the mountains are, as then, covered with woods. The Punic wars caused great ravages and much diminished the population. The civil wars still further diminished it, and in the times of Diodorus a great part of the island was a desert. Strabo only enumerates sixteen towns, four of which were in the interior, and the others all in ruins; the country was a waste, and in the hands of herdsmen. In the beginning of the second century things improved a little, and Pliny mentions sixty-nine towns. The days of Christianity brought no change: great estates existed, but instead of belonging to Roman knights, were made the property of the church. Small tenants, who no doubt had always existed, took the place of the slaves in cultivating the land, wheat continued to be the only export, and breeding cattle caused great tracts of land to be left without culture. Under the rule of the Arabs better times dawned, and in spite of continued wars, Sicily enjoyed a flourishing time, reminding us of the Greek epoch.

The Arabic and Berberic colonists, who had immigrated in great numbers, and occupied the western coast of the island, divided the great estates into small ones, and gardens and the culture of fruit trees soon became very important. The Arabs introduced here, as everywhere, the plants of their country, and their mode of culture; and if we had no information on this point, we should learn it from the words and expressions made use of in the popular dialect in the cultivation of gardens, fields, and fruit trees,† in

Western Sicily, being all of Arabic origin. Had not the island been divided into small estates, it could never have supported the large population of those days, which Amari believes was as great as at the present day, only differently distributed. According to documents and contemporary notes, there were 1000 inhabited places, amongst them 900 smaller ones, double the number of to-day, the average number of the inhabitants of Sicily being now nearly 5000. For instance, in Corleone, a province of Palermo, in 1182, one square kilometre contained fifty towns or villages, while at present there are but twelve; which shows that in those days cultivation was carried to a much higher pitch than now. The principal produce was always wheat, the rich crops of which nearly covered the island. The cultivation of vines and olives had quite fallen away, and oil was imported from Africa; but in their place were grown sugar canes, cotton, silk, agrumi (oranges and lemons) in great abundance. The old writers praise the charming gardens, in which, at all seasons, fruit is found. Edrisi, in his description of Sicily (in 1154), mentions gardens and abundance of fruit in connection with thirty towns. Hugo Fellando, half a century later, in talking of the country round Palermo, mentions pomegranates, figs, locusts, almonds, walnuts, and cucumbers. Chestnuts and walnuts were exported to Africa. Abu-Hali-Hasan, in the eleventh century, talks of the woods on Etna rich with chestnuts, pines, cedars, and hazel-nuts. Woods are also mentioned near Messina, near Prizzi and Bivona. On Monte Lauro there were forests of conifers, and Monte Pellegrino, near Palermo, was covered with trees as late as the fifteenth century. In the times of the Normans, excellent sport amongst the forests and mountains is spoken of. In general, the opinion formed of this island in those days was a favourable one.

But these happy days did not last, and the present unhappy social state of things found its origin in the feudal system introduced by the Normans; but a great change took place under the Aragonese and Spaniards, the feudal seed bore fruit, and brought about the dominion of the nobility and feudal anarchy. Nearly half the Sicilian towns were founded by nobles from the sixteenth to the eighteenth century, and they induced, by all possible means, people to settle in them. In this way they acquired small dominions, and new and higher titles to give fresh splendour to the already-decaying power of the Spaniards. In order to render them inoffensive, these nobles were tempted to the court of the viceroys by high titles and frivolous pleasures and festivals. And in those days was developed the present condition of agriculture, which is unavoidable. Men have to walk for three or four hours to reach the place of their labour, and in these conditions brigandage finds its explanation and existence.

And so things continued until about 100 years ago, when, for the first time, it became possible that a peasant should own land of his own. From that time there was improvement. The increasing facility of communication, the sale and division of the Church estates, have given rise to uninterrupted progress during the last years. We must understand that the greater or less prosperity of the island did not depend on its soil or climate, but on its inhabi-

\* *Ibys*, iv., 56, 57; v., 64, 104, 128, 131; vii., 133; ix., 9; xi., 45; xxvii., 45. *Epiq.*, i., 6.

† *Rivista di Filologia e Istruzione classica*, ii., p. 575, 1874.

tants. If the population in the time of the Peloponnesian war was, according to Belach (Belah?), 3,600,000 (but according to an estimation of my own, not more than 3 millions); in the days of the Arabians, 2½ millions; and under the Aragonese, according to Vanneschi, only one million; under the Spaniards, in the middle of the sixteenth century, only 800,000; in the middle of the seventeenth century, again one million; in 1770, 1,294,215; in 1814, 1,800,000; in 1815, 1,648,955; in 1861, 2,392,414; and at present, 2,700,000 inhabitants. *Nature has undergone no change, but man has.* The causes of the fluctuation in the numbers of the population must be sought for in the history of the many wars that devastated the country and in the rule of the Spaniards, which was even worse than that of the Bourbons. The Spaniards nearly succeeded in laying tracts of the island desert, as in their own country (which they call *despoblados*). Where their foot trod and where their institutions took root, life, material and intellectual, began to dry up, and this with great rapidity in Sicily, where war was uninterrupted, while her coasts were ravaged by barbarians, even to the beginning of this century, burning, wasting, and destroying all traffic. Even the activity of Charles V., who at any rate defended the coast, could not check this decay. After his death the mischievous feudal system developed more and more. In the East, Turks and Mongols carried out the work of devastation so thoroughly that to this day the country resembles a dead body; and the same may be said of Sicily. The Turks and Mongols were replaced by barbarians, by Spanish despotism and Spanish religious fanaticism. The first act of the Spaniards was, as in Spain, the expulsion of the Jews, who formed a numerous and industrious portion of the population. As in Spain, the country was covered with the seats of noblemen and rich convents; and as in Spain, the numbers of monks and priests increased at an enormous rate, and the souls and bodies of their bondmen were given over to them. So, perhaps, after all, it is a cause of wonder and of credit to the Sicilians that they and their country are in the high state of cultivation they now are.

Thus, as we have seen, the population of Sicily at its most flourishing times was not higher, or very slightly so, than at present. The yield of wheat was probably never greater than now, in spite of the population being occasionally distributed more favourably. The same wheat-fields produce as much to-day as 2000 years ago; and, doubtless, with smaller estates and better cultivation the produce might be doubled or trebled. Fruit trees were never so extensively planted as now, when Sicily yearly exports fruits worth 125 millions of lire—never were plants so precious for commerce grown as at present. It is according to history and civilisation that population increases or diminishes.

The supposed exhaustion of the soil (*Marasmus senilis*) cannot be attributed to the conduct of men. It is possible that one day in the plains of Germany and America (United States), now famed for their fertility, it will be necessary to employ combinations of kali and natron, phosphor and silicans, so necessary to the growth of plants, because there is no volcanic force to bring forth from the mountains their mineral treasures. It is quite possible that in these countries exhaustion will take place after a long series

of years of agriculture, and the destruction of forests whose roots penetrate into the soil, bringing up their treasures and spreading them over the surface of the earth. But this is not the case in Southern Europe; there, plains are few and not extensive, and wherever they occur irrigation is possible; the soil is formed of limestone, and they are surrounded by mountains of limestone formation, that with their numerous fissures, form a kind of sponge, from the heart of which flow springs rich with mineral substances, which is a blessing that cannot be sufficiently prized in a country swept for four or five months every year by the trade winds. Sicily belongs to the secondary and tertiary formation, and is rich in organic remains. It has springs, and a sufficient rainfall equal, in the average to that of North Germany. Only one-third of the water yielded by springs is used in agriculture. The elder Saussure was right in refuting the supposed idea, that the plains of Northern Italy were decreasing in fertility, and this idea is equally untrue of Sicily. Nowhere in the Mediterranean are climate and soil more favourable, and there are no contrasts as in Spain, where one step from the watered and rich huerta of Valencia lands you in an arid desert. Cultivation in Sicily does not depend wholly on irrigation, there are gradual transitions; and it is only in the height of summer that some of the wheat-producing country of the interior presents a dried-up appearance.

The planting fruit trees on ground where for thousands of years nothing but wheat was grown, which must cause a greater fertility, trees not only needing other substance than cereals, but penetrating with their roots down into virginal soil. Even where crop after crop of wheat has been grown, the exhaustion of the soil is prevented by the violence of the winter rains, which from the hills wash down earth and rocks, and so supply mineral substance. The saying of Charles Fraas, "that advancing civilisation of nations leaves behind it a desert, and so digs its own grave," can be applied less to Sicily than to other countries.

We have already answered the question, "has vegetation changed during historical times?" that the vegetation of Sicily, like that of the Mediterranean countries generally, has been changed by the introduction of new plants—more especially in the evergreen zone—and though this is not the production of cultivation, nevertheless, has been caused by it. Can we imagine Palermo, the famous Conca d'oro, without forests of agrumi; without hedges and fields of opuntias and agaves; without locust trees clothing the rocky sides of mountains; without olive trees and vineyards; without plantations of sumach; without date palms, cypresses, and pines; without almond and plane trees, all of which have been introduced in historical, and some in quite recent times? It is hardly necessary to enumerate fully other and less conspicuous plants, some of which have been introduced accidentally. I will only mention the oxalis cornua, so common in Sicily and Southern Spain, and mesembryanthemum acinacifolium, from the Cape of Good Hope, but there can be no doubt that many of the plants of Sicily have been introduced with the sugar cane of the Arabs, with the cotton, olive, sumach trees, &c.

Finally, has the climate of Sicily undergone changes; has its annual rainfall diminished; or is it hotter than



it once was? To these questions we must reply in the affirmative, but with great restrictions. No doubt that the climate of a country can be affected by cultivation, the destruction of forests, drying up of marshes, &c. It can become warmer, and the rainfall become more irregular, as has been proved in many instances. Clearing away forests in entire provinces must exert a mischievous influence. But instead of inquiring further into this vexed question, I will refer the reader to that well-known Scotch meteorologist, David Milne Home, who has devoted especial attention to it. He has collected many instances of springs drying up in consequence of the felling of forests, and of their re-appearance where the forests have been allowed to grow up again. This has happened at St. Helena, where, at the present day, the rainfall is double what it was in the time of Napoleon's captivity, and this has also been observed in many parts of Germany.

In general the climate of Sicily has undergone no changes, for it has been under more powerful influences than that of men. Three thousand years ago, when, in all probability, the island was covered with dense forests, the same trade-wind blew in summer, and the same equatorial current in winter, and in consequence there was a dry and a rainy season; but they were not so distinct, and the dry season was shorter. The woods which covered the island necessarily preserved great humidity, and forced the damp equatorial current to give rain later in the spring and earlier in the autumn, and perhaps occasionally during the summer, as the improperly-called trade-wind of the Mediterranean does not prevail absolutely. Directly the forests were destroyed, the rays of the sun fell on the unsheltered earth; and this formed a warm current of air, which could not condense the clouds and form rain, unless under some very favourable circumstance, such as meeting with a cold current. In this way the climate has been changed by the progressive destruction of forests, and by the loosening of the soil by culture, which renders it more accessible to warmth. Even now, the wooded tracts of Sicily have more rain than those that are treeless.

Two writers tell us that, in days not so long past, more rain fell in Sicily, and her rivers were full of water. Edrisi says that the river of Lentini, the ancient Terias, now San Leonardo, was navigable for ships of burthen, as well as the river of Ragusa, the Erminio, and the river of Mazzara. Ibn-Haukal, who was born on the banks of the mighty Tigris, and who lived at Palermo from 972-973, A.D., speaks of the small Oreto, near Palermo, as a great river. One can easily believe that the Oreto was a great river down to the twelfth century, when the famous Admiral's Bridge was built, with its twelve beautiful arches; for no one in his senses would build such a bridge for the Oreto of to-day, which, even after the heaviest winter rains, does not fill one arch, and none of the rivers mentioned are now navigable. Castragiovanni, the ancient Enna, contained in the Arabian epoch, within her walls rich springs, arable lands and gardens. Now the springs are very poor and dried up in summer, and the gardens have nearly disappeared. Thus there can be no doubt, but that the country has become somewhat drier than it was in the times of the Arabs; but, in still more ancient days, that there was scarcity of water is found by the

aqueducts and cisterns belonging to ruined Greek and Sicilian towns, such as Grammichele, Mineo, Scordia, Lentini, Syracuse. Other wells were also mentioned in ancient days, and some exist to this day, and the Conca d'oro of Palermo, is still one of the best-watered countries of Southern Europe. No doubt the climate of Sicily has modified, it has become less dry, but there is no real change in the climate. It is the same with Greece, which, however, has been less favoured by nature than Sicily. Franz Unger proves that it was far more arid in ancient days, and that the actual state of things is to be explained by its history, not by a change in climate.

All who have travelled in Greece, and who have been close observers of the state of this country and its inhabitants at the close of the War of Independence, will share my opinion that this country is not only capable of being reclaimed, but is actually reclaiming itself; certainly not to the same degree as Sicily, but she had never sunk so low, and always belonged to a civilised nation, and was nearer Europe. As in Sicily, since 1860, cultivation extended everywhere, so in Greece it is spreading over great tracts of country, which for thousands of years had been the pasture-ground for countless flocks. Morally, socially, and economically, great progress is visible throughout Greece. But that at the same time that there should be no political improvement shows how unmixed is the descent from the ancient Greeks; and certainly her bad condition in other respects is not so much the fault of her own people as of those who suddenly conferred freedom on a nation torn by wars and brigandage, and incapable of self-government. Sicily would have found a time of transition from Bourbon despotism to a free constitution of immense service.

THEOBALD FISCHER.

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## MEMOIRS OF HANS HENDRIK

(*The Arctic Traveller*).

### III.

#### MY THIRD JOURNEY TO THE NORTH.

[*With the 'Polaris.'*]

WHILE I was at Kangersuatsiak, a post arrived from Upernivik informing me that Americans had reached there, and bringing two letters for me—one from the merchant, the other from Kekertarsuatsiak [Fiskernæs]. I found the letter from Upernivik to contain in substance:—The American Arctic travellers wanted to have me in their service; a boat was coming to fetch us, my wife and children being invited to go with me. They had also taken on board with them a native from the Westland [coast opposite to Greenland], with his wife and foster-daughter, and the American, Mister Morta, a friend of mine, whom I knew from my first voyage, when he was steward, and I also had him for my companion on my sledge-run to the far north. When I opened the other letter, it was from Kekertarsuatsiak, written by my brother, and informed me:—Since Simeon had perished in kayak they were alone, and their condition very sad indeed, and last year another person had perished in kayak; but, thank God! all

of us have a future haven, howsoever we fare by land or by sea, and our days are numbered. When I opened the third letter, I noticed it was not written to me, it being written in Danish. I merely had a look at the writing, and directly folded the paper again.

While I was reading over my letters, I heard shouts of "A boat!" and that it was white, and of a foreign appearance. Already knowing the Americans were coming, I went up the hill, and on the way met with the Assistant Trader. When I had informed him that the Americans were at hand to fetch me, he said: "Thou wilt not be allowed to join them, as thou art in debt." I answered that I was ignorant of my debt, and added: "By mistake I have broken the sealing-wax of the third letter; I did not understand it, as it was in Danish; I will deliver it to thee." When I had gone to fetch it, and given it to him, he grew very angry, saying: "Why hast thou torn off the seal?" I answered: "In ignorance I did so;" whereupon he ordered the Guardian to be called. The Guardian asked: "What does he mean?" I answered: "As I did not know a letter addressed to him, I broke it open, believing it was intended for me." He communicated this to the Assistant, who then grew silent.

The boat having landed, the Assistant Trader said: "The merchant wants thee to join them." A little while after the ship's Mate, Mister Tarsta, said: "What pay dost thou want per month?" I answered: "Ten dollars [Danish?]. He: "It is too little, is it not?" I said: "Twenty-five." He again: "It is too little." At last, as I did not demand any more, he asked: "Will fifty be sufficient?" I replied: "Yes, that will do." He added: "Art thou willing to perform sailor's work on board or not?" I agreed so to do, with the exception of going aloft. When I had spoken thus, he was satisfied, and said that we were to start the next day.

In the evening, Mister Tarsta remarked: "I will sleep in your tent." When we lay down to sleep, Mister Tarsta did the same, and the next morning my wife, having boiled coffee and cooked meat, regaled him with a cup of coffee, but with no meat, thinking he did not like it, although this was quite a mistake [?]. In the morning we departed. It was very sad when our friends came down to the beach to bid us farewell, as some of them were as dear to me as kinsfolk. It was then beautiful weather, and we sailed briskly along, with a fresh easterly breeze, I taking care of the sheet.

When we approached Upernivik, and came aboard the ship, my late companion, Mister Morta, rejoiced at seeing me again. The Master of the ship, Ull [Hall], was very kind and friendly, as were the natives from the Westland, John and his wife. We stayed one day, and, proceeding northward, touched at Tasiusak, whence in three days we came to where lived the natives.

The next day, when we made for their northernmost settlement, Eta, but still pretty far from it, I said to my comrade, the Westlander: "Yonder I lost my companion." He answered me: "Don't say so;" whereupon I grew silent. When our Master had gone away, I asked him: "Why didst thou forbid my speaking?" He answered: "The officers do not like to hear it, as they believe thou caused his death."

I replied: "That never struck me when I spoke to thee; is it possible that any baptised man should be able to think of such a thing?" My comrade did not utter a word more.

Proceeding, and passing the northernmost station, Anoritouk, we steered for the Westland. On the way my wife fell ill from stitch, and grew still worse. At last John's wife said: "I think she ought to be cupped [?]; I should like to try it. It is a very dangerous case; I have seen many such; some got worse, some improved." I agreed, and she went to fetch her blood-letting instrument, and put it on her back, saying: "Now she will grow very hot, and when she feels difficulty in breathing, use this fan;" whereupon she sat down at her side. As she had said, the heat came on, and she felt half-choked, but fanning brought her breathing all right again.

In this state my wife became delirious, and said: "Itakavsak will come over us" [?]. She now grew very talkative, and continued: "Now listen to something. I remember that last summer a *Kivigtok* came up to me, while thou [Hans] wast on the journey to Upernivik with blubber. In the evening I went to fetch water. When I came to the large stone, a man approached, he who had disappeared last year; ye remember, he went out shooting, and did not return. When he drew near he said: 'I come to thee as thou art a stranger [belonging to the far-off Northlanders?]. Last year I ran away because I was in love with Nepisak's daughter, but they [her relatives] would not have it, when I was joking with her. She also was rather fond of me, and as they forbade me marrying her, I went away. I was also tired of needlework, my sister and mother being unwilling to sew my clothes; for this reason I fled from men. Last spring I met with my father in Satut, and also his brother, and last autumn I came upon the dogs of the Assistant at Itivdinguak. When I was going to slip off, I practised it thus: I drove to the coast opposite to us, and coming to a small opening, I deposited my gun and my mittens on the ice, and pushed my sledge, which was loaded with two seals, into the water. Then I went ashore, and observed my two younger brothers running up. As soon as they came to the sledge they began lamenting [believing I had perished], and turned back; but after a little while a swarm of people hastened up, and, having reached the sledge, began searching in the water, although I was standing upon the hill and looking down upon them. When they started to go home, and my brothers and relatives cried out for me, I joined in their wailing. At the same time I heard some of them say: "It sounds as if somebody was crying up yonder." When I perceived this I stopped my crying.' The *Kivigtok*, after having finished this, grew silent. I went off to make it known; but I don't know how it was, when I met another person who fetched water, I had forgotten what I had to say."

My wife continued her tale thus: "Also once afterwards, while Hans was gone to Upernivik, and I slept with my children in the tent, a heavy shower pouring down, I heard a voice outside of some one wanting to come in. But among our dogs sitting on their haunches in the entrance there was one of brownish colour [?], and this was the reason why he could not enter." [She added that] When she had



taken a book, and placed it in the inner part of the tent, he finally went away [?].

What here my wife related was certainly true. On the day when that man disappeared, in the evening there was made inquiry for him, and people said that he had not returned. His two younger brothers had found the sledge floating in the water, and his mittens and gun placed on the ice. But they searched in vain for the owner. I believe also I can remember that when we started to go home from that spot, we heard a wailing; and when we came home, it was mentioned also by others that they had heard a sound as if somebody was crying on the hills. This is the end of my report on my wife's vision.

While we went on far towards the north along the Westland, we also arrived off the furthest point reached by Mister Morta and me on our sledge-journey. When my comrade questioned me about it, I remarked: "There we got two bears." That country was named Kip An Tusen. The great Master of the ship, Ull, during that time was very praiseworthy; he scarcely allowed himself any sleep. We proceeded still farther towards the north, between our country and the Westland, meeting with pack ice of an amazing height. At length we were wholly stopped; the ice closed us up and drove us back, I don't know how many miles. At last we began discharging the cargo on the ice, fearing we should be wrecked. But the next day we took it in again, as the ice spread away. We made for our country [the Greenland coast], and when Captain Ull first went ashore in a boat, they shouted "*Hurra!*" at having reached our wintering harbour.

Here we saw many wild geese upon the land, and the next day I went ashore with one man more, each getting four of them. There were lots of them, but they were very shy. One day, when we took a walk over the hills, we discovered footprints of musk-oxen not quite recent. On coming on board we reported this to our commander, who grew very glad to hear there were oxen in this place.

On September the 8th four of us, namely, the Doctor, Mister Tarsta, John, and I, set off sledging in search of oxen. We travelled the whole day, and took a rest after a journey of 8 [English?] miles, without having seen any live thing. The next day, I, with Mister Tarsta and John, went out on foot, leaving the dogs; only the Doctor remained, to look for some fine stones. We searched the whole day, but only discovered footmarks of oxen, not quite fresh. On our return I said to the others: "I will go this way," and parted from them. When I came to the tent, the others had arrived, also without having found anything. The next day we went in another direction, walking across the eastern hills, behind which we found an inlet covered with ice for a long way, the road to it leading over an extensive plain. We returned to our tent in the evening. Again off in the morning in another direction. We soon returned. While, towards evening, we were busy collecting stones to secure the tent, my comrade came up, whispering: "Look there up the hill; may that be a fox?" I turned round to look, and saw a big beast, whose legs were hardly visible on account of its hairy coat. To people who have not seen such before, it looks rather terrible. When it had stared at us for a while, it drew nearer. The dogs began yelling, and tore

asunder their harness, but on coming up it attacked them, raising a cloud of dust about itself. As we could not get quite near, I fired at a distance, as did my comrade, but still it continued to pursue the dogs. We discharged our pieces I don't know how many times before it fell. We had it dragged to the tent by the dogs, cut it up, and set to cooking. The flesh was similar to that of reindeer; the nape of the neck was very big. Next day, back to the ship, and our arrival gave the Master much pleasure.

Afterwards we used to go shooting. My comrade, the Westlander, and I sometimes caught seals; in this way we roamed about together. In October our Captain made up his mind to sledge, and we set off in one overland. We found the snow very deep, and stopped after 4 miles, made a snow-hut, and lay down to sleep. When we awoke, the Master asked me to return to the ship, and fetch one sledge more. So I set off, and after having stayed a short while on board, as they invited me to eat, I returned with two sledges and more dogs. After our arrival we proceeded again, my comrade with the Commander, and I with Mister Tarsta. We halted, and made a snow-hut, continued two days more, came to the sea, and took rest on the shore ice. Here the Master said: "To-morrow ye may go shooting, while Mister 'Tarsta and I push on afoot."

We started for the open water. I shot a seal which emerged through the new ice, and towards evening my comrade fired after another in the same way, but missed. When it appeared again I hit it, but the current drifted it to sea. Towards evening we returned, and later on our officers joined us. They reported that they had found a large hole in the glacier [?] . . . and made steps in the ice with a knife . . . lest they should slip down [?] When they heard of the seals I had lost, they were vexed, as they had taken a great liking to seal-flesh while staying for several years in the Westland. The Captain said: "To-morrow we will return to the ship."

We went to sleep, but kept quiet next morning, on account of a gale from the south. The day after we set off, reached our snow-hut, and slept there. After having travelled one day more, we again reposed. When we started thence, we at length got sight of our craft. We stopped for a moment to take our meal, agreeably excited by this view, whereupon all of us, shouting, hastened on board.

After our arrival, in the beginning of the evening my comrade entered our room, saying: "Our Father is sick." I asked: "Is he very ill?" "Yes; he is very sick." I rejoined: "But to-day he did not appear ill." Next morning, on meeting my comrade, I asked: "How is our Commander?" He answered: "Just the same." We went out shooting; each of us killed a seal, but my comrade did not get hold of his. For some days we roamed over the hills, but without seeing anything, except at times some tracks of hares. We also tried shooting at the water's edge, and sometimes saw seals, but found them too wild. Several days later our Captain grew better. My wife and children stayed every day in their room, according to his wish; but on returning in the evening, I used to go visiting. The Master, who was now quickly recovering, once said, that as now he felt well he should like to go out the next day. But when we

had gone to sleep, we were wakened by my comrade, who entered, saying: "Our parent is very sick." I replied: "Why, he was lately quite well!" When, thereafter, I went to see him, he was weak, and kept feeling the left side of his chest. My comrade accosted him, but got no answer. On seeing that he could not live, we said to each other: "When he is no more, how shall we fare, for he is our only protector?" When again we had gone to sleep, after midnight, he who kept watch knocked at the door, opened it, and said: "The Master is dead." When he had spoken thus, I said to my wife: "He says our Commander is dead; how will it go with us hereafter, as he was the only one who took care of us? What mournful news, that he who loved us so kindly lives no longer!"

Later on, we put our Master into his grave. When the days shortened, the ice broke up, and drifted us with it, our ship dragging its anchor in a heavy gale. My comrade and I both advised the Master who now had the command to drop the second anchor. When he had ordered the sailors to drop it, the vessel stopped. But then again we drifted towards a large iceberg [?]. He ordered the sailors to ascend the berg [?], and fasten a warp. As none of them was willing, my comrade and I mounted the berg. It blew dreadfully, and on stepping down we found our faces frostbitten. The vessel was now fastened to the berg.

This was the first danger we incurred after the death of the Captain, who was so watchful and careful of us. While he lived we caught seals, I don't know how many, and geese, and I got one Ugsuk [a very large seal] and one musk-ox. When we were frozen up close to the iceberg, he collected the crew, and exhorted them not to be anxious, as they had two native providers, if we should be wrecked there. When the ice had formed, but before it had any thickness, my comrade said to the Master [?] that the iceberg would capsize. He did not mind, saying there was no fear. But when the ice grew thicker, our craft began to incline at low water, and to right itself at high water. At length she began to draw water, and it looked as if the iceberg would break and swallow her.

At the end of the dark season, when daylight began, we went out shooting. We also saw some seals, but they were too shy. Although at neap tides thin ice was forming, we, nevertheless, had open water during the whole of the winter, sometimes distant 3 miles from us. When it became light, it was about as far off. During the darkness the open water was close to the ship; when daylight appeared it withdrew.

When we had got out of the dark season, we used to walk up the hills, but there was no trace of oxen. We only got some hares, I have forgotten how many.

Once, when the sun had re-appeared, I heard that I was to be punished in man-of-war fashion. The sailors informed me: "To-morrow, at nine, thou wilt be tied and brought down to the smithy. Mister Tarsta will come to fetch thee after nine o'clock. Take breakfast without fear; if thou art afraid, thou wilt be treated ill." When I heard this, I pitied my wife and my little children. The next morning, when we rose, towards breakfast time, my wife, our daughter, and I fell a-weeping. Our little son asked: "Why do ye cry?" From pity we were unable to give an answer. However, they brought us our breakfast,

and, though without appetite, we had just begun eating, when we heard a-knocking at the door. It was opened, and Mister Tarsta, with a smiling look, made his appearance, and accosted us: "Godmorgen, are ye eating?"—whereupon, still smiling, he petted our children and left us, and a heavy stone was removed from my heart. I also thanked God, who had shown mercy to a poor little creature. However, since the Captain's death, Mister Morta, and Mister Tarsta, and Mister Blaine, and the Clergyman, and some of the sailors were pretty kind towards me.

When it was daylight, and my comrade and I went out shooting, I said to him: "Why have they this horrible custom?" [corporal punishment]. My comrade answered: "Thine and my custom is to be ashamed of [the white men despise us?]. I cannot speak about it." When he had said this, I was long silent; then I rejoined: "Although in some measure I have an idea of that custom, I am nevertheless unable to understand it quite [?]. Twice [I have seen it?], first in *Tartikene* [with Doctor Kane?], the second time in *Tart Eise*" [with Doctor Hayes?]. Whereupon he put in: "Yes, on board the man-of-war ships they are unable to abandon that custom. I should like to revenge [?] a relative of mine, a Westlander, who was treated in the same way. And likewise I saw a Tuluk, a very handsome youth indeed [exposed to it?]. But we poor natives must be very careful with regard to ourselves." When he had ended, I added: "Now first I begin to understand that detestable custom. While I was young, I would not believe it; I did not think it was said in earnest, and, moreover, did not understand English sufficiently. When I return, I believe I will not go with the Americans more. But should the English want to engage me, I will go with them. People say they are better." In this way we gossiped on what we had observed during our journeys.

After the sun had returned, I got one seal by *Maupok*-catch [watching the breathing-holes]. My comrade got none. He and the Doctor and the Clergyman made an excursion by sledge; but three days after they came back without the Doctor, to repair the sledge, which had been damaged. They also wanted me to join them with one sledge more. The morning after their arrival we set off, my comrade intending to drive with the Doctor, whom we reached in the evening, lodged in his snow-hut. When we had slept, we started, advanced the whole day, and stopped in the evening facing an open water. In the morning my comrade and I went shooting from the edge of the ice. I killed two seals, but only got hold of one, the other being carried off by the current. My comrade shot one, but lost it in the same way. When we came back it became pretty hot in our snow-hut. We set to cooking meat, and furnished our camp amply with blubber; it was in the native fashion, with a long wick. Next day, walked to the south over the shore-ice [ice-foot]. The Doctor said they intended to go to the southern cape, and asked when I thought we could be back again. I said: "To-morrow;" but he objected: "We want to be back to-night."

We started, and wandered the whole day, and not before midnight had we reached our goal. Here we rested for awhile, started again, and then came back quite exhausted. It was also a thirsty trip; not

before our return could we get anything to eat or drink, and we had to lie on the snow. The Doctor and the Clergyman began sleeping. I was nearly doing the same, but, fearing the cold might be dangerous, I wakened them after a short slumber. Oh, how cheerful it was when we gained our sledges, and could sit down upon them! We met with John, who had waited for us, and, when he had slept, had gone to look for us and bring us refreshments. He said: "I was very anxious about you; I thought a bear had devoured you, or ye had fallen into the sea; my fears were many. I think now ye are nearly starving; here I have brought bread and *Panike* [?], but no cooking-pot." When we had rested and eaten, we went on again; where there was no shore-ice we were obliged to carry the sledge. On the other side [?] we came to my comrade's dogs, and thence to our snow-hut.

When we had slept here, the Doctor and John set out in a sledge for the interior of the firch, while the Clergyman and I remained. For some hours I went shooting on the edge of the open water, but without success, as no seals were to be seen. When I came back, the Doctor and John were still missing. It grew evening, and not before late did they return, having killed a bear—a small female one. They brought it entire upon the sledge, and then first it was cut up.

The following day we remained to let our dogs rest. But then we started on our return. We travelled the whole day, and a part of the night too, and arrived on board the ship the next morning at eight o'clock.

While the sea in front of us was covered with ice, we used to walk over it, and watched two breathing holes, but could not get at the seals. At last we began talking about going to look for musk-oxen. In the beginning of May we set out by sledge, John and I alone. We travelled the whole day, following the valleys between the mountains, but without discovering a living creature; we only perceived some tracks of hares. In the evening we stopped, and made a snow-hut, and had a lamp after native fashion, with blubber and a cooking pot. We had a supply of dog's food and *Panikes* [?], containing fruits and sugar. Our eight dogs, as well as ourselves, were well provided for.

Here we stayed two days. We roamed about and searched in vain for oxen. On the third day we descended from the hills, and removed to a firch called Ingeverman Bay, on the border of which we built our snow-hut on the shore-ice. Next day, off sledging into the firch. When we came to an iceberg we brought up; and while my comrade examined the land through a spyglass, I remained on the sledge. But when he exclaimed: "Ah! just look in the glass, I see a small musk-ox moving over the snow." I went to look, and observed something like a big stone moving. We searched for more, and discovered nine others, in the same direction. Hastened in pursuit; but they were very far off, on the top of the hills. Over the ice we drove pretty quickly, our hounds beginning to grow excited. When we reached the land, my comrade took the lead, to hinder the dogs from making any noise. It was a long time before we came up to them. Then we loosened our team. When the beasts observed them they collected in a circle, with their horns pointing outward. My

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comrade said to me: "Their way is, that when they show fight to the dogs they retire, but then suddenly advance, and then again go back, sharpening their horns by rubbing them against the ground." When he had spoken thus, we fired, and some of them fell. But, lo! a large bull drew back, and then suddenly rushed forward in pursuit of the hounds. It was awful to see the snow rising about him, like a cloud. Again he retired, facing the dogs.

We continued shooting until we had finished them all off, and had got nine oxen in one day. When we began skinning them, my comrade said: "When thou observest an oxen quite free from blood, fill it up with snow; we shall then get water for drinking, we are much in need of water." As soon as I saw one of them with no blood inside, I filled it with snow, and after a little it had thawed, and we were provided with drinking water. When we had carried all our game down the hills, we went to our snow-hut, and had a good meal of beef. The following morning we fetched more of the flesh, but leaving a part of it. Again we went for more, until we had collected the whole in our snow-hut. Thereupon we took one day's rest, and then we repaired to the ship. We travelled the whole day, and arrived the next morning.

On board they had been very anxious, and thought we were lost. Consequently, when, on approaching, we shouted that we had got nine musk-oxen, they were delighted. After three days' stay we went off in two sledges, I with Mister Tarsta, and my comrade with Mister Maje. In one day we reached the snow-hut, and discovered on our arrival one musk-ox more. We went to sleep, and next morning walked up the hills, I with Mister Tarsta and John with Mister Maje. We proceeded towards the spot where the day before we had observed the beast. On approaching and spying after it, we got sight of one ox, and, looking farther, I discovered eight more of the same kind. I proceeded on foot towards the first, telling my companion, whom I left behind, that when I made a sign with my hand he might approach. When I came close to the beast I waved my hand, whereupon he drove towards me in the sledge. As he disappeared behind a hill, I grew impatient, and went to look after him. I had left my gun upon the sledge. When he came up I said: "I will fetch my gun." When I had brought it and came to him, he had already hit the game several times, but not before I joined him did we succeed in killing it. After having taken out its entrails, we went in pursuit of the other eight.

We found them browsing separately, but on seeing the dogs they crowded together, forming a ring. We began firing at them, and succeeded in killing them all. While we skinned them my companion broke silence: "Now I will go cook beef and boil coffee, while thou continuest skinning. When I have finished I will assist thee." When the meal was prepared, and we had eaten our meat, we finished skinning and cutting up, loaded our sledge, and returned before our companions had arrived. After awhile they appeared. When we had slept, we set off in both sledges to fetch our store of flesh. We ended our job, bringing it down altogether. Next morning we returned to the ship.

Although we had our large supply of flesh to bring home, my comrade and I remained on board for

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several days to rest. Then we went off again, I, as usual, with Mister Tarsta, and my comrade with Mister Maje. When we had gone half-way we stopped and put up our tent, and thence reached our late encampment, with the stores, by the following day. After a day's rest we started on a trip to the end of this firth, to explore its interior. We found the firth headed by a glacier, and its interior also covered with perpetual ice, on which rested an immense number of stones. We made a sketch of the interior, and turned seawards again. On the road we raised our tent on the ice, and at last reached our late encampment. Next morning we crossed to the opposite shore of the firth, and ascended a hill, where Mister Maje at noon observed the sun, and reported that we were . . . higher [latitude?] than the ship. When we started from this spot we travelled a long way, turned back in the afternoon, and built a snow-hut in the evening. Again advancing, we descended to the ice, and fell in with the traces of two oxen. Following these, we found a cow with her calf, and killed both. At length we came back to our camping-place, and thence to the ship.

After a stay of two days we went off again, I as before with Mister Tarsta and my comrade with one of the sailors. When we had stopped in the evening and began cooking, my comrade went up the hills and discovered two oxen. We hunted them on our sledges and killed them. After one day's stay we returned to the vessel.

Again, after several days, we got help to bring home the flesh. On reaching our encampment we obtained two oxen more. We returned on board, and, later, we two alone went out in one sledge, but got no more venison. Coming back we learned the sailors had been more fortunate, they had carried a tent with them, and brought in two oxen. After this our excursions ceased as the land grew too moist. In June, however, my comrade and I got some Utoks [seals upon the ice].

About this time there began to be a chance of boats passing northwards, although the heavy pack which incessantly came drifting from that quarter rendered it very difficult. However, two boats and provisions were transported over the ice a distance of 3 miles. My comrade asked whether we were to join the party, but the Master replied: "No, better be near the vessel; we must keep you as our purveyors." The skiffs then started, but during the following night one of them returned. The officer in charge, Mister Tarsta, reported that they were wrecked. The ice had crushed the other boat, he said. Some of the luggage was lost, but the crew were all saved. Now they had come to get a skinboat and provisions. When the ice opened they departed, but in the beginning of July one of the men arrived with the message that 25 miles off they had been unable to proceed any farther. They were closed up and cut off from the vessel.

Early in August we left the harbour with our ship, and tried to reach them, but were stopped by ice. We fired the ship's gun to warn them, but they could not hear it, whereupon we turned back. In the evening a heavy gale sprang up from the north. I went to sleep early in the morning, but was awakened at eight o'clock, and ordered to bring a letter to them and recall them. First they pulled me ashore in a

place where I could not land, on account of the shore-ice offering no footing. Then they brought me to an ice-bare beach, but here I had to ascend a high rock; I was obliged to climb a precipice, which appeared quite inaccessible. Imagine my joy when I had reached the top! I set forward, travelling the whole day, and when at length I sighted the ice, and discovered two men at the edge of the water, to be sure I felt easy. I proceeded towards them, although with difficulty, from the ice being inundated. When I came to them, and inquired about the others, I was informed they were half-a-mile off. There were Mister Tarsta and the Doctor, and, as I had letters to the Doctor, I repaired thither. When I had found them, I said that the other day we had started in the ship, but had been obliged to turn back, and then had tried to warn them by firing a gun, and that now we were waiting for them to set out on our home voyage. Mister Tarsta rejoined: "The ice has been quite impassable." When I had slept there, I started in the evening with the Doctor; we went the whole night, and reached the vessel the following day at noon.

In August all the others likewise returned, while the ship was still retarded by the ice. Every day I went up the hills to watch the state of the ice, as the Master had ordered me to give warning when it was going to spread. On the 11th of August, in the night, my dear wife was delivered. What a happy result! After a little while she was restored, and, both being well, I went up the hill to watch the ice.

I found it had begun to clear off. Speedily went down and reported to the Master: "The ice has spread; we ought to be off to-day." On hearing this he directly went ashore, and after a little while returned, whereupon he made ready to start. It was afternoon on the 12th of August when we set out. But after two days we stuck in the pack, and were brought down with it towards the south. While thus we were blocked, my comrade and I caught seals every day, and then began collecting a store of unskinned seals. At the same time while the ship rested immovable, they put up a tent on the ice, and filled it with bread. When we were off Kap Allikisat, a gale sprang up from the south. It was a pitch dark night, when the ice began moving northward, and the floes were jammed and pushed over each other. At last our ship began to crack terribly from their pressure. I thought she would be crushed.

On perceiving this we brought our wives and children down upon the ice, and hurried to fetch all our little luggage, and remove the whole to a short distance from the ship. Then the ice broke up close to the vessel, and her cables broke; but in the awful darkness we could only just hear the voices on board, and when the craft was going adrift we believed she was on the point of sinking. Here we were left, ten men, our wives and children, and the Tuluks, making nineteen in all, and having two boats, no boat remaining with the ship. When the others drifted from us we thought they had gone to the bottom, while we ourselves were in the most miserable state of sadness and tears.

But especially I pitied my poor little wife and her children in the terrible snow-storm. I began thinking: "Have I searched for [?] this myself, by travelling to the north? But no! we have a merciful

Providence to watch over us." At length our children fell asleep, while we covered them with ox-hides in the frightful snow-drift. At dawn our Commander Tarsta said he would make for the land with the men, as soon as their meal was done. When they had cooked and got their breakfasts they set off towards an island called Pikiulek, but before they could reach the shore they were stopped by new ice.

About this time we sighted the ship, which was approaching us, to our great joy. They steamed on, and I believed they would have observed us, but suddenly they turned, a heavy squall from the north coming on at the same time.

When our Tuluk companions were going to make for the land, they asked us to follow them, but my comrade and I preferred to stay behind, knowing that they could not get to shore. The cook also kept us company, saying that he found it pitiful to abandon us. Those who had tried to land returned after a while, not having succeeded. The north wind blew furiously, and the heavy seas threw us towards the Westland. Suddenly the ice on which we dwelled parted, and we were separated from the tent which contained our store of bread. When the ice touched the Westland it stopped, and packed together all around us. Here we made a snow hut. My comrade went out sledging, and how lucky!—he caught sight of the tent. Directly we started, dragging a boat to fetch some bread. At the tent we filled the boat with bread, and drew it over the ice to our camping place. When we left our wives and children I was afraid a bear would devour them, now I was consoled to see them unhurt, and after our arrival we had a good meal. Since we left the ship this was the first time we ate sufficiently.

The following day we deliberated whether we should remove to the floe where stood the tent, as it was very large and might serve us for an island during the winter. We resolved to proceed and first brought thither one of the boats, loaded with bread and luggage, whereupon we filled the other in the same way. My wife and daughter loaded the sledge with our little properties and pulled it, my wife carrying the baby in her hood. Our son was seven years of age, our youngest daughter four, and these poor things walked over the rough ice, my wife and daughter pulling the sledge, and I assisting those who dragged the boat—a sad sight. When they were going to be left behind, I told my wife I should return to her. When we had brought the boat to our new camping-place, I went back, followed by one of the sailors, and, finding my little daughter Sophie Elisabeth very tired, we placed her on the sledge, and more men came to help us. When we had finished our removal, we turned the boat over, I and my family going to sleep under it, while the Tuluks were lodged in the tent, and the Westlanders made a snow-hut for themselves.

The next day we built a snow-hut in the middle of the ice-floe. Fancy! this was to be our settlement for the whole winter. One day we rested; then my comrade and I went out sledging towards the land. On approaching it we fell in with new ice; I remained to look for breathing-holes, while my comrade proceeded towards the shore. I found some holes, and heard the sound of breathing; but as the ice was covered with snow, I could not get at the seals [which

were scared by the noise]. My comrade had been on shore, and told me he had seen footprints of hares and foxes.

When we returned, we made up our minds to remove to the land the following day. We also drove in another direction, but without discovering anything. Next morning we tried to go shorewards, but our island, the ice-floe, began moving. It drifted seawards, consequently we turned back, and now we continued to be carried off incessantly in a southern direction throughout the winter. After some time we caught sight of land, but by-and-by lost it again. Every day my dear comrade, the Westlander John, and I went out hunting. In this way once he succeeded in getting a seal. What a joy, when we had a meal of flesh, and our lamps became supplied with blubber! Afterwards I again got a seal, a small one; I killed it at one shot. Wonderful indeed, we were so blessed with seals for our support, and that we so continued the whole winter.

Once, when we were out shooting, I fell through, having both legs under water. My comrade asked: "Art thou wet?" I answered: "No, I did not get wet." When we had tried shooting we returned, but quite near to our encampment a strong northern gale suddenly overtook us, and made both of us lose our way. The snow drifted terribly. As I was tired with walking, I stopped. Looking up towards the sky, I perceived many stars. Thereupon I proceeded, but came to a broad crack, and on going back, I fell in with the open sea. Now I thought my last day was come. I considered the miserable position of my dear wife and children, on a piece of ice in mid-ocean. Then I pronounced my prayer:—

"Jesu, lead me by the hand,  
While I am here below;  
Forsake me not.  
If Thou dost not abide with me, I shall fall;  
But near to Thee I am safe."

When I had finished these words I ascended a heap of ice-blocks, and discovered a star rising a little above the surface of the ice. But it was my comrade, who had lighted a torch, and pointed it all round from the highest part of the uneven ice. I went down in the direction of what I saw; but on my road I again fell in with a fissure, turned, and went on, but again discovered something like a light. I moved forward, examining it, but was again stopped by the break. While here, some people were heard approaching, and when they came close they shouted: "Art thou Hans?" I answered: "Yes." Whereupon they said: "We had nearly fired at thee, believing it was a bear." I answered: "Never more I had reason to be thankful to anybody than to you, as I was quite unable to make out whither I had to go." When we came home I found my wife and children had been most sorrowful, but I thanked the merciful Providence on high.

While we drifted in this way throughout the winter, my comrade and I frequently got a seal. Our lamps were never out for want of oil. When sometimes our supply was almost consumed, one of us used to catch. Just before Christmas, each of us took a seal. How delightful, that our lamps were well supplied for Christmas! During Yule we finished all the provisions we had, except the bread; but we were consoled by knowing that daylight was near.

When the sun reappeared, we fell in with a great many black guillemots. Of course we also availed ourselves of them, as we were well off for guns—I had four myself, namely, three rifles and one double-barrelled fowling-piece. And we had plenty of shot. These articles I and my comrade John had taken care to provide ourselves with when we left the ship. At first we only threw them down upon ice, then we brought them some distance from the ship. We could, therefore, afford to shoot guillemots.

Although the sun again shone, no land could be seen, and it was truly appalling to think that our Tuluk companions and our wives and children would probably starve. However, we were taken care of by Providence, and the whole winter were supplied with seals. While still we lived on our island of ice, we fell in with bladder-nose and saddle-back seals, and they gave us a good supply of food.

As we advanced far south, we had a heavy swell, and, in a pitch dark night, the floe, our refuge, split in two. At length the whole of it was broken up all around our snow-huts. When we rose in the morning, and I went outside, the sea had gone down, and the ice upon which stood our house had dwindled down to a little round piece. Wonderful! There must be an All-merciful Father.

Some days after, when we had gone to sleep, we heard a gun fired. I went out and saw that a bear had been hit and had fallen. My comrade exclaimed: "We have got a big bear; how cheerful, we shall now have bear's-flesh!"

When we came still farther south the ice appeared more dispersed, and at last we made up our minds to go in search of land, although none at all was in sight. At the same time, we again met the heavy swell. We started in the boat, which was heavily laden. For some days we pushed on pretty well. When the seas came rolling they looked as if they were going to swallow us up, for which reason, at intervals, we landed on ice-floes. At length we made out land.

Again we rested upon a piece of ice. During the night a heavy sea came on; we slept with our children in the boat, while the others used the tent. As the sea still rose higher, it began washing over our place of sojourn. They were obliged to remove the tent, placing it upon the top of an ice-hillock, whereupon all of us had to keep hold of the boat. The children were placed in it, the women assisted us. When the sea began to move the boat, we all kept hold of the gunwales; the breakers looked as if they would engulf us. We exerted ourselves to the utmost each time when the sea began lifting us, whereas when it retired we pushed the boat to remove it to windward, because there was a danger of our being washed down into the sea to leeward. We did not stop until we had brought the skiff close to the edge of the ice. But now the sea reached the tent which was placed on the hillock. To be sure it was awful! whenever the waves washed over us we were in water up to the waist, while at the same time we clung to the gunwale, and all the while one heard nothing but exclamations: "Now use all your strength."

Towards morning the sea had abated, and when it grew light we discovered that some smaller floes were less exposed to the swell. I spoke with my comrade about removing to one of these, and our Commander

Tarsta agreed. We put the boat into the water, loaded it, and went to a smaller ice-floe, which we found much better as it was not washed over.

As the sea grew calmer we pushed on. Seals were plentiful; we had no want of meat; and we used to take our rest on the floes. One night it happened that the ice which served us for our camping place parted between the boat on which I slept and the tent. I jumped out to the other side, while that piece on which the boat was placed moved off quickly with Mister Maje who was seated in the boat, and we were separated from it by the water. Our Master asked the sailors to make a boat [raft] out of a piece of ice, and try to reach it, but they refused. We never had felt so distressed as at this moment, when we had lost our boat. At last I said to my comrade: "However, we must try to get at it." Each of us then formed an *Umiauluk* [literally, a bad boat] out of a piece of ice, and in this way we passed to the other fragment. As now we were three men, we could manage to put the boat into the water. But when on doing so, it sank forward, Mister Maje fell into the sea. My comrade jumped into the boat at the same moment, and pulled him up; I, being unable to follow, remained standing on the ice. When they had taken me along with them, we proceeded towards the others; but meanwhile the ice had screwed together, and we stood still. We three men alone then hauled up the boat [?]. At this time night fell, and our companion who had been in the sea, and now was lying in the boat, was like to freeze to death. I said to my comrade that if he remained so he would really die; if he could walk about, it would be better. I had witnessed such a case before. When I had spoken thus, we asked him to rise, saying, that if he remained, he would perish. The first time he rose, he tumbled down; but, after having walked for a long time, he recovered. At day-break we discovered our friends close by, and the ice joined together. When first they had examined the road, they came to us and assisted us to drag the boat over to them.

When we had started from this place, we were soon stopped by the pack, and no live thing was to be seen. We began to be in need of provisions. We had no seal-flesh left, and the next day our small stock of bread was to be shared out. In the night I had just fallen asleep, as I was to have my turn of the watch, when I was wakened by hearing people speaking about a bear. Rising up, I saw a bear walking towards us. I said to the others that they must lie down near the boat, imitating seals [?], while my comrade and I went towards the bear, who alternately sank and reappeared behind the ice hillocks. We waited until he came close up to us, whereupon my comrade gave him a shot, and I finished him off. Thereupon the others joined us to drag him to the boat. How wonderfully did Providence bring us through the winter, and give us supplies! At length we were off the remotest part of the Westland, whither the ice had brought us since last year: we left the ship in the far north. We were now near the country of the Tuluks without having suffered any real misfortune. Before we had finished the last of our bear's-flesh the field opened, and we began catching seals, and sighted land, and when we proceeded towards it we fell in with a ship.

Once in the afternoon, while still making for the



land, we discovered a vessel steaming northwards. We tried to follow it; but night fell, and we stopped at the ice. At the same time there rose a dense mist. During the night we showed two lights near the boat, making them pretty large, that people on board might observe us. After midnight I went to sleep, when the others had risen. Towards morning I was awakened by hearing them talking about "ship;" and when I got up I saw it emerging from the fog. I directly set off in my kayak, and when I came to them they questioned me: "Who are ye?" I answered: "*Nord Polen mut Polaris Bebeles*" [peoples?]. Then furthermore they asked: "How do ye do?" I answered: "*Captain Ull Diet*;" whereupon they said: "Where's the ship?" I answered: "Last year we left it." On hearing this they said to me: "Just follow a little alongside the ship, we will soon stop her."

When we had come up to my companions, they lay to, to take them on board. I was the first who set foot on deck, then followed the others; and when all had come on board it was as if we were ashore. The Master of the ship and the crew altogether were exceedingly kind to us, and pitied us who had spent the whole winter, with our little children, on a piece of ice. They gave us tobacco and pipes, and, before all, a good meal. Their Master, from mere kindness, was like a kinsman to us.

When the mist cleared we discovered another vessel close by, steering towards flocks of seals which lay upon the ice. Then the sailors in a body went seal hunting. We were informed that the other ship now had a full cargo of seals, and intended to start on their return voyage. We delivered letters to them concerning our rescue, but our ship had first to complete its catch before returning.

(To be continued.)

## THE BEGINNING.

### GRUITHUISEN.

THE British scientific world has no problem before it at the present moment of more importance than the beginning of this earth. How did it begin to be? Our natural sciences and their present controversies hang on this peg. We have been told by the President of the British Association, Professor Allan Thomson, "*that we are just as ignorant of the mode of first origin of all the compounds of the inorganic elements, as we are of that of living matter.*"

This was one of the most obvious truths in the learned and deeply-studied address to the scientific meeting at Plymouth. It has been often repeated since the time of Solomon; but in the face of this certain and acknowledged ignorance of primary details, men have invented—and men have accepted—certain theories of the beginning, not only of this earth, but of our solar system. On these ideals man is constantly engaged in explaining certain terrestrial phenomena, which cannot be explained truly without a knowledge of first principles. False interpretation must follow ideal data; and so we have around us volumes of unfounded structures and theories, crumbling to their ruin in vast confusion. Powerful associations and liquid pens prop up these world-theories with buttress and with brass, but these are

equally without foundation, and must share in the ruin of the principle they confide in. Something springs on the site of all ruins, it may be a thistle, a nettle, or a bramble; we only hope to plant one germ of truth.

Natural history, physical science, mathematics, astronomy, and geology have lately differed as to the age of this earth by hundreds of millions of years. They take their data from the nebular hypothesis of Laplace. If the data were true, precise science could not differ in results. The uncertainty of this theory may be found elsewhere, but we take some of its main points for the sake of their contrast with the theory of the beginning by the German astronomer Gruithuisen. This theory was published at Munich, between 1832 and 1842, in *Neue Analecter* and *Astronomisches Jahrbuch*. The author must have had a full knowledge of the nebular theory, as it was published in 1796, and his ideal is exactly the reverse of that by the French astronomer.

During the last century Sir John Herschel discovered, and reported on, numbers of luminous nebulae floating in space. Laplace adopted the novelties as worlds in making. He imagined that a similar nebula once occupied the whole area now embraced by our solar system; he brought this mass under the laws of attraction and gravitation, extending over a diameter of some 5,500,000,000 miles, forming the whole into one compact mass of rotating matter, which threw off by its centrifugal force, at varied distances, certain rings of matter, which formed our planets, till at last the planet Mercury was formed at a distance of 35,000,000 miles from the nucleus, which then "gathered with immense energy round its own centre, and formed the sun."\* The ring which formed this earth having once belonged to "the fiery mass of the sun,"\* retained its heat, and this is supposed to be still within the nucleus of this earth, providing the surface with its igneous phenomena.

Laplace made his solar system with so much mathematical precision, that astronomers, naturalists, physicists, and geologists embraced the uncertain hypothesis as a sure solution of many puzzles, saving geologists much trouble in arranging causes and effects. Improvements in telescopes showed that some of the nebulae of Laplace were distant systems of worlds, and it is known that other nebulae, now floating in space, are luminous vapours, having in them certain gases inadequate to world making. British science, however, still adheres to the nebular hypothesis of Laplace, in its tottering condition. But before it became so ruinous as it now is, the German astronomer, Gruithuisen, suggested a slow, gradual manner of making this earth. In comparing the two theories, we come upon the national characteristics of the theorists. Laplace began with an impulse without a cause, forming a molten earth without any known fuel. Gruithuisen brought his unknown dust together without a cause for their collection. Neither give the origin of matter; but both seem to have been guided by their own surroundings more than by any certain knowledge of the subject. Each has many believers, but they cannot both be right. A follower of Gruithuisen has kindly given us abstracts of the theory according to which he built up this earth,

\* *Quarterly Review*, July, 1875.



with a mean circumference of nearly 25,000 miles, and a mean diameter of nearly 8000. The quotations which follow are from the MS. of Dr. E. Gryzanovski:—

I. "The earth, like all celestial bodies, is the result of a gradual agglomeration of cosmical dust. Ever since the primordial disturbance of equilibrium in the universe, matter has and must have continued to condense into particles. The bigger masses must have attracted the smaller ones."

We do not know of any primordial disturbance of equilibrium in the universe, and we do not know of the origin of dust. The fact, however, remains that the nucleus of this earth is composed of what we call dust. We are consequently forced to confess that dust existed, in some shape or another, before the nucleus was made. Certain atoms attract others now, and as the whole earth, where known, has in it more or less magnetic power, we may allow that attraction must have existed in the beginning, and must have aided in the condensation of matter.

II. "The first consequence of mutual attraction is contact and adhesion, more or less superficial, according to the violence of the shock."

The ideal shock militates against the gradual agglomeration principle. This supplied the necessary contact and adhesion. Dust falling gently adheres to over-polished surfaces, and becomes cohesive in accumulation and pressure. As the nucleus earth is composed of cohesive dust, we may allow that it acquired its condition without any violent shock. The only violent shocks that we know of as occurring on the surface earth, are produced by falling meteors; but none that are known of were violent enough to produce—

III. "The next consequence—rotation. The position of the axis of rotation and the centre of gravity depends on the shapes, masses, and position of the two coalescing bodies. If these shapes are irregular, the rotation will tend to restore regularity. The ideal being the spheroid shape. This tendency, though partly checked by the hardness, or inner cohesion of the two bodies, must induce a gradual disgregation in both bodies, apart from the sudden disgregation produced by the shock of the first contact. This gradual molecular displacement, which affects first the interior, and through it the surface of the new body, constitutes its history."

If rotation was a consequence of impact, there was no rotation previous to this action, and the agglomerated mass of dust must have been chaotic. But there had been a disturbance of equilibrium. Rotation and revolution cause our present equilibrium, so that it remains to be explained how it was maintained before the impact took place. If this explanation cannot be given, Gruithuisen's cosmical dust requires a new idea, and his cause of rotation is inadmissible. If the irregularities of the sphere while forming on the principles laid down were to be smoothed away by the action of rotation, how is it that our artificial and natural irregularities are not influenced by it? We have mountain peaks 5 miles high on dry land; we have many elevated peaks in the sea, notably the Island of Bermuda, the base of which is given with a diameter about 120 miles, with a mean depth below the sea-level on that line of nearly 3 miles. This pinnacle has been exposed for an unknown period,

not only to the ideal force of rotation, but to the certain forces of water; yet the 'Challenger' found it still as an unsmoothed irregularity in 1873. As we have no knowledge of disgregation, internal or external, caused by the rotation of the earth, we cannot accept the third section as in any way connected with the history of the Beginning. Gruithuisen wanted these actions for his theory, consequently—

IV. "Molecular displacement producing friction must also produce heat. Thus every cosmic body becomes a reservoir of heat, unevenly distributed through its interior, but ever increasing—by no means greatest at its geometrical centre, or even at its centre of gravity. For even if the two coalescing bodies succeed in rounding off into a perfect spheroid, so that the centre of gravity would coincide with the geometrical centre, that centre is not the point of maximum pressure or of maximum heat. Pressure and density reach their maximum at a depth of two-thirds of its radius; therefore, if the centre of the earth were chemically homogeneous, its zone of maximum heat would form a spheroidal surface surrounding its centre at a distance of one-third of its radius. But the earth cannot be homogeneous, because the northern, with its vast continents and high mountains, having a larger volume than the southern hemisphere, must be specifically lighter, and chemical differences involve differences in the generation and condition of heat. This shows that the points of maximum heat in the interior of the earth, far from forming a continuous zone, must be very irregularly scattered and grouped along each radius."

This method of obtaining cosmical heat and igneous action was, we believe, adopted by Mr. Robert Mallet a few years ago. The great misfortune of the theory is that we do not know if the molecular action takes place. We have just assigned reasons why it should not take place under the arrangements suggested by Gruithuisen. We know that displacement happens in sedimentary deposits; we do not know that the friction in these cases produces volcanoes; and we do not know that cosmic bodies become reservoirs of heat at a depth of two-thirds of the earth's radius from the surface. This distance is about 2600 miles below our feet, and though it is arranged that heat may run up and down the radius at irregular distances, we cannot accept the arguments offered for this conclusion. We are told that the northern hemisphere, with its high mountains and great lands, is lighter than the southern with its great water areas. We are in a better position now than Gruithuisen was to show that the equilibrium of this earth, so wonderfully exhibited to us in all her motions, is equalled by the wonderful distribution of land and water. By referring to the deep-sea soundings of H.M.S. 'Challenger,' as published by the Admiralty for private circulation, we find that 227 soundings north of the Equator give an average depth of 1907 fathoms, and 208 soundings south of the Equator give an average of 1642 fathoms. The soundings between England and Gibraltar in the north, and those in the Straits of Magellan in the south, are not included. The deepest water in the north was 4575; in the south, 2900 fathoms. A very irregular bottom was noticed by the 'Challenger' between 46° and 64° S. latitude, and the 'Valorous' found a similar condition between 55° and 64° N. (*Geographical Magazine*, October, 1875). The deepest

soundings in these respective regions were 1860 fathoms north and 1800 fathoms south. The most northerly soundings, as given by Captain Markham, of the late Arctic Expedition in  $83^{\circ} 20' 26''$ , gave a depth of 72 fathoms (chart, *Geographical Magazine*); and M. H. Woodward gives us a chart in the *Popular Science Review* for April 1877, showing dry land all round the Antarctic, and water all round the Arctic Pole. If Gruithuisen had known of this perfect and wonderful balance of elemental matter, he could not have used the argument for the scattering of heat up and down the radius.

The chemical differences mixed up with the volume and the density of earth in this section will be noticed presently. We now continue the Beginning. We are told that a relative fluidity of solids secures—

V. "A universality of drop form among celestial bodies. . . . If the earth is the result of many successive aggregations, it follows that, the first nucleus being formed of small bodies of irregular shapes, the rounding-off process or mechanical liquefaction cannot have been considerable. The rough nucleus revolved, but, long before anything like a drop form was produced, a new piece of cosmic matter came to displace its centre of gravity and its axis of rotation. The rounding-off labour had to be commenced again, and in a new sense. Thus it must have happened that many interstices and clefts were covered or bridged over by new matter without being filled up, and it is highly probable that the part of the earth which is nearest the centre is its most cavernous and least compact part."

This is a curious passage from the pen of the German astronomer in working out details of his own gradual accumulation of matter. We have a parallel to it from the head of our present Physical School. Sir William Thompson is reported to have told his section of the British Association at Glasgow:—"We may be quite sure the earth is solid in its interior, not absolutely throughout its whole volume, for there certainly are spaces in volcanic regions occupied by liquid lava; but whatever portion of the whole mass is liquid, whether waters of the ocean or melted matter . . . these portions are small in comparison with the whole; and we must utterly reject any geological hypothesis, which, whether for explaining underground heat, or ancient upheavals, or subsidencies of the solid crust, or earthquakes, or existing volcanoes, assumes the solid earth to be a shell of 30, or 100, or 500 kilometres in thickness, resting on an interior liquid mass." Sir William spoke confidently of the interior condition, having first acknowledged that he knew nothing below "one kilometre." Relying on the hypothesis of Laplace, he discards the "*interior liquid mass*," which must be there, if the nebular theory is true. Gruithuisen, relying on the mechanical results of his own ideal, produces heat in the unknown interior by forces dependant on his theory alone. These hot places are 2000 miles and more below us, his hollow places are more distant still; he gets his heat from the supposed falling together of these hollow places; but Sir William infers hollow places from volcanic action, and fills them with *molten lava* or *water of the ocean*. Let us see how Gruithuisen fills his.

VI. "Theoretically the remainder of the earth must be more compact, its ever-growing bulk enabling it

to approach nearer and nearer to the drop form. We do not know how often or at what irregular intervals the earth was interrupted in its process. The probability, as well as the irregularity of these interruptions, justifies the belief that the whole interior of the earth (with the sole exception, perhaps, of the zone of maximum pressure), is full of hollow places, sometimes isolated, sometimes connected, all filled with gases or water, or emanations from surrounding rocks."

The German again loses his point of gradual collection, and refers to unknown interruptions in the making of his world, where no interruption could have taken place, if made by the coming together of cosmical dust from a universal disturbance. He had seen hollow places—there are plenty of them in the hills of Germany and Austria. He did not know much of the erosive action of subterranean waters on the sedimentary deposits of earth; but finding the hollow places in these deposits, he assumed that they must also be in the interior nucleus, of which he knew nothing. The filling of these imaginary hollows with gases, water, and emanations was the natural result of a limited experience. Gruithuisen contradicts himself, and the two philosophers contradict one another; but as neither of them knew anything of the interior, the contradictions are the almost necessary results of ideal explanations of the same phenomenon.

We now plunge into deeper water.

VII. "The earth attracted and assimilated not only solid bodies, but watery ones. The first water forming a primordial ocean found a very rough and irregular surface for its bed. It covered the whole . . . and stood many miles higher than the highest peak of the Himalayas. In the initial irregularities of the water-bed is the true cause of the existing irregularities on the surface of the earth."

It will be shown presently that water could come without the attraction supposed by Gruithuisen; but we must return to this section again.

Gruithuisen required deep water to account for—

VIII. "Certain complete crystals . . . and for boulders strewn on the plains around the Baltic; and having discovered that granite would remain suspended in sea water at a depth of 52 miles, he did not hesitate to accept such an ocean."

Dr. E. Gryzanovski is puzzled here, and asks, how could such an ocean disappear; the ideal replies:—

IX. "The process of aggregation going on throughout the universe, solar conflagrations must have been as frequent as planetary and cometary collisions, and their conflagrations must have been quite sufficient to deprive the earth and the other planets of any amount of water."

One monster ideal swallows another. Whatever the earth may know of local accidents now, we are not aware that it ever suffered from celestial conflagrations or collisions. Crystals do not require deep water for their formation, though some of them have been long in forming. The boulders on the present surface of the earth were not deposited by the water that surrounded its embryo. The water of the earth is not taken away from it now, though it may be transferred from one part to another. We know nothing of any water ever having been taken away from it without an equivalent return. We allow

that the ocean level was once higher than the Himalayas are now, but we do not require an ocean of water 52 miles in depth to satisfy any of the requirements of earth.

Dr. Gryzanovski thinks that "this theory contains much that may appear fantastic:" he believes in its essence. We put it down as an ingenious theory of a human being, on a par with the fire universe of Laplace, in which that astronomer did not entirely believe; and as on a par with the forty thousand mile-high mountain, which, believed in or no by its author, Buddah, has been accepted by millions as the hope of their morality and the summit of their ambitions. Man is always credulous—never more so than at the present moment; and if a tale is told with authority, few stop to probe its truth.

The MS. before us goes on with interesting details of earthly phenomena; they do not belong to the Beginning, but we hope to return to them. We have now to see what portions of these opposing theories will so amalgamate with recent discoveries, and known laws of nature, that all may fit together in one harmonious system, as far as it goes. It is possible that we may add one more link to the never-ending chain, assisting others to go on forging link upon link, till the final ring of the great far-off Beginning may be riveted on to the completed circle.

H. P. MALLET.

(To be continued.)

#### SIR ANDREW SCOTT WAUGH.

Two illustrious Indian surveyors have passed away from among us during the last month, Andrew Scott Waugh, and George Thomas Montgomerie—one almost in the fulness of time, and the other in the prime of life. Both were Gold Medallists of the Royal Geographical Society. Andrew Scott Waugh was the son of General Gilbert Waugh, the Military Auditor-General at Madras, and was born in 1810. He entered the corps of Bengal Engineers in 1827, became Garrison Engineer at Allahabad in 1830; and, when still a very young man, joined the Great Trigonometrical Survey, then under the able direction of Colonel Everest. His nomination was dated the 2nd of July, 1832, and his friend and contemporary was Thomas Renny, now Major Renny Tailour, of Borrowfield, co. Forfar. The first work which was entrusted to the two zealous young officers, Waugh and Renny, was the exploration of the wild, jungly country between Chunar and the sources of the Son and Narbada, up to Jabalpur. They completed this service, and submitted a very interesting topographical and geological report in 1834, with coloured sketches of their route, the manuscript of which is still preserved in the Geographical Department of the India Office.

Their next work was of a far more difficult character. It was to assist Colonel Everest in the important operation of measuring the most northern base for the Great Arc Series, which was commenced in the end of 1834. The region selected for this measurement was the Dehra Dun, a beautiful valley between the Siwalik hills and the Himalayas. As soon as the base was measured, it was re-measured in reverse order by Waugh and Renny, the error being 2.396 inches in 7.42 miles. On the 1st of October, 1836, Colonel Everest took the field with both the large theodolites, dividing his staff into two distinct parties, under himself and Andrew Waugh. After two years of incessant work, Lieutenant Waugh was sent, in October 1838, to revise the angles in the Deccan, and he completed a series of triangles over a meridional distance of 260 miles, returning to Dehra in June 1839. To show the wonderful accuracy of these observations,

it may be mentioned that the difference between the length of the Dehra Dun base as measured, and as computed by triangulation from the Sironj base, was 7 inches. In 1840, Waugh was engaged in fixing latitudes at stations on the Great Arc by observations of stars; and in 1841 he proceeded to re-measure the Bidar base. This brought to a close the operations for measuring the Great Arc Series of India, which extends from Cape Comorin to the Himalayas.

When Sir George Everest retired, in 1843, he recommended that his able and indefatigable assistant, Andrew Waugh, should succeed him. In doing so, Everest thus spoke of his successor:—"He is beloved and respected by all the subordinate members of my department, and held in honour and esteem by all who know him personally. His talents, acquirements, and habits as a scholar, a mathematician, a gentleman, and a soldier, are of a high order." In 1843, Captain Andrew Waugh was appointed Surveyor-General and Superintendent of the Great Trigonometrical Survey of India. His first work was to complete Sir George Everest's project for the triangulation of the important region between the Great Arc Series and Calcutta, and until 1848 he was engaged in the supervision of this work, and especially in fixing the heights of Himalayan peaks. The heights of 79 peaks were fixed, the loftiest of which, 29,002 feet above the sea, was well named by Colonel Waugh after his old chief, Mount Everest. It is still the loftiest measured peak in the world.

After the completion of this series, Colonel Waugh was free to undertake a work originated by himself, and the acquisition of Sind and the Punjab offered a vast field for fresh operations. He conceived a project for forming a system of triangulation to the westward of the Great Arc Series, to include the newly-acquired territory. His old friend and companion, Renny Tailour, was with him when this work was begun, but he retired in 1849, on succeeding to his father's estate of Borrowfield. In 1851, Colonel Waugh superintended the measurement of the Chuch base in the Punjab, and in 1854 he saw the base at Karáchi completed. He took special pains in the preparation of the volume recording the measurement of the Chuch and Karáchi bases, and drew up a memorandum to serve as a guide for measuring future base lines. This volume, in manuscript, is preserved in the Geographical Department of the India Office. In 1856, Colonel Waugh instituted a series of levelling operations to determine the height of the base lines in the interior, commencing in the Indus valley, in 1858; and he also ordered the commencement of the survey of Kashmir.

Great progress was made in the Topographical and Revenue Surveys during the administration of Sir Andrew Waugh, who was admirably supported by Major Thuillier from 1847. In 1861 Sir Andrew published his *Instructions for Topographical Surveying*; and besides the Kashmir Survey, under Montgomerie, that of the Sind Sagar Doab, under Robinson, was due to the initiative of the Surveyor-General.

Sir Andrew Waugh became a Major-General and was knighted in 1861; and he retired in March of the same year, after having held the appointment for seventeen years. When he returned to England, he took with him the appreciative thanks of his Government, and the attachment of a splendid staff of surveyors who had been trained under his auspices. The whole staff, 191 in number, presented him with a service of plate in 1862. He had pushed forward the great work with such ability and energy that his successor, Colonel Walker, can see his way to its completion within a limited number of years. His labours were brought to public notice in several of the Annual Addresses of the Presidents of the Royal Geographical Society, and in 1857 he was awarded its Gold Medal. A history of the operations of the Great Trigonometrical Survey down to the time of Sir Andrew Waugh's resignation, compiled by H. Duhan, will be found in five articles in the

*Professional Papers on Indian Engineering* (vol. ii., pp. 285 and 398, and vol. iii., pp. 94, 305, and 402).

On his return to England, Sir Andrew Waugh became an active and useful member of the Royal Geographical Society, where his advice was most valuable in all matters relating to instruments and to Asiatic geography. He became a Fellow in 1857, and was a member of the Council from 1861 to 1872, holding the office of Vice-President during the last five years. In 1862 he was elected a member of the Geographical Club. He was also a Fellow of the Royal Society.

Sir Andrew Waugh was twice married, and had one son by his first wife, Gilbert William Renny Waugh, who entered the army in 1867, and is now a Lieutenant in the 78th Highlanders. For the last five years the health of the veteran surveyor had been failing. He was missed at his seat at the Council table of the Geographical Society, and still more was the absence of his genial smile and kindly greeting regretted by the Geographical Club. But his friends had the pleasure of seeing him at the Athenæum almost to the last. He died at his house, 7, Petersham Terrace, Kensington, on the 21st of February, 1878, at the age of sixty-eight.

#### COLONEL T. G. MONTGOMERIE.

AMONG the young surveyors who were trained under the auspices of Sir Andrew Waugh, there was none who did more admirable service in after life, and whose untimely loss will be more deeply felt, than the late Colonel Montgomerie.

Thomas George Montgomerie, the third son of Colonel Montgomerie, of Annick Lodge, and nephew of the twelfth Earl of Eglinton, was born at Ayr on the 23rd of April, 1830. Whilst at Addiscombe he gained the "Pollock Medal," awarded to the most distinguished cadet of the season, and he entered the East India Company's service, as a Lieutenant in the Bengal Engineers, on the 8th of June 1849.

Very soon after his arrival in India, young Montgomerie joined the Great Trigonometrical Survey, in October 1852; and in 1853 we find him assisting in the measurement of the Chuch base, near Attock. In 1854 he accompanied Sir Andrew Waugh to Karáchi, and took part in that base measurement from December 1854 until its completion on January 20th 1855.

As soon as this work was done, the survey of Kashmir, and of the mighty mass of mountains up to the Tibetan frontier, was commenced. Captain Montgomerie was only in his twenty-fifth year when this important and most difficult service was entrusted to him by Sir Andrew Waugh. He began work in the spring of 1855, and during the first season he carried the series across the Pir Panjal range into Kashmir. Two of the stations were 13,000 and 15,000 feet above the sea. Building materials had to be dug out of the snow for the station pillars, and the observers were detained at one station for twenty-two days, owing to snowstorms and foggy weather. Afterwards, as the party penetrated into the mountains, the height of the stations averaged 17,000 feet, and luminous signals were used from peaks 19,000 and even 20,000 feet above the sea. Between 1855 and 1861, young Montgomerie extended the triangulation over 93,000 square miles. One member of the party took observations from a station which was 20,600 feet above the sea, and marks were erected on peaks as high as 21,480 feet. Montgomerie fixed the height of a peak in the Karakorum range, temporarily called K. 2, which is second only to Mount Everest, having a height of 28,290 feet. This most difficult and laborious survey is remarkable for its accuracy, and in a circuit of 890 miles, only a discrepancy of  $\frac{1}{10}$  of a second in latitude, and of  $\frac{1}{10}$  in longitude, was found. The topographical filling in by plane table advanced with the triangulation, both being under the superintendence of Captain Montgomerie.

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After ten years of uninterrupted labour in Kashmir, Montgomerie went home on leave; and on the 22nd of May 1865, Sir Roderick Murchison presented him with the Founders' Gold Medal of the Royal Geographical Society. The President said to him, on the part of the Council:—"When we reflected upon the remarkable facts that you had passed from the hot plains of Hindustan to the loftiest region on the face of the globe, and that there, amidst enormous glaciers, you had made accurate scientific observations at stations, one of which was 5000 feet higher than the summit of Mont Blanc, we could not fail to applaud and reward such noble feats, displaying, as they did, the great abilities and energy with which you conducted so arduous a survey."

On May 1st, 1867, Captain Montgomerie resumed his labours in India, conducting the Kumaun and Gurhwal survey, and executing a specially accurate survey of the hill sanatorium of Ranikhet.

But the work by which Colonel Montgomerie is most generally known among geographers, is that comprised in his system of employing native explorers to make discoveries in the unknown regions beyond the northern frontiers of British India. He hoped that by this means the whole country between British and Russian territories would be laid open. Natives are permitted to travel without molestation, as traders or in other capacities, through countries where Europeans would certainly be regarded with suspicion, and most probably would be murdered. Montgomerie's plan was to employ Pathans to explore the Hindu Kush, the valley of the Oxus, and Eastern Turkistan; while for the exploration of Tibet he engaged Bhutiyas and inhabitants of the upper valleys of the Himalayas within British territory. He taught them to make route surveys by taking bearings with a compass and pacing the distances; to take meridian altitudes with a sextant to determine latitudes; and to observe with a boiling-point thermometer. But he did not teach them how to reduce their observations, and they were not supplied with astronomical tables, in order that they might not be able to fabricate fictitious work.

There was great difficulty in training these native explorers, and there were many disappointments. Out of six or eight men that were instructed for years, only two or three turned out first-class observers. Nevertheless, this system resulted in the acquisition of a large amount of new information, and the work of "Montgomerie's Pundits" is well known to all geographers. They penetrated to Lhasa and the interior Tibetan lakes on one side, and to the unexplored regions of the Upper Oxus on the other. On his return, each explorer brought his crude work to Montgomerie, who reduced the observations, prepared the journals for publication, compared the work with all that was previously known, and finally completed a series of invaluable reports.

Colonel Montgomerie was senior Deputy-Superintendent of the Great Trigonometrical Survey, when ill-health obliged him to retire, to the great regret of the Department, in 1875. An appreciative notice of his services—by his colleague, Mr. Hennessey—appeared in the Annual Report for 1875-76, which we reprinted at page 123 of our number for May, 1877. Colonel Montgomerie became a Fellow of the Royal Geographical Society in 1865, and a member of the Geographical Club in 1873. He was elected a Fellow of the Royal Society in 1872.

The last time that he was officially employed was in 1875, when he acted as Her Majesty's Commissioner at the Geographical Congress in Paris. But his long and severe service had shortened his valuable life. He never seems to have really recovered after his return to England; and he died at Bath on the 31st of January 1878, leaving a widow and three children to mourn his loss. Their sorrow will be shared by many friends and admirers, both in this country and in India. The Indian Survey Department has lost one of its brightest ornaments, and all geographers will feel that a life has been cut short, which, had it been spared, would yet have done much precious service in furthering the objects of their science.

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## Reviews.

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### THE VOYAGE OF THE 'CHALLENGER.'\*

THESE two volumes contain Sir Wyville Thomson's account of the results of the voyage of the 'Challenger,' as regards the Atlantic Ocean. In his former volume—*The Depths of the Sea*—he gave a general history of deep sea investigations, and described with some minuteness the appliances and methods employed during the preliminary cruises of the 'Lightning' and 'Porcupine,' in ascertaining the exact depth, and in ascertaining the distribution of the deep-sea fauna by means of the dredge. *The Depths of the Sea* may therefore be regarded as a general introduction to the volumes giving an outline of the results of the 'Challenger' expedition.

In the present work Sir Wyville Thomson gives a very complete and detailed account of the equipment of the ship; and then conveys to his readers an excellent general idea of the results of the voyage, as regards the Atlantic, in an agreeably-written narrative. Thus, while the physical geographer obtains a good abstract of the data on which the conclusions and speculations of Sir Wyville Thomson and his colleagues are founded, the general reader is provided with an interesting account of the proceedings of an important expedition. The chapters describe the scientific work during the various sections of the voyage, from Portsmouth to Teneriffe, from Teneriffe to Sombrero, from St. Thomas to Bermuda, the Gulf Stream, from Bermuda to Madeira, from Madeira to the coast of Brazil, from Bahia to the Cape, and the voyage home. The final chapter summarises the general results of the expedition.

The Atlantic investigations disclosed the contour of the bed of that ocean, which has a mean depth of a little over 2000 fathoms, with an elevated ridge rising to about 1900 fathoms below the surface, and traversing the basins of the north and south Atlantic in a meridional direction, from Cape Farewell to as far south as Gough Island, following roughly the outlines of the coasts of the old and new worlds.

Except in the neighbourhood of coasts, where there is the *débris* washed down by rivers, the bed of the Atlantic, at depths between 400 and 2000 fathoms, is covered with the well-known calcareous deposit, the globigerina-ooze, which consists to a great extent of broken and decomposed shells of pelagic foraminifera. But everywhere in this ooze Mr. Murray detected fragments of pumice and other minerals due to the disintegration of volcanic rocks. These pieces of pumice are due to volcanic action, and have been washed and floated out to sea by rains and rivers, sinking to the bottom when they become water-logged. On several occasions pieces of pumice were taken on the surface of the ocean by means of the tow-net.

With reference to the distribution of ocean temperature, it was found that, throughout the whole of the Atlantic, the water was warmest at the surface, cooling

rapidly for the first hundred fathoms; then cooling more slowly down to five or six hundred fathoms; and cooling extremely slowly to the bottom, or to a certain point from which it maintains a uniform, or nearly uniform, temperature to the bottom. The conclusion respecting currents, derived from the facts of temperature distribution, is that the entire mass of Atlantic water is supplied by an indraught from the southern sea, moving slowly northwards, and interrupted at different heights by the continuous barriers which limit its different basins. This involves the remarkable phenomenon of a vast body of water constantly flowing into a *cul de sac*, from which there is no exit; and Sir Wyville Thomson's explanation forms one of the most interesting passages in his concluding chapter.

As regards the distribution and nature of the deep sea fauna the most prominent biological result of the 'Challenger' investigations is the final establishment of the fact that the distribution of living beings has no depth limit. Animals of all the marine invertebrate classes, and probably fishes also, exist over the whole of the floor of the ocean; and some of the most important problems have reference to the nature and distribution of the deep sea fauna, and to its relation with the faunæ of shallower water, and of past periods in the earth's history. But as yet only an infinitesimally small portion of the floor of the ocean at depths over 2500 fathoms has been explored, while the critical study and determination of the animal forms which have been collected, has only just commenced, and will occupy several years. Meanwhile the present instalment of the results is very welcome to every student of physical geography. The two handsome volumes are illustrated by numerous maps, diagrams, and drawings of marine animals.

### NATURAL HISTORY AND ANTIQUITIES OF SELBORNE.\*

WE welcome with much pleasure Professor Bell's long-promised edition of *White's Selborne*. The delay in its appearance, though somewhat tantalising while it lasted, is the less to be regretted, as it is owing to the resolve of the editor to make his work as accurate and complete as possible. Gilbert White's natural history of his native parish has long since taken its place amongst our standard works, and its constant popularity is proved by the editions which follow each other with remarkable rapidity. Two somewhat pretentious ones have appeared in the last few years, but, till now, the charming edition prepared by E. T. Bennett, and published by his brother in 1837, has been undoubtedly the best. Professor Bell's work, however, surpasses all its predecessors, and we heartily congratulate the veteran author on the completion of his labours. A more competent editor could not be found. An eminent naturalist, he is endowed with that spirit of patient research and careful and accurate observation which was so re-

\* *The Voyage of the 'Challenger'; a Preliminary Account of the General Results of the Exploring Voyage of H.M.S. 'Challenger' during the year 1873 and the early part of 1876.* By Sir C. Wyville Thomson, &c. &c. Two Vols. Macmillan and Co. 1877.

\* *The Natural History and Antiquities of Selborne, in the County of Southampton.* By the late Rev. Gilbert White, formerly fellow of Oriel College, Oxford. Edited by Thomas Bell, F.R.S., F.L.S., F.G.S., &c., Professor of Zoology in King's College, London. Two Vols. (London: John Van Voorst, 1877.)

markable a characteristic of Gilbert White. For more than thirty years he has been owner of White's property, where for the last fifteen years he has entirely resided. He has thus carried out his own observations on the very same spot as his author, and has had opportunities of verifying the accuracy of the historian of Selborne, and of continuing and amplifying his observations which have fallen to the lot of no one else. This work is, indeed, a labour of love. It has been, we are given to understand, the delight of Professor Bell to gather round him every relic of White's that he could obtain, and to collect all the information that long and constant enquiry could recover respecting White's life, habits, and family.

Former editors were content to follow the brief biographical record prefixed by Gilbert White's nephew, John, to the edition of 1802, and made little effort to bring before their readers a clearer and better picture of the man who has already delighted three generations, and who, if one may judge from the increasing popularity of his book, will yet delight many more. Brief as John White's memoir was, it was yet not entirely accurate. He states that his uncle was *one of the senior Proctors of the University of Oxford*. Professor Bell shows that he was not senior but junior proctor; and though this error is a matter of little importance, yet its correction is a proof of the accuracy and research of the present edition. He has collected much new matter respecting his author which he has embodied in a very pleasing memoir, and the greater part of the second volume consists of a large number of original letters which he has obtained from various members of the White family. The greater part of these have never been published, and most of those that have been already printed have hitherto been inaccessible to the public. This correspondence brings the naturalist before us, occupied with his favourite pursuits as well as with classic literature, etymology, and poetry—not taking much notice of public events—superintending the education of his nephew *Jack*—full of interest in and kind thought for his relations and neighbours. Apart from Gilbert White, these letters have much general interest, as indeed the lapse of a century must always give to the letters of intelligent men. Observations constantly occur which are of value in comparing our own age with his. To take one instance, the effect of the long, dry spring of 1776 was to raise the price of butter to 10d. per pound, and of hay to 4l. 10s. per ton. How many housekeepers would welcome such *famine* prices now! The letters, too, illustrate the principal work in many ways. In 1776 we find White writing to his brother-in-law, Mr. Barker—"When I opened your letter all the *Parnassia* seed fell out, and I took it to be dust and dirt from the pocket of the person who brought it, but luckily it fell in my lap, so that I saved it all. I shall sow it soon in the sandy bogs, and see if I can succeed better." He does not include the grass of Parnassus in his list of the more rare plants found within his limits. In the much more extended list given by the present editor this plant is stated to have been found at one place only, Oak-hanger, by Lord Selborne, and by no one else. Is it not possible, or even probable that Lord Selborne's discovery is the descendant of Mr. Barker's seed?

White was no recluse: he seems to have moved about

as much as most persons of his position did in that age of much more limited locomotion. After he succeeded his second cousin and uncle by marriage, the Rev. Charles White, in the property at Selborne in 1763, he not unfrequently went to town; his Fellowship at Oriel took him at stated times to Oxford; he visited friends in Sussex; and his own house, *The Wakes*, seems to have been constantly filled with friends and relations. It was doubtless his love of hospitality which led him to add considerably to his house. He was in constant correspondence with a number of persons, several of them, besides Tennant and Daines Barrington, literary and scientific characters. He never ceased performing the sacred duties of his profession, and at the time of his death was acting as curate of Selborne. Can it be necessary here to contradict the vulgar notion that he was ever vicar of the parish?

The notes to the present edition are such as we should have expected from the editor; he wisely determined not to treat at large of the general history of the various objects referred to in the original work, but rather to render as correct and complete as lay in his power the text of Gilbert White. He has thus avoided encumbering and confusing the text with a mass of other matter, the one fault of Bennett's edition. The lists of the fauna and flora of Selborne and its neighbourhood have been much amplified. The editor has given us some pages of White's quaint, full, and methodical account-books, which are not only a help in forming an idea of White himself, but are certainly a valuable contribution to the domestic history of that time. The engravings, mostly from Professor Bell's own photographs, are good and appropriate.

We have confined our observations to this *new* edition, and have not treated of Gilbert White's original work: that, surely, is well known to our readers! If there be any who are not already familiar with it, we recommend them to lose no time in making themselves acquainted with a book which its merits, both of style and matter, have justly established as an English classic, and which they cannot read in a more agreeable form than that now presented to the public by the editor.

#### HISTORY OF THE INDIAN NAVY.\*

It is strange that in a maritime country like England, the history of this small but brave service, with which some of the most stirring achievements of Indian history are bound up, should have so long remained unwritten. The Indian Navy had its origin in that small fleet of "grabs" and "galivats," whose seamen in the early days of the Company protected the factory of Surat and their trading vessels from pirates or the fanaticism of wild Mahrattas. Little by little did this tiny fleet develop into the dimensions of a navy, which was the terror of the pirate swarms in the Persian Gulf and China Sea, and whose hydrographical labours from the Gulf of Pechili to the Red Sea have proved of no small advantage to all navigators down to our own times. It needs but a glance at Lieutenant Low's very full work to show how rich

\* *History of the Indian Navy (1613—1863)*. By C. R. Low, Lieutenant (late) I.N., F.R.G.S. London: Bentley. 1877.



a mine of adventurous history he has hit upon. The surveys of the old Indian Navy had indeed been succinctly but ably narrated in Mr. Markham's *Memoir on the Indian Surveys*, but of the exciting conflicts in which Indian Navy vessels were continually being involved, whether with the Portuguese, Dutch, or French, or with the savage pirate crew infesting the Indian and Arabian Seas, no continuous history has hitherto been presented to us. Of these and other memorable exploits a most graphic and absorbing narrative is now furnished to us, and the quick succession in which these incidents are reproduced serves to give Lieutenant Low's work the air of a narrative of exciting adventure rather than that of a sober history. We do not, however, mean this in disparagement of a work which, as a naval history, must necessarily deal largely with such events. Amid so many stirring scenes it is difficult to pick out one as more worthy of notice than others, but the reader will find the description of the operation against the Joasmi pirates especially interesting (*vide* Chapter X.). One incident in the attack on Ras-ul-Khymah deserves being singled out, so eminently characteristic is it of the British Jack Tar. The story is borrowed from an officer who was present:—

“Towards the afternoon of the 8th, and during the hottest of the cannonade, a bullock and a white cock were descried close under the wall of the town, exposed to the showers of shot from our batteries, from which they remained unharmed. The attention of several of the men was called to these objects. ‘What a — fine mess they would make!’ shouted out one of the sailors. ‘Bill, I say, you bear a hand with me in towing them things out.’ Over the trenches both of them vaulted, and scampered away at a slapping pace towards the ramparts, heedless of the balls plunging around them. We slackened our fire as speedily as possible, the men in the trenches cheering and exulting in the boldness of the enterprise. The Arabs crowded on the walls, firing their matchlocks with steady aim at the two fellows, as one of the sailors coolly drove the bullock towards us, whilst the other, after a sharp chase, captured the cock. They returned to the trenches, loudly huzzaed by their comrades.”

An amusing incident, which officers, vexed in their souls by excessive red tape, will fully appreciate, is related *à propos* of the arrangement by which the administration of the Indian Navy was subject to the control of a Military Board and Audit Department. This board, noticing in the audit of the expense and supply books of a certain master, that the main-top-sail yard was “carried away,” immediately concluded, in the plenitude of their wisdom, that some one had clandestinely walked off with it, and read the master a strict lecture on the impropriety of permitting any article the property of Government to be carried away without proper authority.

A considerable portion of the present work is devoted to the valuable hydrographical labours of the Indian Navy, of which the author has given us a careful and detailed account, some of the particulars being new, and of special interest. In referring to these and other passages in the work, we are constrained to observe that the want of an index detracts from its usefulness.

We have only one fault to find with this book. It is too much spun out. The author has industry, and a capacity for research; but he does not seem to have the knack of extracting the pith of such documents as come before him. It is certainly better to have too much than too little; but the constant repetition *in extenso* of the Government orders on such-and-such

an occasion (documents of a colourless and depressing nature at the best of times) have served to swell the book beyond convenient dimensions. When this practice culminates in the immortalisation of a round-robin, penned by the passengers of one of the P. and O. Company's vessels, and expressing their contentment at things in general, including a passage tolerably free from the bodily discomforts of the sea—which effusion is printed in its entirety, barring the signatures of the eleven ladies and twenty-seven gentlemen passengers on board—the reader will infallibly protest.

It is impossible to refrain from a few reflections on the policy which advocated the abolition of the Indian Navy, and on which Lieutenant Low, as might be expected, animadverts pretty strongly. Sir Charles Wood bears a high name as an Indian administrator; but whether it be the irony of history or not, his abolition of the Indian Navy has certainly proved an unfortunate step. The fact is, that India is too big an entity to be placed under the wing of England, as regards its naval or other requirements. A dozen years had not elapsed since the functions of the old Indian Navy were formally handed over to the Admiralty before it became evident that India would have to see to matters herself if she wished them properly looked after. Accordingly a new Department, charged with the care of marine matters in general, and another one with that of marine surveying, have been organised; while, as regards defensive purposes, it has been found necessary to provide two monitors, at the sole expense of Indian revenues, for Bombay Harbour. A germ is thus forming which may eventually develop into something like the Indian Navy of former days; but we fear it will be some time before the *esprit de corps*, the experience, and the traditions of the old service will be grafted on to the coming one. In the meantime, no better service could have been done by the cause than Lieutenant Low has done by the publication of the two volumes before us. They contain a mass of most interesting matter, in the treatment of which the author's best qualification has been his warm love of the subject.

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PIONEERING IN SOUTH BRAZIL: THREE YEARS OF FOREST AND PRAIRIE LIFE IN THE PROVINCE OF PARANA. By *Thomas P. Bigg-Wither*, Assoc. Inst. C.E., F.R.G.S. Two vols., with Maps and Illustrations. (Murray. 1878.)

THE author of this work was engaged on an exploring staff, under the direction of Captain Palm, an officer in the Swedish army, who had obtained support for a plan of opening a road through the centre of the South American continent. The preliminary difficulties had been overcome, the Brazilian Government had approved of the plan, and the Viscount Mauá, the chief capitalist of Brazil, had given it his support, when Captain Palm sailed from Liverpool with his staff in 1872.

The region which Mr. Bigg-Wither describes is that part of South Brazil which lies between the Atlantic coast at Paranagua, and the River Paraná. It is almost entirely included within the valleys of the two rivers, Tibagy and Ivahy, tributaries of the Paraná, and the western part consists of wild and unexplored forest and prairie. Our author landed at Paranagua, and proceeded thence to Curitiba, the capital of the Province of Paraná, which was the starting-point for exploration.



His accounts of camp life, of hunting excursions and boat voyages, of adventures by flood and field, and of the wild Coroado Indians, are well and pleasantly written, and convey much new information.

In the second volume Mr. Bigg-Wither gives some account of the English colony of Assungui, north of Curitiba, on the River Ribeira, which flows direct to the Atlantic. The colony was commenced about ten years ago, but, owing to various causes, it does not contain a single successful emigrant. The failure is due to two causes, the hard conditions imposed by the Brazilian Government, which alone makes success impossible, and the character of the emigrants, who are town-bred men and not agricultural labourers. The site of the colony is also badly chosen, the ground being too steep for ploughing, and there being no pasture for mules within reasonable distance.

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SPICILEGIUM FLORÆ MOROCCANÆ, by *John Ball, F.R.S.* ("Journal of the Linnæan Society," vol. xvi. No. 93, p. 281).

THIS interesting paper, by Mr. Ball, is the first fruits of the journey to Morocco undertaken by Sir Joseph Hooker, Mr. George Maw, and the author in 1871. After three days passed at Tangier, during which an excursion was made to Cape Spartel, the party proceeded to explore the neighbourhood of Tetuan, and arrived at Mogador on the 25th of April, whence they rode to the ancient capital of Morocco. On the 8th of May the travellers made their way from Morocco in the direction of the chain of the Great Atlas, which rises in full view of the city, with the intention of studying its flora. In spite of much opposition from the escort, they succeeded in ascending to a considerable height. Mr. Maw alone reached the actual crest of the ridge, about 11,500 feet above the sea. They also made another excursion into the interior of the range, and on May 23rd they ascended a summit called Djebel Tezak, whence they had a view of the great valley of Sous, and of the parallel range or Anti-Atlas, some 60 miles distant. On June 3rd they returned to Mogador. In the present paper, before the "Enumeratio generum ac specierum," Mr. Ball gives a most interesting account of the Morocco flora in its bearings on the floras of surrounding regions.

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I. VIAGE A LA PATAGONIA SEPTENTRIONAL. Memoria leida el 14 de Marzo en la Sociedad Cientifica Argentina, por *Francisco P. Moreno*. (Buenos Ayres, 1876).

II. INFORMES DEL SEÑOR DON FRANCISCO P. MORENO, AL MINISTRO DE RELACIONES ESTERIORES. (Rio Santa Cruz, Dec. 26, 1876.)

In the first of these papers Señor Moreno gives an account of a journey of exploration in the northern part of Patagonia, which he made in the footsteps of Villarino, Cox, and Musters, from 1873 to 1876. On the 18th of October 1873 he reached Carmen de Patagones, on the Rio Negro. Thence he travelled on to the Lake of Nahuel-huapi, making large geological and ethnological collections, and learning much respecting the various tribes in this part of Patagonia.

The second paper is a report by Señor Moreno to the Argentine Minister of Foreign Affairs, on his visit to the River Chabut, which falls into the Atlantic on the east coast of Patagonia, and to the River Santa Cruz.

DR. E. T. HAMY has published, in the *Bulletin* of the French Geographical Society, the exhaustive paper read by him before the Society last year on certain old maps of New Guinea, which illustrate the discoveries made by the Spanish navigators between 1528 and 1606.

## Cartography.

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### Maps of Spitzbergen.\*

THIS is the title of the valuable paper written by Captain de Bas, explanatory of a series of Maps of Spitzbergen, published by the Dutch Geographical Society. It was considered that these maps would show not only how much the Dutch had done in the Arctic regions, but also the confusion caused by the constant changing of names on successive maps. In comparing the ancient maps of Spitzbergen, the same place is often found to appear under several different names. Captain de Bas suggests that there should be two international rules in geographical nomenclature. First, that any newly-discovered place should have the name used by its inhabitants; and, second, that when there is no such name, it should always be known by that given by its first discoverer.

The first map shows the track of William Barents, in 1596. It was engraved by a Dutchman named Baptista A. Doetechem, in 1598, and adapted by Judocus Hondius, in 1611. A reproduction of this map appeared in a later edition of De Veer (1598), a copy of which is in the British Museum. The map is also in the original edition of the *History of Amsterdam*, by Pontanus (1611), the reproduction being the work of Hondius. It is repeated in Mr. Asher's *Henry Hudson*, a volume belonging to the Hakluyt Society's series. Hondius was the most celebrated geographer and engraver of his time. On this map Spitzbergen is called "Nieu Land."

Captain de Bas's second map is that of Hessel Gerritz (1612), the cartographer to the Dutch East India Company, and a very eminent geographer. It is here that the word Spitzbergen first appears: "Nieu Landt aitrement dit Spitsbergh." Here also Jan Meyen Island appears as "Hold with Hope;" it should be "Hudson's Tutches." The northern coast of Spitzbergen is not given.

The third map is that of Thomas Edge (1625), which is bound up in Purchas. It was reproduced in our number for March 1873 (facing page 388), and also in the first edition of *The Threshold of the Unknown Region* (p. 51).

The fourth map is one by M. H. Middelhoven (1634). It is mentioned in the catalogue of the collection in the archives at the Hague, but has never before been reproduced. Here we have "Het Nieuwe Land, Spitsberghen."

On the fifth sheet there are three maps of later date, yet of less value. One has the title "Delineatio Spitsbergiæ (1642). The second is "'T Land Spitsbergen" (1648); and the third is a small-scale sketch, with the date "eerste jaren van de tweede helft der 17 eeuw," or, more briefly, 1651. The names are English, and it seems to be mainly copied from the map in Purchas.

The sixth map is well known. It is that of Joannes van Keulen (1710), which we reproduced in our number for March 1873 (facing p. 388), and also in the first edition of *The Threshold of the Unknown Region* (p. 59). It is curious that the name of Smeerenburg, so long frequented by the Dutch whalers, should be omitted by Van Keulen.

The seventh and last map is that which was compiled under the direction of Dunér and Nordenskiöld in 1864.

The series will be of great use to comparative Arctic geographers, and Captain de Bas has done very good service in preparing it for publication, its value being much enhanced by his able explanatory memoir.

\* *Het doopregister van Spitsbergen volge us reisjournalen en Kaarten.* Door F. de Bas Kapitein van den Generalen Staf (Met Zeven Kaarten).

### New Map of Madagascar.

MUCH has been done of late years towards improving and correcting our geographical knowledge of Madagascar, especially by Dr. Mullens and other missionaries. The coast was laid down by Captain Owen and his officers in 1824, and the delineations of the interior, until quite lately, were based on a map by Colonel Lloyd, which was published by Mr. Arrowsmith in 1851. M. Grandidier, who was in Madagascar from 1865 to 1870, mapped considerable tracts; and a further important contribution was made by Dr. Mullens in his Map of the Central Provinces of Madagascar, published in the 45th volume of the *Journal of the Royal Geographical Society*.

The map now before us, which is very creditably executed, has been compiled from materials furnished by the work of M. Grandidier, Dr. Mullens, Mr. Houlder, Bishop Cornish, Sewell, Sibree, Shaw, Moss, Grainge, and from observations by William Johnson. It was copied for transfer by Rajesima, a pupil trained in the Mission School, and lithographed at the Mission Press at Antananarivo. The map is dedicated to Ranavalomanjaka, Queen of Madagascar, and to Rainilaiamanjaka, the Prime Minister.

### Stanford's Stereographical Map of the British Isles.

MR. STANFORD has published a map of the British Isles, on a scale of  $\frac{1}{730,134}$ , constructed to show the correct relation of their physical features. The map is tinted, and the hills are shaded with great care, in order to indicate clearly and accurately the relative elevations as well as the steepness of the ranges. An admirable orographical map is thus produced which must be of great assistance to geographical students; for it is extraordinary the assistance that such cartographic illustration affords in acquiring a correct notion of the physical aspects of any country. For example, it would need a long description to convey an accurate impression of the relations between the Pentland, Lammermuir, and Cheviot Hills, which on Mr. Stanford's map are graphically shown at a glance.

## Log Book.

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**Reported Existence of Relics of the Franklin Expedition.**—In 1876 Mr. Barry was serving on board an American whaler, belonging to the firm of Morrison and Brown, of New York. When off Whale Point, at the entrance of Sir Thomas Roe's Welcome, a party of Eskimos came on board, who arrived from what Mr. Barry called Cape Inglefield, 3 miles north of Whale Point. Here there is clearly some mistake, as there is no Cape Inglefield in the position indicated. The whaler subsequently wintered at Marble Island, south of Chesterfield Inlet, and a good deal more was seen of the same Eskimos in the following months. They said that a party of white men (from Franklin's ships) came to their village, called Nachili, and that they all died during the winter, having previously deposited books in a cairn, which has remained undisturbed. The Eskimos offered to conduct Mr. Barry to the spot, but he was unable to undertake the journey, and returned home with this story to his employers. Messrs. Morrison and Brown intend to send Mr. Barry this year, in a schooner called the 'Eothen,' to visit the spot indicated by the Eskimos, and investigate their story.

It is possible that there may be something in what the Eskimos assert, and the question ought certainly to be well sifted. A very absurd letter on the subject recently appeared in the *Times*, in which it was assumed that the cairn in question was near Cape Inglefield, at

the western entrance of Hecla and Fury Strait. The mention of Cape Inglefield was merely an error of Mr. Barry's, and has no bearing whatever on the position of Nachili, which is more probably on the line of the Wager river.

### Professor Nordenskiöld's approaching Arctic Voyage.

—Professor Nordenskiöld has written an exhaustive report on his approaching expedition along the northern coasts of Europe and Asia. He considers that the best route into the Sea of Kara is by way of the Matochkin Straits, as the ice gets broken up there tolerably early in the season, and there are good harbours on the eastern side. From thence to the Yenisei mouth, a circuitous route to the southward is often necessary to avoid the large masses of floating ice, with which the Sea of Kara is encumbered until the beginning of September. The Professor expects to reach Port Dickson, at the mouth of the Yenisei, about the first few days of August. From thence to the eastward our knowledge of the coast is very meagre. In 1740, Minin reached  $75^{\circ} 15'$  N. latitude in a sloop, but was unable to explore after the 2nd September, "the season being too far advanced." Middendorf, in 1843, was informed by the Yakut Fomin, who had passed a winter in Taimyr Bay, that in the first half of August the ice gets driven by the south wind right out of sight of land. Cheliuskin surveyed the coast line between Taimyr and Cape Cheliuskin in sledges in May 1742, when the sea was frozen hard. Pronchichef, on the 1st September, 1736, advanced through open water nearly as far as Cape Cheliuskin, and Norwegian whalers have advanced to about the same latitude and  $68^{\circ}$  E. long., without meeting with ice. The Professor considers that the warming influence of the Great Siberian rivers must be very considerable, as he found the temperature of the current in the Yenisei as high as  $9^{\circ} 4'$  centigrade, and that of the Ob  $8^{\circ}$ , in the month of August. The only maritime gulf which is at all comparable with the Sea of Kara is the Gulf of Mexico, and it is known that there the force of the rivers is supposed to contribute largely towards the power of the Gulf Stream. As regards the sea eastward of Cape Cheliuskin, it was navigated by Russian expeditions in the last century; but though conducted with great resolution and courage, the sailing-vessels were too small, and manned by too inexperienced sailors, to achieve much, though they, too, seem to demonstrate that the sea is navigable during autumn. Both Pronchichef and Laptef, although greatly hindered by contrary winds, succeeded in reaching very nearly as far as Cape Cheliuskin; so it may be presumed that a well-appointed steam-vessel would have but little difficulty in doubling the cape.

With reference to the portion of the coast between the Lena and Behring Straits, there is much more information extant. From the middle of the seventeenth century the hope of doing a profitable trade or levying dues on the tribes inhabiting the coast, induced the Russian whalers to undertake many expeditions along it. On a map based on information in the Siberian archives, and attached to Muller's work, there is a route drawn along in that direction, with the words, "Route much frequented in former times, and undertaken in 1648 by three Russian vessels, one of which reached Kamtchatka." Of most of these expeditions, however, details are wholly wanting, although, owing to litigation regarding some of the discoveries made, Deshnef's expedition in three ships, in 1648, from Kolyma to the Anadyr river, has been chronicled with more exactness. After the foundation of Nishni Kolymsk, in 1644, many voyages were undertaken from the Siberian rivers, but the leaders of these were afraid of ever venturing far from land. Hedenstrom's expedition to the New Siberian Isles, in 1809-11, and Lieutenant Anjou's, in 1823, furnish little or no information regarding the navigability of the sea during the autumn. Sonnikof,

an inhabitant of Yakutsk and companion of Hendenstrom's, made a remarkable discovery in 1811. He found on the western side of the Island of Kotelnoi a winter hut, close to the remains of a vessel of a different construction from those of Siberia. He concluded, from several minor circumstances, that some seal-hunter had been driven thither from Spitzbergen or Novaya Zemlya.

Although Deshnef's expedition had established the existence of a strait between Asia and America, his discoveries were lost sight of, and the matter was not considered proved till Behring's voyage. Since Cook's voyage, in 1778, the whaling expeditions of Rodgers and Long have both demonstrated the probable navigability of the sea, and this opinion is borne out by private information derived by Professor Nordenskiöld from Yakutsk. His general conclusions are that the ocean north of Siberia has never been traversed by a perfectly seaworthy vessel, and still less by a steamer built for Arctic work. The small sailing vessels which have journeyed there have never ventured far from land, and have always retired into winter quarters at the end of the summer, the best time for navigation. A well-appointed steamer, he considers, would find no insuperable difficulty in traversing this route, from Cape Cheliuskin to Behring Straits, in one season.

**A Canadian Geographical Society** has been established in Quebec and the opening meeting took place on the 22nd December, under the presidency of Dr. Fortin, who, in his opening address, made mention of the natural resources of Canada as forming a legitimate subject of enquiry for the Society, and referred specially to her fisheries and forests as of great economic importance, and the more so, as those of the United States had, in some instances, been completely exhausted.

**Further Exploration of the Darien Isthmus.**—In our numbers for February, June, and October 1877, pp. 45, 162, and 276, we gave some account of the surveying expedition under Lieutenant Wyse. That officer returned to the isthmus on the 28th of last November. On the 8th of December he and his party left Panama, with the intention of thoroughly examining the various routes which have been mentioned as practicable for a ship canal between the Atrato and Panama. The party consisted of Lieutenant Lucien N. B. Wyse himself, and M. M. Reclus, P. J. Sosa, Lecharme, and Pouydesseau. Their first destination was Chepigana, whence they carefully examined the Chucunaque and Gandi. Then they proceeded to explore the Bayano route, as well as all the intermediate country. The examination of the Bayano route tended to confirm the report of Commander Selfridge, U.S.N., that a tunnel over 7 miles long would be necessary in opening a ship canal at that point. By the latest news the members of the expedition were in good health, and satisfactory progress was being made in the important work under Lieutenant Wyse's direction.

**The New President of Colombia.**—Ignorant newspaper writers in this country are never tired of talking contemptuously of the unceasing revolutions in South American States. In Colombia (formerly New Granada) there has never been a single successful revolution since the declaration of independence. The priests instigated a rebellion which broke out in July 1876, but it was put down, and peace was restored by General Trujillo in March 1877. Don Aquileo Parra, a merchant of Velez, became President in April 1876, and served his regular term of office for two years. In April 1878 he will be succeeded by General Julian Trujillo, who will hold the office of President of Colombia until April 1880. Julian Trujillo was born at Popayan on the 28th of January 1828; he was educated in the university of his native town, and became an advocate and a politician. Under General Mosquera the rising statesman not only acquired experience as a Finance Minister, but also learnt the art of war. In 1863 he had acquired

the reputation of being one of the ablest generals in Colombia. He has twice been President of his native State of Cauca, and he displayed great ability and skill in quelling the late priestly rebellion. Last September he was elected President by all the nine States which compose the Federation. General Trujillo is now engaged in examining the line for an important projected railway from Buenaventura to Cali.

**Statistical Department in Peru.**—The creation of a central Statistical Department in Peru, under the auspices and with the co-operation of the Government, has at length been secured. Don Manuel A. Fuentes, the accomplished author of the *Sketches of Lima*, the English version of which was published by Mr. Trübner in 1866, has been selected as the Director of this useful department. No better choice could have been made. The new Director has entered upon his duties with a full knowledge of the requirements, and of the immense difficulties to be overcome, especially as regards the absence of all local machinery for the collection of statistics. His plan is to establish, in all the provinces of Peru, special Statistical Commissions, which, with the co-operation of the local authorities, but independent of them, will undertake the collection, and regular transmission to the central office, of the required information. Dr. Fuentes is also devoting much attention to the elaboration of suitable machinery for taking the next census.

**Recent Earthquake and Flood in Peru.**—On the 2nd of December 1877, at 4.27 P.M., there was an earthquake at the city of Chachapoyas, in the valley of the Upper Marañon, the shock lasting twenty-five seconds. From 1.30 P.M. the sky was overclouded; at 4 there was a violent storm of rain, with lightning; and a few minutes after the rain ceased the shocks of earthquake began. The duration of the shocks and the rapidity of the oscillations were quite exceptional, the oscillations being from north to south. Many buildings were destroyed.

On the 20th of December there was a great inundation at Tarma. The river traversing the town became so much swollen, in consequence of a heavy storm, that it overflowed its banks, and inundated a large part of the town, as well as several estates and villages in the neighbourhood. All the crops of Collana and Acobamba were destroyed, and a wide extent of country was devastated. No such inundation has been experienced at Tarma for fifty years.

**Piaggia's Explorations in the African Lake Region.**—Signor Piaggia, who left Dufii, in Equatorial Africa, in company with Cavaliere Gessi, on the 7th March, 1876, for Lake Albert Nyanza, has furnished a brief notice of his own exploration of Lake Kapeki, or Ibrahim, which is reproduced in the *Bolletino* of the Italian Geographical Society for October last. He reports that he has discovered on the eastern coast of this lake a new outlet, about 60 yards wide, and called Massanga, which, according to the natives, loses itself in extensive marshes to the north-east of the lake, after a brief course. The lake itself, originally discovered by Colonel Long-bey, in 1874, is about 35 miles long and 15 miles wide, and varies in depth between 6 and 30 feet. It is tenanted by plenty of hippopotami and crocodiles, and the surrounding country abounds in large snakes, such as pythons, boas, &c. Otters, too, are plentiful, and are hunted by the natives for the sake of making carpets of their skins. The locality is extremely unhealthy, owing to its marshy nature, and Piaggia's followers suffered greatly from fever. On returning to Mruli, Colonel Gordon's station, situated about 30 miles west of the lake, Piaggia met some of King M'tesa's dragomans, who gave him a great deal of information about the topography of the surrounding country, and told him that about a month previously (*i.e.*, about the 24th of May, 1876), Mr. Stanley had

departed towards Bezebat, to the south-west of Lake Victoria Nyanza, in search of a copper-mine, of which he had heard from native report.

**Death of Captain Elton.**—We regret to have to record the death of this intrepid explorer on his way from the head of Lake Nyassa to the coast. Captain Frederick Elton first became known to geographers through his exploration of the Limpopo river in 1870. His paper on the subject was read at a meeting of the Geographical Society on November 13th, 1871, and published in volume xlii. of the *Journal* (1872). He descended the Limpopo as far as the confluence of the Lipalule river, and thence struck across to the Portuguese town of Lorenzo Marques, in Delagoa Bay. It fell to the perseverance and good fortune of Mr. St. Vincent Erskine to carry down the Limpopo from the junction of the Lipalule to the sea. While Sir Bartle Frere's Mission was engaged in visiting Mozambique and other ports to the southward, Captain Elton arrived at Zanzibar; and he afterwards wrote a narrative of his trip, in a series of letters to the *Natal Mercury*, which were reprinted at Durban in a separate form in 1873. In these letters he gave an interesting account of Mozambique, Zanzibar, Mombas, and Kilwa (see our number for January 1874, p. 427). He also contributed a paper on the same subject, and describing the copal districts south of Dar-es-Salem and the Rufiji river, which he ascended with Lieutenant Pullen, of H.M.S. 'Shearwater,' to the *R.G.S. Journal* for 1874 (vol. xlv., p. 227. See also our number for April 1874, p. 181). Captain Elton became First Assistant to the Political Agent at Zanzibar, and was afterwards appointed H.M. Consul at Mozambique. Here he had excellent opportunities of achieving further geographical work; and we sincerely regret the untimely death of this gallant young explorer.

**Death of the Belgian Explorers.**—In our number for November 1877 (p. 304) we announced the departure of the Belgian Expedition for the Exploration of Central Africa, consisting of Dr. Maes and Captain Crespel. It is now our duty to record the death of these two gentlemen of fever, at Zanzibar. They were seen by Mr. Stanley when he was at Zanzibar, on his way home, full of zeal and energy; and the sad news will have been startling in its suddenness. The King and people of Belgium will have the warm sympathy of all geographers in their loss.

**Life of Captain Flinders.**—We are glad to be able to announce that Mr. John J. Shillinglaw, who is now residing at Melbourne, is engaged upon a Life of Captain Flinders, the explorer of the coasts of Australia, under whom Sir John Franklin served. Mr. Shillinglaw is favourably known as the author of *A History of Arctic Voyages*, which was published just before the departure of the expedition of 1850-51. He has very diligently collected materials for his biography of the illustrious Australian navigator from colonial records and numerous other sources, and has now been engaged on the work for some years. Through the aid of Sir Henry Barkly he has also discovered a fine portrait of Flinders; and if all goes well, the work will go to press in the present year.

**Travels in Western China.**—Mr. Baber, of the Chinese Consular Service, has recently tracked the course of the Yang-tze river from near Tung-chuan to Pingshan. No European had ever been in the region before, and the course of the river (there called the Gold river) is altogether incorrectly laid down on the Jesuit maps. A line drawn south-west for a mile or two above Pingshan will, according to Mr. Baber, indicate its general direction. He describes the country as the wildest and poorest imaginable. Lieut. Gill (who accompanied the mission) appears to have traversed over much of the same ground in the northern part of the province as did the Pere Armand David and Mr. T. T. Cooper in their respective journeys.

## Correspondence.

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### THE COUNTRY ROUND LAKE NYASSA.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—As one of the members of Bishop Steere's original party for mission work in the vicinity of Lake Nyassa, I beg to offer a few corrective remarks, accompanied by sketch map, on the "Map of the Country Round Lake Nyassa," by Keith Johnston, F.R.G.S., in the August number of the above magazine.

There is no large river running into Lindi Harbour: river is a misnomer, as it is only a salt-water inlet, with two mountain torrents emptying themselves into it. According to native report they are respectively two hours and one hour long, or about 10 and 5 miles.

This would have been self-evident, I mean as to the large river, had Mr. Johnston been aware that the Nyassa road from Lindi led over the hills at the back or west of the town round the end of the arm that comes from the north-west, and so on trending towards the Rovuma. Had the river been there, Bishop Steere must have crossed it. The Yao Chief Machemba, the dread of Lindi and its vicinity, lives on the south side of the harbour and effectually closes any road that way.

The large river does not exist, however, as may be inferred from the number of streams crossed by Decken and Roscher which find their way into the sea about 5 miles south of Kisawera, not Kisawara Harbour, under the name of the Umbekuru. The late Commander Gray, of H.M.S. 'Nassau,' to whom we were greatly indebted for information regarding Lindi and its neighbourhood, told Bishop Steere that he had heard of a large river running into the sea, somewhere to the north of Lindi, and the Bishop despatched me with a companion to look for it. Owing to being sent a round-about way by the sea shore, and suffering from a severe attack of fever in consequence of a heavy march in a blazing sun, and our time being limited, we did not get farther north than Mchinga Bay, or Port Nungwa of the map, also surveyed by Commander Gray, and lately visited by Dr. Kirk in the R.M.S. 'Natal.' However, we heard sufficient from the natives to satisfy us as to its existence and great size in the rainy season, when it was reported to attain a breadth of about 1000 yards or thereabouts. We crossed two rivers on our way from Lindi, the Mbanga and Kera, the latter of which was reported about 30 miles long, besides a small but deep river flowing into Mchinga Bay, beyond which were the Nondo, the Ruvu, and the Umbekuru. My colleague, the late Rev. C. A. James, had, at the same time as we went to Mchinga, gone west to Lake Lutambo, where he remained for several weeks, and it was crossing an open waterless plain, in search of the same river, known further inland as the Kwem Kuru, that he was taken with last and, as it proved, fatal attack of fever.

Having been sent by the Bishop to Kilwa Kavinji to obtain porters by dhow, I asked particularly about the Umbekuru, and its mouth was pointed out to me, a little south of Kisawera Harbour. The mountains on the accompanying map to the west of Kilwa, were seen from the western brow of a hill at the back of the town, composed chiefly of ironstone and quartz, and about 400 feet high (by two aneroids). The distant mountains, apparently very lofty, were at least 50 miles off; and I should say, from their fantastic and jagged peaks, decidedly of igneous formation. They appeared to stretch right across the valley of the Rufiji, and may be the chain of mountains through which that river is reported to cut its way. Of the country to the west of Kilwa, I could get no information, and though I was there ten days, in the whole of that time only came across one man who could give any information as to the Rufiji. He described a journey he had once made up the north bank of the river for fourteen days, to Moroko, a land



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of grain ; they crossed many rivers of various depths, and there were rapids in the Rufigi, near Moroko. The people on the south side were Makua ; on the north, Rufigi. Maroko was now (1875) overrun by the Mavite.

This man had also been to Mererés, the chief of Usango, about which Dr. Livingstone made so many enquiries. He described Mererés as being in the fork between two rivers, the Rhwa and the Timbwe or Zimbwe, which came from Ufipa through the country of Muarooli. He drew a rough plan of the rivers on the ground, as neither Susi and myself at first understood what he meant, because he said in coming from Unyanyembe to Mererés he crossed no large river, and yet Mererés was between two. A glance at Cameron's map will show that the man was evidently speaking the truth as he came along the watershed between the Rhwa and Tanganyika. On being asked where the rivers went to, he unhesitatingly said "Rufigi."

He described the country rich in cattle and ivory, men armed with shield and assegais, wearing profusion of beads, but no other clothes. The Mazitu or Mavite five days south of Mererés. The caravan on leaving Usango crossed the Rhwa and journeyed to the coast along the north bank of the Rufigi, crossing many rivers, and passing through the countries of Upugi, Ukutu, Moroko (not the same as before), Kedai, Eringo, Makamba, Kwanimba, Kwandega, Veranji to Uboamaji. The man's name was Swedi Adiali. In all my cross questioning here and elsewhere my interpreter was Susi, the late Dr. Livingstone's faithful servant, and no mean geographer himself.

Hoping that this information may be of service to the geographical world at large,

I am, &c.,

ALFRED BELLVILLE, F.R.G.S.

—:o:—

A LANGUAGE-MAP OF AFRICA.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—My attention is called to a statement made in your last number by Mr. Robert Cust, that he is "collecting materials for a language-map of Africa." Will you allow me to inform Mr. Cust of the fact—which he does not seem to be aware—that the materials for such a map, with the map itself, have been already collected, and published by me in the volume on Africa recently issued by Mr. Stanford, and noticed in your columns. The map is, of course, on a small scale, but may be enlarged at pleasure, and the materials are as exhaustive as is, perhaps, possible in the present state of our knowledge. Mr. Cust calls for "a language-map of Europe," and other regions. He will, therefore, be glad to know that these also are either ready or in course of preparation for the corresponding volumes of Mr. Stanford's *Compendium of Geography and Travel*. When that series is complete, it is my intention to resume the subject in a separate volume, which will contain a complete classification of all known languages, based on their morphological and other relations, together with enlarged linguistic and tribal maps, covering the whole field. The languages and tribes of America, for instance, will be dealt with to the number of 1700, or thereabouts ; and I think I may promise Mr. Cust that there will be very few omissions of any consequence.

A. H. KEANE.

10, NORFOLK TERRACE, W.

[We are all aware of the language-map of Africa, and of the excellent chapter on the African languages from the pen of Mr. Keane. But the map is on far too small a scale to be of any practical use. It is to be hoped that Mr. Keane is adequately acquainted with the difficulties of treating the American languages in the way he proposes, especially as regards their relations to each other. Some of these questions have not yet been solved, even by students who have devoted many years to the subject.—ED. G. M.]

VOL V.

Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

Special Meeting of 7th February, 1878.

Mr. STANLEY'S EXPLORATIONS IN AFRICA.

A SPECIAL MEETING of the Society was held on the above date, in St. James's Hall, under the presidency of Sir RUTHERFORD ALCOCK, when Mr. STANLEY gave an account of his recent explorations. The hall was densely crowded, among those present being H.R.H. the PRINCE of WALES, the Prince Imperial, the Maharajah Dhuleep Singh, the Duke of Sutherland, the German Ambassador, Midhat Pasha, Lord Houghton, Lord Kinnaird, Lord Cottesloe, Lord Arthur Russell, Sir Henry Rawlinson, Sir Samuel Baker, Sir Harry Verney, Sir T. Fowell Buxton, Sir Douglas Forsyth, General Probyn, Colonel Ellis, Sir G. Nares, Sir Allen Young, Captain Cameron, R.N., Dr. Moffat, and many others.

In introducing Mr. Stanley, the PRESIDENT remarked that the distinguished explorer was in truth no stranger, He was already well known, and the nation owed him a debt of gratitude as the deliverer of Livingstone. His first exploration was a feat which might suffice for a man's life ; but in his second journey he had succeeded in tracing the Congo to its head source, which feat had placed him in the foremost rank of great explorers. Everywhere he had been received with welcome, and he (Sir Rutherford) felt sure that the Royal Geographical Society would not be backward in rendering due homage and praise to such an explorer.

Mr. STANLEY'S rising was the signal for tremendous cheering. When silence had been restored, he said that he should like to have spent a long time in preparing a paper which would have given a reasonably accurate idea of the sad Continent which he had crossed to the great meeting which, as the President told him, had assembled to do him honour. He was told, however, that it would perhaps be better to tell his story as he would do had he met some of those whom he addressed at a camp fire in Central Africa. Besides, he had not had time to put a word he had to say in writing, and sometimes when he thought of the thousands of letters he was expected to answer he really wished himself back in Central Africa. He had heard that an African Explorer, when asked by one of those Englishmen who indulged in milk-and-water-sort of talk how he had treated the natives of Central Africa, replied, "My dear Sir, I treated them like gentlemen ;" and he only wished to know how that explorer managed to do so. He would tell his story briefly and rapidly, but it would be mere affectation if he were to say he did not know that there were some present who did not agree with him in his treatment of some of the natives. If, however, there were any whose sensibilities he had shocked, he would like them to stand up so that he might see what they were made of. He flattered himself he had a little of the gift of measuring people, having made human nature his study, and to that fact he attributed much of his success in his march across Africa. When he met people who were kindly disposed, he treated them kindly. If he met a missionary he would try to learn from him how he proceeded in his work, and put in practice what he learned. It had been said by a certain anti-Stanley journal that he had been civilizing negroes with explosive shells, that he was a belligerent kind of person, and had shut the Continent instead of opening it. That was all nonsense, and he asked them not to believe it. Zanzibar, as they all knew, was the starting point of the explorer. On arriving there he sent his emissaries through the streets of the town to hunt up followers, and it was soon known

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that the "open-handed white man," as he was called, was again on the island. Fifty or sixty men soon came to him and asked what he proposed to do. He said he meant to cross the Continent, though he should have to cross mountains and lakes, to make his way through wastes and forests, and have to face strange and savage tribes and races and nations. They said it would take years to do, so that they could never hope to see their families or native land again; but when he reasoned with them, they asked him how much he would give them. He said he would give them three dollars a month, and from 150 to 200 eventually signed articles for that sum. After a time, however, they returned and demanded five dollars a month, saying that the last explorer had given that sum, and he was obliged to comply. The day of starting at length came, and they landed on the East Coast of Africa, which had been so thoroughly described by Livingstone, Grant, Speke, Cameron himself, and others, that he need not say more about it or of his route until he broke off from his former track and headed for Lake Victoria. Before reaching the lake, he made the acquaintance of a tall, swarthy prince, whose perfectly natural manner and friendly tone were such as to win their way to the heart. He had then, he said, for the first time seen a white man. From the district governed by that prince he made his way to the country of the Masaai, who, it was said, delighted in the drinking of blood. They were a warlike people, and from what he saw of them he could say that if any one wished to be murdered there was no people on the earth who would be more likely to gratify that desire than those of whom he spoke. The people of Soona were equally savage and more suspicious. He endeavoured to conciliate them by making them presents of old tin pots and exhausted sardine boxes, but finding that, notwithstanding this, one of his men was killed and another badly wounded, he thought it wise to move on, but could only do so successfully after three days skirmishing. Soon afterwards he reached the region over which M'tesa ruled—Nganda. In him he found a good and kind man, and before he left, M'tesa not only observed the Islam, but also the Christian Sabbath, and he also had the Ten Commandments, the Lord's Prayer, and the Golden Commandment of our Saviour, "Thou shalt love thy neighbour as thyself," cut upon wood that he might contemplate them daily. Here he found a great harvest for the sickle of civilization and Christianity. The missionary that was required must be a practical man. He should, of course, be a teacher of Christianity; but to be truly successful he must be able also to give instruction in the construction of dwellings, in the cure of diseases, in agriculture, and be something, too, of a sailor. Such was the man that was wanted for the work; a band of such men would be the salvation of Africa. But, again, he must be tied to no Church or sect, he must love God and his Son, and teach the moral laws, and be in charity with all men, belonging to no nation in particular, but to the entire white race, exhibiting practically the interest taken by them in the welfare of the black. It had been said that the African was unimprovable and irredeemable; but that he wholly and utterly denied. Having reached Lake Victoria, and going to the Albert, he became acquainted with another ruler named Ruminika, who was also a natural born gentleman. He found it, however, a more difficult thing to make a Christian of him than of M'tesa, but a very pleasant month he spent in the district of that Prince. They next came to Ujiji, which had been spoken of as the watering-place of explorers. He could not, however, enjoy it long, as he had to follow up the work his predecessors had left undone. After navigating Lake Tanganyika they came to Nyangwe. Mr. Stanley then proceeded to speak of the river Lualaba, which Livingstone had mistaken for the Nile, and of his successful voyage—one which was beset with all but insurmountable difficulties—down the Congo. To reach

it they had to make their way day after day through dense forests. The stories as to the ferocity of the natives of the towns and villages on the banks of the river terrified his men, and more than once he feared he would find himself deserted, and that the work he had set himself to do would remain unaccomplished. At length, however, the voyage was commenced. To pass the first falls they had to work night and day for 26 days, during which they cut 13 miles of road through forests, along which they carried their canoes. They were subject to constant attacks from natives. On one occasion no fewer than 63 war canoes came against them—the leading canoe being driven by 80 paddles—and each was filled with armed savages. He told his men that if they desired to see home again they must resist to the last, as they could hope for no mercy; but he ordered them not to fire till they were assailed, as they must first see what the natives came for. The order was strictly obeyed. It was not till poisoned arrows were shot at them and spears flung that they fired, and then the rattle of 52 muskets was heard in a country in which never musket had been fired before. He had done all he could to avoid fighting and only acted in self-defence; for his strong desire was to be and to remain on good and friendly terms with the various tribes he met with. Day after day, however, they were attacked, and, had in consequence, to suffer great privations, until, at last, they reached the cataracts. Fortunately the natives there were friendly. For five months they battled with every obstacle, till they reached the last cataract, 45 miles from Boma, and connecting the Congo with the Lualaba. From Tuckey's farthest to Boma was simply a fight against famine. Three days' journey from Boma he sent four men with a letter directed to any English resident, stating that 115 souls were in a fearful condition from want of food. Happily, the only agent from an English house in Boma got the letter, and he and the other merchants of the town sent them large supplies of biscuits and bread, and fish and rum, and tobacco. It was the relief of Lucknow over again. Thus was the work completed which he had set before him. In due time they reached the Cape, where one of Her Majesty's ships was placed at his service. He conducted his men back to Zanzibar, and as they touched the strand of their island they kissed the sand, and uttered the words, with which he would conclude,—"*La Allah il Allah!*" ("Thanks be to God.")

THE PRINCE OF WALES, in proposing a vote of thanks to Mr. Stanley said that after the most interesting, exhaustive, and entertaining account which the distinguished traveller and explorer who had just sat down has given us, it is impossible for me not to express in my own name my thanks for what we have heard to-night and, perhaps, I may be allowed, as the spokesman of this large assemblage, to tender to Mr. Stanley our cordial and sincere thanks for the interesting evening we have spent under the auspices of the Royal Geographical Society. There is nothing for me to add after the address we have heard, but I think it will be evident to all present the wonderful endurance Mr. Stanley has shown and the privations he has undergone for the sake of science and geography. We congratulate him on his safe return after all he has gone through, and we sincerely hope that, if it is his intention once more to take or make so difficult and arduous a journey as the one he has so successfully accomplished, I, for one and I am sure all present will join me in the hope that his journey will be as successful as that of which we have just heard him speak.

In seconding the vote, Sir SAMUEL BAKER remarked that much of the progress of African exploration was due to the discovery of a most useful drug—sulphate of quinine. Many mysteries remained to be solved in Africa. Its history remained unknown. Tribes had been discovered which must have been in existence when the Pentateuch was being written and the creation

of man described by Moses. There was not a chiselled stone to be found in the whole of Africa. It was singular that in every portion of that continent domestic fowls were found. Sheep and oxen were similarly found, though wild sheep and oxen were not. Therefore the question arose, Whence came the progenitors of these animals, if the people had no intercourse with any other portion of the globe? Tobacco, which was formerly believed to be confined to the continent of America, was found cultivated in most parts of Africa, but never indigenous. So with Indian corn, which was supposed to come only from America, it was found growing in most portions of Africa, but never indigenous. Neither was the castor oil plant, which was always found growing near habitations, indigenous. If Africa was to have a future she must have means of communication, and must have some natural productions which would lead to commerce, and lead the natives to industrial pursuits. As for Mr. Stanley, no one who had not travelled in Africa could appreciate his labours, and he was sure he would look back to the encouragement he had received that evening from the PRINCE OF WALES, which also expressed the voice and opinion of England.

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#### FRENCH GEOGRAPHICAL SOCIETY.

*January 9th, 1878.*—M. LEVASSEUR presiding. The Minister of Public Instruction announced that he had sanctioned a grant to the Society of 1000 francs, as payment for fifty copies of the *Bulletin* for 1878. The Princess Doria d'Istria sent a copy of a work called *Greece before the Greeks and the Albanians in Rumania*. M. F. DELONCLE advised the despatch of a tracing of a map of Africa, taken from a terrestrial globe containing valuable information regarding the travels and discoveries of the Jesuits and Portuguese Capuchins in the sixteenth and seventeenth centuries. M. DAUBREE, Director of the School of Mines, made announcement of an International Congress of Geologists, which will assemble at Paris on the 19th August.

M. D. CHARNAY gave an account of his ascent of Mount Popocatepetl, in Mexico. He made reference to previous ascents of the same mountain—the most notable of which was the ascent by five Spaniards in 1522, who were the first Europeans to reach the summit. M. Charnay's description of his own ascent was very interesting, and the view from the summit appears to have been most magnificent.

M. LEON ROUSSET, Director of the Arsenal of Chow-fu, read a paper on the basin of the Yellow River.

*January 23rd, 1878.*—M. DAUBREE presiding. M. DE FONVIELLE made a communication to the Society on the subject of Captain Howgate's schemes for Polar exploration. M. RAFFRAY read an account of his recent travels in the north of New Guinea. He made Dore in Geelvink Bay his head-quarters, and journeyed along the coast for a distance of about 100 kilometres, in the course of which he rectified the position of the mouth of the Prati, and discovered several other streams. Besides making some trips inland he visited the Sowek and Korido islands and made careful ethnological researches. He divides the population of the north-west of New Guinea into four families, viz., the Mafors, who are found in the Mafor and Mansinam islands, and at Dore and Amberbaki; the Arfaks, who live in the mountains around the bay at Dore; and the inhabitants of the Biak islands, who are likewise to be found at Korido and doubtless also at Jobi. These three families are closely connected. There are also the Karus, a cannibal race inhabiting the mountains overlooking the northern coast, and who differ greatly from the other Papuan races in the rounded shape of their head and other characteristics. M. Raffray compiled vocabularies of

the Mafor and Amberbaki dialects, and brought home extensive collections of native implements, besides photographs of ethnological types.

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#### PARIS SOCIETY OF COMMERCIAL GEOGRAPHY.

*January 10th, 1878.*—M. POMEL presiding. M. BEAUVISAGE read an interesting paper on the industrial wealth of Belgium, and recommended the establishment of an industrial museum at Antwerp, which is the chief outlet for the trade of the country.

*January 21st, 1878.*—Count FOUCHER DE CAREIL presiding. A letter was read from M. Ch. Hertz, the Secretary to the Society, who had reached the Ashanti country. The President gave an amusing and spirited account of Mr. Stanley's reception by the French Geographical Society, and expressed his opinion that Mr. Stanley, far from being a cold and reticent person, was astonished and dazzled by the civilisation from which he had been shut out for three long years. After giving credit to the proprietors of the *New York Herald* and *Daily Telegraph* for their liberality in organising the expedition, Count Foucher de Careil mentioned that at his departure Stanley weighed 11 stone 6 lbs., and on his return he weighed only 8 stone, but that he was picking up rapidly.

M. BEAUVISAGE referred to the charges of cruelty brought against Mr. Stanley, and mentioned, as a proof to the contrary, that he had sold three thousand pounds' worth of ivory for the benefit of his followers, and re-conducted them safely to their country.

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#### LYONS GEOGRAPHICAL SOCIETY.

*Monthly Meeting of December 27th, 1877.*—Lieut.-Colonel DEBIZE presiding. The Minister of War sent several maps of Algeria, with reference to Colonel Champanhet's researches on the creation of an inland sea and the laying down of a railway in the Sahara desert. The Canon CHRISTOPHE read the conclusion of his paper on the geography of Gaul according to Marcellinus; the former part having dealt with the administrative, historical, and topographical geography, and this part being devoted to a consideration of its physical character. Colonel CHAMPANHET read a paper on the future civilisation of Africa, in connection with the Brussels Conference.

*January 20th, 1878.*—Professor CH. PERRIN inaugurated a course of historical and military geography by a lecture on the movements of the armies and fleets of the Ottoman Empire up to the sixteenth century.

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#### IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

*Annual Meeting of January 11th, 1878.*

M. P. DE SEMENOF, Vice-President, presiding. The publications of the Society during 1877 were laid on the table. These included the Results of the Ethnographical and Statistical Expedition in the Western Provinces, one volume of the work of the Amu-Daria Expedition, the account of the levelling between the Aral and Caspian Seas, the fourth volume of the translation of *Ritter's Asia*, with appendices to the third volume, by Messrs. P. Semenov and G. Potanin; the seventh volume of the Memoirs of the Ethnographical Section, and the account of Colonel Prejevalsky's last expedition, entitled, *From Kuldja to the Tian-Shan and Lob-Nor*.

The SECRETARY gave obituary notices of the various

members of the Society who had died during the year under review, including the names of Messrs. N. Barbot de Marny, P. de Helmersen, and others. M. SREZNEVSKY then read the chapter treating of the Expeditions of the Society, including those of Messrs. Prejevalsky and Potanin in the North-West of Mongolia, Mainof in the Basin of the Volga, &c.; and the Vice-President read a telegram regarding Colonel Prejevalsky's recent illness, and a dispatch announcing Mikluko-Maklai's return from New Guinea to Singapore.

The award of the medals was as follows:—The Constantine Medal (awarded this year by the Ethnographical Section), to M. Zakharof, for his Dictionary of the Manchu tongue; Count T. de Lütke's Medal to M. Rykatchef, for his works on the climate of Russia in general, and particularly on atmospheric pressure in Russia in Europe. In the section of Physical and Mathematical Geography, a small Gold Medal was awarded to M. A. de Thilo, for his levels between the Aral and Caspian Seas; and to M. Marx, for Ten Years of Meteorological Observations. In the Ethnographical Section, a small Gold Medal was awarded M. Matreief, for his researches in regard to national customs and rights.

The Silver Medals were awarded as follows:—To M. Kuropatkin, for route surveys and barometric heights from Osh to Korle by way of Kashgar and Karashar. To M. Sidensner for his astronomical observations on the water-parting between the Ob and Yenisei rivers. To M. Mushketof, for his researches on the orography of the Tianshan. To Messrs. Struve and Moshkof, for their series of levels between the Aral and Caspian seas. To Messrs. Bolshef and Kramorof, for levels from Kimilter to Lake Baikal. To M. Schwanenberg, for the account of his journey in the schooner 'Zaria,' from the mouth of the Yenisei to St. Petersburg. To M. Noumellin, for eleven months meteorological observations taken at the mouth of the Yenisei. To M. C. Mulberg, for his assistance in the registration of meteorological observations at stations on the Amu-Daria. In the Ethnographic Section, to M. Efimenko, for his work on the customs of the inhabitants of the Arkangel district; and to M. Uspensky, for his work on the Kuku Nor country and the Mongols; and in the Statistical Section, to M. Stein, for certain researches in regard to funded property in St. Petersburg. A Silver Medal was also granted, by order of the Council of the Society, to Madame Clara Fuss for her botanical illustrations to the third volume of Colonel Prejevalsky's work on Mongolia and the Tangut country.

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#### SPANISH GEOGRAPHICAL SOCIETY.

In February 1877, a Spanish Association for the exploration of Africa was formed at Madrid, of which the King became President. The Association was to hold meetings, publish information, collect subscriptions, and promote African exploration. At the first meeting the King offered to defray the main part of the expenses of an expedition, the object of which would be to explore some parts of the west coast of Africa opposite to the Canary Islands.

In the numbers of the *Boletin* for August and September 1877, there are papers on the travels in Morocco of Don José Maria de Murga, under the name of Hajji Muhammad el Baghdadi; and in the September number there is an elaborate paper, with a map, on the kingdom of Tonquin, communicated by M. Soullère, the Spanish Consul at Saigon. The October number contains a paper by Don Juan Facundo Riaño on the travels of foreigners in Spain during the fifteenth century. Señor Riaño enumerates six travellers during that period, whose narratives have been preserved. The first was Messire Guillebert de Lannoy, an Ambassador from Flanders in 1405, who served in a campaign against the Moors of Granada, and went on a

pilgrimage to Santiago. The second was another Fleming named Jaques de Lalain, aged twenty-two, who came with the sole object of fighting on horseback and on foot with anyone who would accept his challenge. He died in 1453. Jorge Ehingen, a Hungarian or Swabian, who was in Spain from 1454 to 1457, and also at the siege of Ceuta, was the third. The fourth was an anonymous German, the text of whose interesting narrative was discovered by Don Pascual de Gayongos, in the British Museum. The most important, however, was the Bohemian Rosmital, who came to Spain in 1465, and wrote a very full account of all he saw. The sixth traveller was a herald named Machado, employed by Henry VII. of England, and probably of Portuguese nationality. He gives a curious and very detailed account of the dress of Queen Isabella. There can be no doubt of the importance of such accounts of travellers to illustrate historical and geographical knowledge of any country.

In another paper, in this October number, Don Enrique Dupuy de Lôme discusses the eastern question, and shows that the descendants of the conquerors of Lepanto take the same view in favour of freedom for oppressed nationalities as is held by the best and most patriotic among the countrymen of the heroes of Navarino.

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#### HAMBURG GEOGRAPHICAL SOCIETY.

*December 6th, 1877.*—Dr. NEUMAYER presiding. The President referred in warm terms to the loss of the African traveller Von Bary. Herr LINDEMANN, from Bremen, read a paper "On the Possibility of Sea Communication with Northern Siberia." The President spoke on the project of Count Wilczek and Lieutenant Weyprecht for an international series of Arctic observing-stations.

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*January 3rd, 1878.*—Dr. KIRCHENPAUER presiding. Dr. HILDEBRANDT, of Berlin, gave an account of his journeys in Eastern Africa since 1872, and a special notice of his journey in 1877, from Mombasa to Mount Kenia.

Herr FRIEDERICHSEN read a paper on Dr. Pfund's journeys in 1875 and 1876 in Kordofan and Darfur, based on his letters written in El-Fashir. These furnish information regarding Colston Prouth, and Purdy's expeditions, in the two former of which he (Dr. Pfund) held the position of physician and naturalist.

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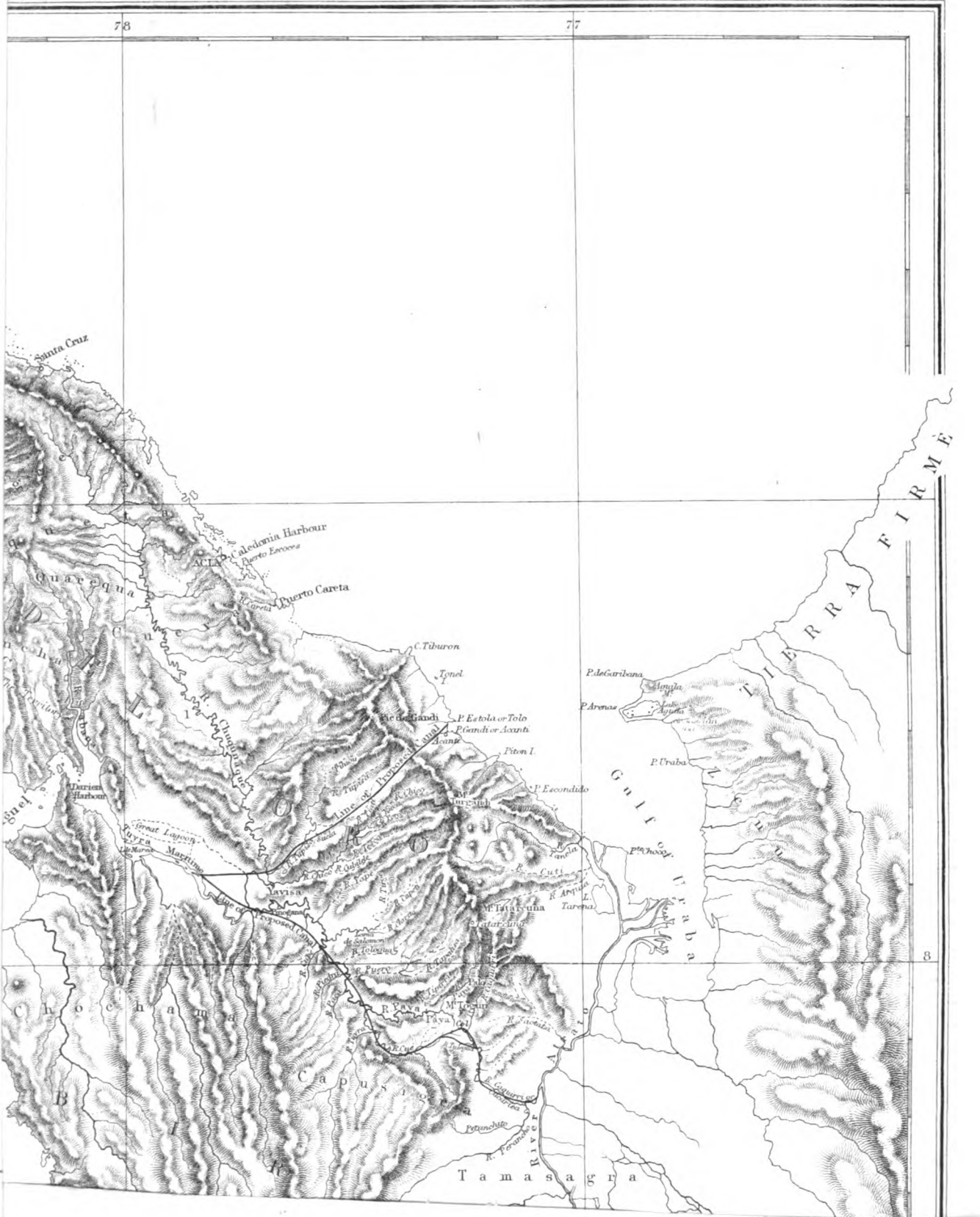
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pages 45, 162, and 276, and for March 1878, p. 75.  
VOL. V.

† *Waser's Description of the Isthmus* (1704), Cullen (1852,  
1857 and 1867), Gisborne (1852), M'Dermot (1857).

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...ssador from Flanders in 1405, who served in a ...  
 ...ain against the Moors of Granada, and went on a | Trübner & Co., 57 & 59, Ludgate Hill, London, E.C.

# THE GEOGRAPHICAL MAGAZINE.

APRIL, 1878.

## THE ISTHMUS OF DARIEN.

(*Surveys of Lieut. Lucien N. B. Wyse.*)

THE interest in the Darien Isthmus now rests on the question of a ship canal between the two oceans; but the attention of those who, in studying that important question, read the history of the isthmus, cannot fail to be arrested by the romantic adventures of its early explorers. The engineers who run surveys across between the Gulfs of Darien and San Miguel are on the very route which was made memorable by Vasco Nuñez de Balboa when he marched over it to discover the South Sea in 1513. That Isthmus of Darien, which is now so little known, was traversed in all directions by the adventurous explorers of the sixteenth century, by Vasco Nuñez and Morales, by Meneses and Espinosa, by Pedrarias and Andagoya. Here too were the scenes of the romantic exploits of Drake and Oxenham, of Wafer and Dampier, and of the ill-fated Scottish colony, the history of which has been so well told by Elliot Warburton.

The exploring surveys of Lucien N. B. Wyse during 1876 and 1877 (noticed in previous numbers\*) have again brought the Darien Isthmus prominently to the notice of geographers; and that officer has given a detailed account of his proceedings in the *Bulletin de la Société de Géographie* for last December.

The Isthmus of Darien is comprised between 7° 30' and 9° 30' N. latitude, and is separated from that of Panama by the mountains of San Blas. It is traversed by a cordillera which keeps nearer to the Atlantic than to the Pacific shore, so that there are no important rivers on the Atlantic slope. Three great arteries receive most of the water which falls so abundantly over this region, the rivers Bayano, Chucunaque and Tuyra, the two latter uniting and falling into the Gulf of San Miguel, after forming a great estuary which supplies a superb land-locked harbour. There are no traces of recent volcanic action on the isthmus, and borings that have been made, have not resulted in the discovery of crystalline rocks. A communication has evidently existed between the two oceans at a recent geological period, but the epoch cannot be fixed owing to the paucity of fossils. The coasts, especially on the Atlantic side, are lined with coral reefs; and the plains are formed of clay-sandy alluvium, while higher up a schistose rock crops out, with sandstone and a calcareous conglomerate. Iron,

copper, silver, and gold abound, especially in the western part of the region. A luxuriant vegetation covers the whole land, making it difficult to obtain a general view, and rendering the work of the explorer very laborious.

There are two seasons in the isthmus. The first, from January to April, is dry and agreeable. The rains begin in May on the coasts, they diminish in quantity from the end of June to August; but the fall is extraordinary from August until the end of November, when the rivers overflow, and the low plains are inundated. Lieut. Wyse considers that the isthmus does not deserve the character of insalubrity, which it has got, and he says that, with the exception of some localities, situated near stagnant marshes, the country is healthy, especially the Pacific slopes. In this opinion his predecessor, Commander Selfridge, concurs.

The aborigines of Darien are of Carib race, and belong to the Indian tribe of Cunas or Irraiques, called *Tule* in their own language. The men occupy themselves in fishing and hunting; while the women do all agricultural and indoor work. A very full account of them at the time of the discovery, in 1513, is given by Pascual de Andagoya, in his narrative published by Navarette,\* and we have further particulars from Lionel Wafer, and other sources.†

The Colombian Government granted a concession on the 26th of May 1876 for a ship canal across the Darien Isthmus, which led to the exploring expedition commanded by Lieutenant Wyse. The Committee for exploring the isthmus was formed in October, 1876, in Paris, with General Turr as president. The command of the expedition was entrusted to Lieut. Wyse, who sailed from St. Nazaire on 6th of November with a large staff of assistants. These were Lieut. Reclus; Captain Bixio of the Italian army; M. Celler, an engineer, in charge of the levelling operations; Mr. W. Brooks as engineering geologist; MM. Gerster, Millat, Barbiez, Musso, Baudoin, Lacharme, Sosa, and Archibald Balfour, engineers; Dr. Viguier, naturalist; MM. Genty, Charlot, Merendol, Lenoan and Giocanti, assistants, and M. Pouydesseau, Secretary to the commander of the expedition. Two Colombian interpreters, named Carranza and Recuero, were also attached to the expedition.

Lieut. Wyse determined to commence operations

\* See our numbers for February, June, and October, 1877, pages 45, 162, and 276, and for March 1878, p. 75.

\* Translated and edited for the Hakluyt Society in 1865.  
† *Wafer's Description of the Isthmus* (1704), Cullen (1852, 1857 and 1867), Gisborne (1852), M'Dermot (1857).

on the Pacific side, and the party was conveyed from Panama to the Gulf of San Miguel in a steamer freighted for the purpose, in December 1876. Up to Chepigana, a point to which large ships can be taken, the existing maps are sufficiently correct, especially that executed by the officers of the American corvette 'Resaca' in 1871, and attached to the report of commander Selfridge. The vast estuary formed by the rivers Tuyra, Chucunaque and Sabana is protected at its entrance, by picturesque islets, like baskets of verdure rising from the sea. The harbour thus formed is surrounded by high land, and the magnificence of the scenery is only equalled by that of the harbour of Rio de Janeiro. To Lieutenant Reclus was entrusted the duty of surveying the navigable part of the Tuyra and the harbour. The most important rivers which fall into the harbour are the Sabana, the Chucunaque, the Seteganti, the Marea or Pagre, the Balsas or Tucuti, besides various small torrents. The affluents of the Tuyra between the confluence of the Chucunaque and the sea, are the rivers Pirri and Uruti, and the ravines, Marranganti, Quiperti, Molinera and Estanislaio.

On the 14th of December 1876 the expedition arrived at the village of Pinogana, a little above the limit of the tides, where a depôt of provisions and stores was formed, and where carriers and labourers were engaged. This brought the number of men employed in the expedition up to sixty. Lieut. Wyse then proceeded up the course of the Tuyra, fixing the positions of its numerous tributaries; and on the 28th he discovered the pass of Tihule, the lowest in the whole country. He then returned to Pinogana, and on the 8th of January 1877 the expedition had the misfortune to lose Captain Bixio, one of the most zealous and active of its members.

During January the engineers continued the survey of the Tuyra, while Lieut. Wyse explored the valleys of Capeti, Pucro, and Tapalisa; and on the 15th all the members of the expedition were re-united at Paya. Here Dr. Vignier had good opportunities for studying the manners and customs of the Darien (Cuna) Indians; and he has communicated an interesting paper on their rites and mode of sepulture to the French Anthropological Society. Meanwhile the levellings were continued with a view to determining the lowest point on the water-parting between the two oceans. It was finally established that the least elevated point was the pass between the Tihule and the Nalubquia. The distance between the waters of the two slopes, at this point, is not more than 225 metres, or 246 yards; and the height of the pass above the level of the Pacific at the lowest tide is 466 feet. On the 22nd of January, Lieuts. Wyse and Reclus reached the Atlantic at Pisisi by an Indian road following the Tulegua to its confluence, with the Caquirri which falls into the Atrato. MM. Barbiez, Millat, and Sosa were entrusted with the levelling operations along the course of the Caquirri. On his return to Paya, Lieut. Wyse received the sad news of the death of Mr. Brooks, which took place on the 26th of January owing to a wound from the bite of a vampire, which his great age rendered fatal.

The commander of the expedition then determined to examine the narrow region, which however is wild and unknown, between the Tuyra and Chucunaque and the Atlantic. MM. Reclus and Lacherme were

ordered to execute a line of levellings from the confluence of the rivers Aputi and Chuputi with the Tuyra, to the neighbourhood of Port Gandi or Acanti in the Atlantic. The direction, which is N. 36° E. (true), corresponds with that of a very important valley which Lieut. Wyse had obtained a view of by cutting down the trees on the summit of the hill of Tuno, near Pinogana. Meanwhile Lieut. Wyse himself set out for Yavisa, the chief place in the Darien district, situated on a peninsula formed by the Chucunaque and Yavisa rivers. This village has 600 inhabitants, and from it, as a base of operations, the explorer studied the course of the river Chucunaque. He found that this river is deeper than the Tuyra, and that the tide ascends it for a considerable distance. From a hill above the Yavisa, Lieut. Wyse saw a depression in the cordillera, which he determined to reach by following the course of a principal tributary of the Chucunaque called the Tupisa, and thence up the Tiati. The elevation of this part of the ridge admits of a canal being carried over it by an open cutting; but further exploration was impeded by the torrents of rain. On the 19th of May, a third member of the expedition, M. Musso, fell a victim to his scientific zeal.

The conclusion arrived at was that a canal could not be constructed by the route of the Tuyra and Caquirri, without heavy tunnelling and locks, owing to the thickness of the solid rock that must be excavated. But Lieut. Wyse reported that a canal directly up the valleys of the Tupisa and Tiati was feasible, and this is the route which he now recommends. The results of this first expedition are satisfactory, and Lieut. Wyse, after warmly thanking his own colleagues for their zealous co-operation, concludes his paper by paying a just tribute to the value of the work done by the explorers, who immediately preceded him on the isthmus, Commanders Selfridge \* and Lull of the American Navy.

As we announced in our last number (p. 74), Lieut. Wyse has proceeded a second time to the isthmus, and we believe that he and his colleagues have been completing their surveys during the season of 1877-78.

## ESKIMO REPORTS

RESPECTING

### SIR JOHN FRANKLIN'S EXPEDITION.

WE noticed the reported existence of records of Sir John Franklin's Expedition at page 74 of our last number. The matter has since been carefully investigated by Chief Justice Daly, the President of the American Geographical Society, who gave the results in his recent Annual Address.

The ascertained facts are as follows:—In 1872 Captain Potter, in command of an American whaler in Hudson's Bay, met some Eskimos of the Nachili tribe near Whale Point, to the south of Repulse Bay. The Nachilis are the natives of the Boothia Isthmus, often mentioned in the narrative of Sir John Ross.

\* Commander Selfridge executed his surveys in 1872 and 1873. (See our numbers for April 1873, p. 32, and July 1873, p. 170.) A Peruvian expedition, under Captain Carrillo, was sent to co-operate with Selfridge. (See our number for October 1873, p. 299, for an account of his proceedings and their results.)



They told him that a party of white men came, a long time before, to a place in the Gulf of Boothia where the Nachili were then wintering, and that they all died there. Captain Potter also obtained some silver and other things belonging to the Franklin Expedition from these people. In 1877 Mr. Thomas F. Barry, in the whaler 'A. Houghton,' belonging to Messrs. Morrison and Brown, of New York, wintered at Marble Island, off the mouth of the Wager river. He was visited by other Eskimo of the Nachili tribe, from whom he obtained a spoon with Sir John Franklin's crest upon it. They told him exactly the same story as had been told to Captain Potter five years before. Two, who were between fifty and sixty years of age, said that they had seen the white men. They added, that the white men had a leader, but that when the spring came they were all dead. After a good many had died, the rest made a cairn, and put under it some things like the book in which Barry was writing, and which the Nachili examined. They offered to go and point out the spot where the cairn still remains, with the books under it; but it involved a journey of several hundred miles, and Barry was unable to undertake it. When asked to point out the position of the island where the white men died on the map, they always put their fingers on a spot in the unexplored part of the Gulf of Boothia N.W. of the entrance to Fury and Hecla Strait, in the direction of Felix Harbour of Ross, on the east coast of Boothia. The wonderful accuracy of these people in delineating coast lines and islands within their actual knowledge is well known from the narratives of Parry and Ross.

Chief Justice Daly has had a long and satisfactory conversation with Mr. Barry, and is thoroughly satisfied of his truthfulness; while Joe (the faithful companion of Captain Hall) bears testimony to Barry's competent knowledge of the Eskimo language. Sir John Ross found that the Nachilis of Boothia were well acquainted with the route to Repulse Bay; and both Ross and Parry ascertained that the Eskimo were acquainted with an extent of country equal to 400 miles of coast, so that the presence of Nachili at Whale Point is quite probable.

We fully concur in the opinion of Chief Justice Daly, that these reports, whether accurate or not, are sufficiently important to call for a searching investigation on the spot. The fact of the same story having been told by separate parties of the Nachili tribe in 1872, and again in 1877, is a proof, at all events of *bona fides*, and of the belief of the tribe in the truth of what they say; while the testimony of two men who were alive and present when the strangers died is presumptive evidence of its accuracy. Moreover, a version of the same story was told to Hall in 1867, when he wintered near Igloodik. He received information that some of Franklin's people had been in Fury and Hecla Strait. He also heard of a cairn built by white men, which he visited in the spring on the west coast of the Gulf of Akkoolee. It proved to be a cairn built by Hudson's Bay explorers in 1847. But this was quite a distinct report from that referring to the white men in Fury and Hecla Strait. The latter is no doubt a version of the same story that was told to Mr. Barry, and, so far as it goes, is a confirmation of it. Hall actually found relics of white men at Gifford river, on the north side of Fury and Hecla Strait, in June 1878.

A comparison of the reports of the Nachili Eskimos with the facts already ascertained respecting the fate of the Franklin Expedition will throw some light upon the question.

On the 22nd of April 1848 the 'Erebus' and 'Terror' were abandoned, and on the 25th the officers and men, consisting of 105 souls, were at Point Victory, on the north-west coast of King William Island. This fact was discovered by Sir Leopold McClintock and Captain Hobson, when they found a record containing the information, and signed by Captains Crozier and Fitzjames. On the 26th the officers and men were to start for Back's Fish river. It is certain that they did start, and that some at least reached Montreal Island, at the mouth of the Back river, a distance of 250 miles by sledge route from the ships. For McClintock found the skeleton of a steward on the beach 135 miles from the position of the ships. Captain Hall found a skeleton on Todd Island, in the strait between King William Island and the coast of America, which has been identified as that of Lieutenant Le Vesconte, of the 'Erebus.' Anderson and McClintock found further traces on Montreal Island. McClintock also obtained several relics from natives on the east coast of King William Island. They told him that the wreck of a ship was stranded in a position now believed, from Hall's report, to be O'Reilly Island, on the western side of Adelaide Peninsula; and they told Hall that one dead body was in it. All this evidence proves, beyond doubt, that the whole of the survivors left the 'Erebus' and 'Terror' with the intention of making for the Fish river, by marching round the west coast of King William Island; that some dropped by the way; but that others actually reached Montreal Island, in the mouth of that river.

But there is evidence that a detachment gave up this plan, and returned to the ships. On the 30th of May, 1859, Sir Leopold McClintock came upon a large boat resting on a sledge, with two skeletons in it, and her head pointing N.E., back to the position of the ships. The conclusion was inevitable that the unfortunate explorers had over estimated their strength, and had found that the provisions they had taken with them could not hold out. Then a detachment must have set out to return to the ships for fresh supplies, with this boat. Their strength failing after a time, they must have abandoned the boat, and left the two men who were unable to proceed. It seems clear that this party did reach the ships, for every soul left them on April 22nd, while the Eskimos found a dead body in the wreck. But they only found one body, consequently the rest of the party must have left the ships again.

The question now arises as to whither this forlorn party would have turned its steps. It is improbable that the men who had returned would have again set out upon a route the difficulties and horrors of which they had already experienced. Obviously they would have made for the nearest known point where there was the faintest hope of succour. At that time the nearest point known to be inhabited was Nachili or the Boothia Isthmus, near Felix Harbour, where Sir John Ross had wintered in 1829—30, and where he was visited by Eskimos. Thence they might have hoped, in another year, to have made their way to Igloodik, where Parry kept up such friendly relations

with the Eskimos in 1823—24, or to Repulse Bay, and finally to a settlement in Hudson's Bay. While the distance from the ships to the mouth of the Fish river, by sledge route, is 250 miles, the distance to Felix Harbour is only a little over 120 miles.

Now it is precisely on the line, from Felix Harbour to Igloodik, that the Nachili Eskimos state that the Island is situated where the white men built their cairn, deposited their books, and died. This portion of the Arctic Regions has never yet been searched, and most of it is unknown. It includes the east coast of Boothia from Stillwell Bay to Lord Mayor Bay, a distance of 118 miles; the opposite coast from Cape Kater to Fury and Hecla Strait, a distance of 170 miles, which is entirely unknown; and any islands that may exist between the two coasts, in the undiscovered southern part of the Gulf of Boothia.

The evidence against the reports of the Nachili is that they had not been heard of before by former able searchers and inquirers in the same direction. But this is negative evidence only, and undoubtedly the island, pointed out by the Nachili Eskimos, ought to be visited and carefully examined. We believe that Messrs. Morrison and Brown, of New York, have it in contemplation to despatch Mr. Barry in a schooner, called the 'Eothen,' this year, to make a journey from Hudson's Bay to the spot, under the guidance of his old Nachili friends.

But the English ought not to be idle, for it is our bounden duty to follow up these traces of our lost countrymen. A steamer should be sent down Prince Regent's Inlet to the Gulf of Boothia, equipped for a winter and provided with the means of sledge travelling; in order to complete the search over the unexplored area. We think that the considerations stated above are of sufficient weight, not only to justify this completion of the Franklin search, but to make it an imperative duty; while such an expedition would, under any circumstances, do much valuable geographical work by exploring the region between Cape Kater and Fury and Hecla Strait.

#### THE VALLEY OF THE YEN-E-SAY (YENESEI).\*

The Yenesei, pronounced Yen-e-say', is said to be the third largest river in the world, being only exceeded in size by the Amazon and the Mississippi. The principal stream rises in the mountains of Central Mongolia, enters Siberia near the famous town of Kyakh'-ta, on the Chinese frontier, and flowing through Lake By-kal', passes Eer-kutsk' (Irkutsk) the capital of Siberia, under the name of the An'-go-ra or Vairkhuya, Tun-goosk', and enters the smaller stream, whose name it subsequently bears, a few miles to the south of Yen-e-saisk'. Up to this point its length may be roughly estimated at 2000 miles, and judging from the time it takes to sledge across the river at Yen-e-saisk', its width must exceed an English mile. Following the windings of the river from the latter town to the Arctic circle, the road is calculated as a journey of

800 miles, during which the waters are augmented by two important tributaries, the Pod-kah'-min-a Tun-goosk' and the Uizh-ni Tun-goosk', which increase the width of the river to more than three English miles. On the Arctic circle it receives an important tributary, the Koo-ray'-i-ka, about a mile wide, and somewhat more circuitously than appears on our maps, travels to the islands of the delta, a distance possibly slightly over-estimated at 800 miles, during which the average width may be about four miles. The delta and lagoon of the Yen-e-say' are about 400 miles in length, and must average 20 miles in width, making the total length of the river about 4000 miles.

Throughout the whole extent of the river, as far as I travelled upon it from Yan-e-saisk', in lat. 58° to Gol-chee'-ka in lat. 71½°, the banks are generally steep and lofty, from 60 to 100 feet above the water level, and, so far as I could learn, comparatively little land is covered by the summer floods. In this respect it presents a marked contrast to the Obb. The villages on the banks are from 20 to 30 versts (15 to 20 miles) apart, and are of course built upon high ground. In the winter, relays of horses and sledges, and in the summer of rowers and boats, are to be obtained at these villages. As we sledged down the river, we had always a heavy climb up to the post stations; and in descending again into the bed of the river, it sometimes almost made our hearts jump into our mouths to look down the precipice, which our horses took at a gallop, with half a dozen villagers hanging on to the sledge to prevent an upset, a feat which they performed so cleverly, that, although many a peasant got a roll in the snow, we always escaped without any serious accident. We found a good supply of horses as far as Too-ro-kansk'. The second stage from this town we travelled by dogs, and completed the rest of the journey with reindeer. The dogs were fine fellows, black, white, piebald or brown, with long hair, small ears, and bushy tail turned over the back. They never seemed tired, never tried to shirk their work, were good-natured and tractable in the extreme, and are so sagacious that it is a common practice, at the end of a stage, to send the team back to the last station alone with the empty sledge. The harness is of the simplest construction possible, being nothing but a padded belt over the small of the back, passing underneath to the sledge between the hind legs.

Soon after leaving Yen-e-saisk' agriculture practically ceases. A few cows graze on the meadows near the villages, and hay is cut for their use during winter, but the villagers are too busy fishing during the short summer to till the land. At Sit-o-vah'-noff, however, not far from Too-ro-kansk', the unfortunate Scop'si cultivate potatoes successfully.

The banks of the Yen-e-say' are clothed with magnificent forests up to the Arctic circle, but northwards the trees rapidly diminish in size, and disappear altogether soon after leaving Doo-din'-ka, in lat. 69½°. These forests are principally pine of various species. The larch extends further north than any of the other pines, and is abundant, though small, at Doo-din'-ka. Further south it attains large dimensions. At Yen-e-saisk' a larch pole suitable for the mast of a ship, 36 inches diameter at the base, 18 inches diameter at the apex, and 60 feet long, may be bought

\* The Russian names in this paper are all spelt phonetically. The only explanation required is that *kh* represents the German guttural *ch*. I have accented the syllable upon which the emphasis must be laid, a very important point in the pronunciation of Russian.

for a sovereign. This hard, dark wood looks very well for the walls and ceilings of the peasants' rooms. The spruce fir, perhaps the most elegant tree in the Yen-e-say' forests, with branches almost down to the root, and trailing on the ground, is still more abundant, and extends nearly as far north, say to lat.  $69^{\circ}$ . The Siberiaks look upon this tree as one of the most important for commercial purposes. The wood is white, of very small specific gravity, and very elastic, and is said not to lose its elasticity by age. It is the favourite tree for ships' masts, and is considered the best substitute for ash for oars. Snow-shoes are also generally made of this wood. The quality is good down into the roots, and it makes the best knees for shipbuilding, not requiring to be cut out of the solid or artificially bent. It is, however, subject to very hard knots, which are said to blunt the edge of any axe not made out of Siberian steel. The Siberian spruce is less abundant, and does not extend so far north. I did not observe it north of lat.  $63^{\circ}$ . It differs from the common spruce in having a smooth bark of an ash-grey colour. The leaves are also of a much darker, bluer green. It has little commercial value on the Yen-e-say', the wood being soft, and liable to crack and decay. Being easy to split, it is largely used for firewood and for roofing. The Scotch fir, with the upper trunk and branches almost of a cinnamon yellow, is in many places the most abundant forest tree, but does not extend further north than lat.  $62\frac{1}{2}^{\circ}$ . The Siberiak is, however, proudest of his cedar, a tree very similar in appearance to the Scotch fir, but more regular in its growth, clothed with branches to nearer the ground, and with an almost uniform grey trunk. The wood is dark, but not so dark as larch, and there is very little of the white inferior wood next the bark. If stacked too long in the forest, it is liable to be attacked by the worm, but for furniture and indoor work it is considered to be the best timber in Siberia. It is said never to rot, or shrink, or warp, or crack. It is soft and easy to work, but has nevertheless a fine grain, and is almost free from knots. The Ost'-yaks use it for building their ships. They take a trunk 2 or 3 feet in diameter, split it, and of each half make a wide, thin board. The rest is wasted. Such an extravagant tool is the axe! The Russian peasant is still more prodigal with his timber. It is by no means an uncommon thing to see magnificent cedars cut down, merely to be stripped of their cones, to provide the peasant with a sackful of his favourite cedar-nuts. I noticed this tree up to lat.  $67\frac{1}{2}^{\circ}$ . The birch is common up to lat.  $69\frac{1}{2}^{\circ}$ , and in various places I noticed that, where a pine forest had been burnt or cut down, it appeared to be immediately replaced by a luxuriant growth of birch. The creeping birch and two or three sorts of willow are common in suitable localities on the tundra as far north as we went, *i.e.* lat.  $71\frac{1}{2}^{\circ}$ . The alder was abundant at  $69\frac{1}{2}^{\circ}$ , and the juniper at  $69^{\circ}$ . I did not observe the poplar further north than lat.  $66^{\circ}$ . The Ost'-yaks hollow their canoes from the trunks of this tree.

We came into contact with several of the native races. The Russians call them all Asiatics. The name in general use among the Polish exiles, with whom I was able to converse in German, was "die Wilden."

The most northerly race is that of the Sam'-o-

yades. They extend from the Kah'-nin peninsular in Europe to the North East Cape in Asia, occupying the land to about 300 miles from the coast, exceeding that distance at the Gulfs of the Obb and the Taz, the whole of the shores of which they are said to frequent.

The Yu-raks' are not a numerous race, and occupy the district between the east shore of the Gulf of the Taz and the Yen-e-say', from the Arctic circle to about  $70^{\circ}$  N. lat. They seem to me to be very nearly allied to the Sam'-o-yades, especially to the Sam'-o-yades of the Pet-chor-a.

The Ost'-yaks are distributed immediately south of the Yu-raks', from the Arctic circle to the Pod-kah-min-a Tun-goosk'. They seem also to be nearly allied to the two preceding races, and to speak a dialect of Sam'-o-yade, and must not be confounded with the Ost'-yaks of the Obb, who are said to be a Finnish race.

The Dol-gahn' territory is bounded on the north by the Sam'-o-yade land about  $70^{\circ}$  N. lat., on the south by the Arctic circle, and on the west by the Yen-e-say', from which river it extends eastward 300 or 400 miles. These people are of quite a distinct race. Instead of being sallow complexioned like the races previously mentioned, they are more copper coloured, and if we may judge by the taste they display in ornamenting their dresses with beads, more civilized. From their language, and especially their numerals, we may infer their close relationship to the Tatars of Western Siberia and Eastern Russia, and also to the Turks. They must, however, have separated from these nations before the latter became Muhammadan. They are said to possess calendars, made of wood or mammoth ivory, hexagonal and tapering slightly from the centre to each end. On these the days and months are marked, with signs for the Russian holidays. There are other signs upon them, said not to be Russian, but to resemble Runic characters. Their nearest relations are said to be the Yah-kuts', a race which we did not meet with, but who, we were told, occupy the district watered by the Kat-an-gar' river from  $70^{\circ}$  to  $73^{\circ}$  N. lat. Whether these Yah-kuts' are of the same race as those inhabiting the valley of the Lay'-na (Lena) I am unable to say.

The Tun-goosks' occupy the districts on the east bank of the Yen-e-say', drained by the Uizh'-ni Tun-goosk' and the Pod-kah-min-a Tun-goosk'. They are also a copper-coloured race, but of a very low type of feature. I was told that their language is also nearly allied to that of the Dol-gahn. If this information is correct, they are probably a different race to the Tun-goosks' of the the Lay'-na

Part of these tribes have been nominally converted to Christianity, but by far the greater portions prefer the purer faith of their ancestors to the fetishism of the illiterate Russian peasant. Like the North American Indians, they believe in a great spirit, and have vague notions of happy hunting grounds beyond the grave. They do not bury the dead, but lay them out on the tundra or in the forest, in their best fur, with their bows and arrows and a supply of food. Their favourite reindeer is also slaughtered and placed by their side, so that they may not arrive in the next world altogether unprovided for. They have a semi-fetishism of their own. Each family has a collection of household gods, but these are used for divination and not for worship. These images are carried on a

sledge, set apart for their use alone, drawn by reindeer reserved for this purpose only, and they are covered by a clean reindeer skin, *i.e.* one upon which man has never slept. The diviner is called a Sham'-man, and answers to the medicine man of the North American Indians. His dress is hung round with scores of pieces of iron, sometimes rudely fashioned into the shapes of animals or fishes. The Sham'-man arranges the household gods on the sledge, whilst the people stand in a circle around him. Then they begin to dance round, until they and the Sham'-man become excited, the latter getting into a state bordering upon frenzy, and sometimes foaming at the mouth. In this state he is supposed to exercise supernatural influence upon the sick, or upon the weather, or to give supernatural information respecting lost reindeer, or productive hunting or fishing grounds.

The great event of the year in the valley of the Yen-e-say' is the annual battle between the sun and the winter forces, ending in the breaking up of the ice on the great river—a stupendous performance, the magnificence of which can scarcely be imagined by those who have not been eye-witnesses of the scene.

Last year, when Captain Wiggins and I were on the Yen-e-say', the ice broke up in Yen-e-saisk' on the 1st of May. On the 21st it was broken up at a village 200 miles north of Too-ro-kansk'. Two days later 100 miles more were broken up. On the 1st of June the first movement of the ice at the Arctic circle took place. On the 12th the revolution took place at Vare'-shin-sky, in lat. 69°, and on the 18th at the island of Mah'-la Brek'-off-sky, in lat. 70½°, and two days later at Gol-cheek'-a, in lat. 71¼°.

On the Arctic circle, the first real indication of summer was the appearance of a swan on the 5th of May. On the 9th we had the first rain, and saw the first goose. On the 24th the water under the ice had risen so much that the ship, which had been frozen in on the 17th of the previous October, floated. On the morning of the 1st of June, a slight revolution in the ice, at the juncture of the Koo-ray'-i-ka and the Yen-e-say', took place, and early the following night the Yen-e-say' rose so rapidly that it began to flow up the Koo-ray'-i-ka. By midnight the ice on the Yen-e-say' south of the Koo-ray'-i-ka was broken up, and thousands of acres of pack ice were marched up the smaller river, at speeds varying from 4 to 6 knots an hour. The snow, which up to this date had covered the ground to the depth of 6 feet, began to melt rapidly, and migratory birds began to arrive in countless thousands.

About midnight, between the 2nd and 3rd of June, an enormous pressure from above came on somewhat suddenly. The great field of ice to the north of the Koo-ray'-i-ka was broken up. Many more thousands of acres of pack ice were marched up the Koo-ray'-i-ka, and we frequently saw huge icebergs driven down the Yen-e-say' at a speed not less than twenty miles an hour. All this took place to the accompaniment of a perfect babel of birds. The cries of thousands of ducks and geese, the demoniac laughter of gulls, and the screams of the red-throated and black-throated divers, like the cries of children in pain, filled the air. This lasted for fourteen days, the river alternately rising and falling, the ice being alternately marched up the Koo-ray'-i-ka, and then marched down again, the total rise in the rivers during this

period being upwards of 70 feet. At last the sun, having made an alliance with the south wind, came off victorious, and the last march past of the defeated forces of winter was over, and for seven days more the tagrag and bobtail of the great Arctic army came straggling down, worn and weather-beaten little icebergs, dirty floes that looked like mud banks floating along, and straggling pack-ice perishing on its march.

The snow had no sooner melted from the ground than vegetation seemed to spring up as if by magic. Three days after the grass was bare, the wood anemones and the March marigolds were in flower, and many of the birds made preparations for breeding.

A very large number of the species of birds had however merely crossed the Arctic circle on their way to the tundra beyond the limit of forest growth. The Siberian tundra is something like the fjelds of Lapland—something like a Scotch moor, or an Irish bog. It is a wild undulating extent of country, full of rivers, lakes, and swamps, stony but not rocky, gay with brilliant wild flowers, and abounding with ground fruits, such as crowberry, cranberry, cloudberry, and Arctic strawberry. The hill-tops are barren and stony, but the valleys shelter dwarf willows and stunted birch. Insect-eating birds are amply provided for by myriads of mosquitoes. These tundras are evidently rising gradually. Ancient drift wood rotted into tinder is often found above the present limit of the highest floods, and at Gol-cheek'-a I found large heaps of recent sea-shells, at least four miles from the river bank, and 500 feet above the level of the sea. At Doo-din'-ka I saw excellent coal, and copper ore, said to analyse from 5 to 10 per cent. of copper, which had been brought down in considerable quantity from the tundra. The river abounds in fish, sturgeon, sterlet, nyelma or white salmon, and other excellent kinds, and at Gol-cheek'-a we saw hundreds of beluga, or white whale. The principal trade which will no doubt some day be carried on between this country and Siberia, *via* the Kara Sea, will not be in Arctic products, but in the unlimited produce of South Siberia, which can so easily be floated down the Yen-e-say' and the Obb to some port which may be selected near the mouths of those rivers. To attempt to take a steamer to these rivers on speculation, with the chance of picking up a cargo, is simply throwing away money. The duration of open way in the Kara Sea is too short to admit of the ascent of either river to any town where a cargo can be obtained. The appearance of any vessel at such town would raise the value of produce to famine prices; and the navigation of the rivers is too dangerous for ships drawing depth of water sufficient to be seaworthy.

A responsible agent must reside in the country; for the Yen-e-say' at Yen-e-saisk', the emporium of the gold-mining district; and for the Obb at Tyu-main, within easy reach of the great fair at Eer-beet' (Irbyt); and he must himself accompany the cargo down to the port, where storehouses must be built for the safe wintering of any cargo that the steamers are unable to take. Cargoes may be towed down in lighters by the Russian steamers on the river, but eventually it will no doubt be found most profitable to have tug steamers for the purpose, which ought not to draw more than thirty inches of water. Some difficulty may be found in selecting suitable ports.

The present port of Gol-cheek-a on the Yen-e-say' is entirely unsuitable. The sand banks at the mouth of the little river of Gol-cheek-a increase every year, and this harbour will probably soon have to be deserted. No ship drawing more than 5 feet of water ought to venture there, and then only with great care, for the channel is a very tortuous one, and continually becoming shallower. A colossal fortune awaits the adventurer, who is backed by sufficient capital, and a properly-organized staff, to carry on a trade between this country and Siberia, *viâ* the Kara Sea, provided always that he combines British pluck with German "Grundlichkeit."

H. SEEBOHM.

## MEMOIRS OF HANS HENDRIK

(*The Arctic Traveller*).

### IV.

MY FOURTH VOYAGE TO THE NORTH, WHEN I WAS ENGAGED BY THE TULUKS.

[*The English Expedition under Nares.*]

ONCE I set out in a boat to fetch blubber from Southern Upernivik [an outpost about 40 miles south of Upernivik]. When we had departed we soon fell in with southerly wind, and therefore made for a harbour called Inginelertok. Ascending a small hill and looking seawards, I sighted two ships off the place where we were, and made out that they were Arctic explorers. I went down and set off again for our destined place. The wind was not very strong, but the current took us to the north. The breeze abating, we took down the sails and rowed back to the harbour. I again went up the hill with the Kavdlunak cooper. He questioned me about the road to Southern Upernivik. I pointed out to him where one had to go either by crossing the hills or by coasting. I thought he had asked me the question without any particular purpose. When we came down to the boat he asked me for a walking-stick. I gave him the longest tiller, thinking he intended to walk to Southern Upernivik, though he did not mention it. However, we waited for him till towards evening, when I went up the hill, and spied him with the glass. In the evening a southern gale sprang up, with heavy rain and a foaming sea. I feared we should have been driven ashore, as, for want of a spot to fasten a rope, we only rode at anchor. I did not sleep the whole night. My men tried to sleep, but could not, on account of the rain. In the morning, when the wind abated, I said to my crew: "I will turn back now. If we remain here, we shall have nothing to eat. However, I know that the assistant will reprove me, thinking I have done so for the sake of the Tuluks." We reefed sails, took up the anchor, and started. We made a good headway, with a favourable wind. On approaching our settlement [the outpost *Pröven*, belonging to Upernivik], we put out the reefs, as the wind lessened.

On entering the harbour we found that the Tuluk vessels had arrived. When we were going to anchor, the assistant [outpost-trader] came down, I feared to scold me; but on the contrary, he accosted me very friendly: "I am glad thou hast returned, otherwise the Tuluks would have gone to fetch thee. Thou art

to follow the northern explorers, taking Matak along with thee." When I heard this I reluctantly agreed. I went up to my house to take my best clothes. before I was ready they shouted outside: "The assistant wants thee." When I came out to him, I found there the Tuluk officers who had come to ask me whether I was willing to go with them or not. At the same time the assistant gave me a letter, by which I understood that I was to go with them. Consequently when they asked me whether I was willing, I complied. They also talked about a companion for me. I said I should like, as I went along, to pick up my wife's brother who lived near Kip John [Cape York?]. I believed him to be a good hand at building snow huts. But as I was now going to depart, I pitied my wife and my little children who were so attached to me, especially my only son who would not cease crying, as he preferred me to his mother. I said to the master of the ship, that I should like to take my little son and my daughter Augustina along with me to Upernivik, where they were to remain. Thereupon I left Kangersuatsiak, making my fourth visit to the north, with the Tuluks.\* When we put to sea and I looked at the people on shore, through the spy glass, I discovered my little daughter, Sophia Elizabeth, lying prostrate on the top of a big stone and staring at us. It was a sad sight which made me shed tears from pity. But I felt consoled by thinking that if no mischief should happen me or her, we should meet again. I also got sight of my wife standing amongst the crowd and looking after us. I said to myself with a sigh: "May I return to them in good health."

We arrived at Upernivik in the morning and again left in the afternoon; my two little children followed me to the beach. We made our way behind the islands. East of Kingitok we stopped for a little while, as the other ship had run on a reef, but soon got off again. North of Kingitok two kayakers left us, who had followed us as pilots from Upernivik. We continued to proceed towards the north, until the country where people live came to sight, called Kip John by the Tuluks and Ivnganek by the natives. When we were off this coast, we parted company with the other ship, to visit the native settlements, and try to find the man I wished to take along with me.

When we landed I observed footprints of men in the snow, and supposed they were those of people living in the eastern settlement. When they had made fast the boat to the ice, I went over land with an officer and a Kavdlunak cooper, whom the Tuluks had engaged. While we walked over the hills, I observed a sledge standing on the ice near the waters' edge. We made for the eastern hamlet, but when we arrived we found the houses empty, and only some sealskins spread to dry. The sledge which we saw had first been driving in an easterly direction, but when they discovered the vessel they turned towards her. When they came close to the ship, I asked them: "Do ye know me?" They answered: "Yes, dost thou recognise us?" I rejoined: "I only recognise that old man amongst you." Who the others were I could first make out when they had stated their names, as I knew them well when they were children. I questioned them: "Is Augina well?" They

\* Hans was on board the 'Discovery,' Captain Stephenson.

answered: "Yes, pretty well." "Where is he?" "On that island yonder." When I heard this I said to the Tuluks: "They say that he stays yonder on the island." The commander then wanted the natives to go and fetch him by sledge, but they said they did not like on account of the great distance. Just when we arrived here, the Tuluks had caught a narwhal: they gave the natives some of its skin to eat, and some biscuits. They did not care very much for the bread, but greatly preferred the *Matak* (whale-skin).

We started and proceeded along the edge of the ice towards the island, but stopped before we came close to it. I then went quick by sledge with two companions, an officer and the Kavdlunak cooper. By the way we discovered two sledges driving north of us. I instantly directed our course towards them, and coming up asked: "Where is Augina?" They answered: "Yonder on the island, we come thence making a long circuit on account of a crack." I repeated this to my companions, who replied that I might go thither: they intended to return to the ship. I answered: "If I go, I shall not be back before to-morrow, the captain has ordered us to make haste." When I made this objection, they agreed that we should only return to the ship. These people also soon recognized me, though I did not them, before they told me their names, as I had only seen them in their childhood. The old ones I knew quite well. We repaired to the vessel followed by the natives; after having searched in vain for him whom I wished to engage.

Starting from this place we continued our course northwards, and touched at Eta. Here we went up the firth to hunt reindeer, and came to the head of it. We had the Captain with us. His steward asked me to wait a little as he wanted to go with me. When I went off with the master I fell ill from stitch. I got sight of a hare, and when we drew nearer there were two, of which the master shot one, and I the other. When we had ascended the top of the hills and proceeded towards the glacier, my illness increased, and I said to the Captain that I should like to turn back, to which he agreed. In returning by the way, I picked up the hares. My stitch grew worse; when I came to our camping place they were going to cook. I had a severe cough, shivered from cold, and felt very ill. Our companions came back with one reindeer. When we had finished cooking and eating we returned on board. The following day we left. I now grew very ill, and thought my life was near its end, although we were unable to know the number of our days. The doctor, however, gave me medicine, but it was of no avail, and I could eat nothing. At length he cupped me on my back, and this took effect, I began to improve.

We now went north, coasting the Westland, while our ships sometimes were stopped by ice. Whenever it retired from the shore we went on, and when it grew very bad we made fast to an iceberg. In this way we reached the narrowest part of the sound between our country and the Westland.

On the 18th of August I caught my first seal, a Natsek (firth seal). On the 22nd, in the night, we arrived at our wintering station. When in the morning I came on deck, they told me that on board the other vessel they had got a musk-ox, and I believe three walruses, and that they had seen seals. It was

a great joy to know that here, there was something to hunt. I was also informed that the other steamer was to proceed farther, while we had to winter in this place. When the others were going to start, I went ashore to accompany them in my kayak some distance and bid farewell to my comrade, the other native. I stopped at the side of the ship and talked with him, whereupon I went ashore in search of musk-oxen. I ascended a hill and got sight of a large one. I approached, taking care he should not see me. While he went up another hill, I came close above him. Just as he saw me he took to running, but stopped to stare at me, whereupon I fired, but at the same moment he rushed on me as if unhurt. I retired, loaded again and fired a second time, still he moved towards me. But when I fired the third time he turned back, and at the fourth shot he fell. This, my first success in ox-hunting, happened on the 23rd of August. While cutting it up, two officers caught sight of me and I heard one of them cheerfully exclaim: "Look there, Hans has got an ox!" After having stayed a while with me they said: "Better remain here, we are going on board to give information, and then the sailors will come to fetch it." When they had gone it grew evening, I spied with my glass, but nobody appeared. At last I repaired to the ship. I was asked: "Where are the men who went to fetch it,?" I replied: "I did not see anybody, I was tired of waiting for them and went off." I was informed that they were gone to bring me food. Not before I had been down to take my meal and came on deck again they returned.

The next five days I continued hunting, but in vain. On Sunday we attended divine service. The following day, August 30th, I travelled six English miles into the firth, crossed a hill, and, spying with the glass, discovered one ox. I descended towards the head of the firth and saw a herd of the same kind. Unfortunately my ammunition was insufficient, I had only nine charges left. However, I came up to them, shot six, and as then my ammunition was used up, I pelted one more [which was wounded?] with stones, but without killing it. I then returned. The day after I did not go out, but the next we set out to skin the oxen. We were accompanied by two officers who intended to go a-hunting in another direction. When I had climbed the hill I waited for my companions, and on their coming up we found the one I had pelted now dead. Its flesh began to turn on account of the entrails not having been taken out. Towards evening when they were going back, I said: "I will remain here until I have skinned them all." "But how wilt thou sleep?" "The ox-hides will afford me sufficient covering." When we had cooked and eaten they left me. In the evening when I had finished, I went to sleep. On awaking I saw three hares, I seized my gun and fired, but without hitting, whereupon I lay down again. After a while I rose, breakfasted and joined the ship.

On the 7th of September I got one ox, and only two hares on the 25th, and five in the beginning of October. When ice had formed, our Captain wanted to travel by sledge. We also went in search of the other ship in three sledges, one of which was drawn by dogs, and went back. On the third day we tried by land, but were obliged to give up on account of the deep snow. Some of our party also made a trip



in another direction, but soon returned without having seen a live thing. I have noted my game during this season as follows:—October 12th, one hare; 13th, one; 17th, one; on the 16th, the sun was just to be seen [the last time]—18th, two hares; 19th, two; 22nd, one; 23rd, one; 26th, one; 27th, one.

In the month of November, moving about became difficult from the darkness. About this time I ceased to keep a record of the days. As I could not go out hunting more, I lent a hand at work. We built up walls of snow, making a large house for amusements [performances], and another large building we formed out of ice, intended for a smithy. The iceberg from which we fetched ice for drinking water was half an English mile off. I sometimes joined the men who had the charge of this, as I could not stand having nothing to do. I was not engaged for sailor's work, but only as hunter, sledge-driver and dog feeder. This is what I had promised on leaving my home.

For three months I had no work at all. When daylight appeared and one could look for some game, I again tried for hares: the first time I got three, then sometimes two, and sometimes one. Already before the sun began rising again I was on my legs. I also did duty as the Captain's sledge-driver in surveying the country and climbing the hills, but when he remained at home, I went alone.

While the dark season still lasted I began to perceive that some of the crew were talking about me, and had wicked designs towards me. We also used to collect at nine o'clock in the morning, and stand upright in a row near the ship in military fashion. But I being a native was not accustomed to this. Two officers then proceeded to examine our faces, arms and feet [?]. A little after nine o'clock the clergyman appeared to read prayers. This was repeated every day. Also in the evening they assembled to be inspected, but then without divine service. One evening I heard them talking thus: "When Hans is to be punished, who shall flog him?" The boatswain answered: "I." To be sure, as I am not very clever in English, and do not know whether I have thoroughly understood their meaning, I only have written this without any particular purpose.

I also remember that in the beginning, when we took our meals, I was placed at the table of the first-class sailors [petty officers?], but afterwards I abstained [?] from their table. In this way I grew dejected, and the sadness of my mind was increased by my having no business on account of the terrible darkness. So when I took a walk near the ship I used to fall a-weeping, remembering my wife and little children, especially that little son of mine who was so tenderly attached to me, that I could not be without him even when I was travelling with the transport boat. However, I had one friend, a young man named Tage;\* he sometimes took a walk with me, and when I made him know my sorrow, he consoled me. But at length my thoughts grew on me, and I took it into my head to go away to the wilds. If I should freeze to death it would be preferable to hearing this vile talk about me.

Once when heavy with grief I thus walked alone, I again heard them gossiping in their wicked manner. I then said to myself: "These people are all united

as countrymen. I am the only one without any comrade of my nation, the only abandoned one"—and I ran away in the black night a distance of about 5 miles, when I stopped and meditated: "Our Captain likes me; perhaps he will send people in search of me. I will return, and if I am to be treated ill, the All-Merciful will pity my soul." I turned back but resolved to stop in the neighbourhood of the ship, as I knew our Captain who was my friend would search for me. I went ashore, dug a hole in the snow and lay down. I had just fallen asleep when I heard footsteps, and as they approached I went out. They asked me: "Hast thou slept?"—"Yes, I have slept." "Dost thou feel cold?"—"Only a little." The two officers said to me: "Our Captain was afraid thou wert lost, we have followed thy footprints, go home now." We went down upon the ice and met several men carrying torches. On coming on board the boatswain accosted me: "To-morrow morning sleep sufficiently; when we rouse thou needst not rise, only sleep in peace." The next morning I did not rise before I had slept well. At noon I got something to eat, and towards two o'clock I was summoned by the Master, who questioned me: "Why didst thou run away last night?" I made answer: "I heard them talk badly about me, and thought they reviled me." He rejoined: "Whenever thou hearest them speaking thus, tell me directly." I afterwards heard them speaking several times in the same way, but, nevertheless, did not mention it, because I supposed that, if I reported it, none of them would like me more.

When bright daylight had set in, the Captain and I used to travel about by sledge, to measure the height of the mountains. Once, on our way homeward, we saw a Tuluk coming. On drawing nearer, he shouted to us that a sledge had arrived from the other ship. When we returned, the officer next the Captain, Mister Bluman,\* reported that Petersen had been frost-bitten, and that both his feet had been cut off. First they had departed, but turned back again on account of his being frost-bitten. All the others were well, they said. Coming on board, we met the four Tuluks. I made inquiry about my dear countryman on board their ship, and it gave me pleasure to hear that he was well. A few days later we set off for the south with three sledges, two of them drawn by men, while I, with the Commander, drove in a dog-sledge. We were five persons in one sledge. The two hand-drawn sledges were intended for carrying provisions, to make deposits in the uninhabited tracts. The Captain and I returned, I have forgotten how many days after, leaving the others, who proceeded still further south. Having spent three days on board, we started to visit the other craft. We were five now also, and it took us several days to go thither. When I got to the ship, and saw my countryman, he appeared to me like a brother. He went off the next morning, and was absent sledging, I believe, for three days, and we then set off on our return journey. We fell in with a tent, a party with the boatswain as their leader, who had crossed to a part of our country [Greenland]. The other party, in charge of the officers, had continued their trip. We stayed for awhile with them, and then went on. When we came to the rough ice we stopped, the Captain saying to me:

\* Page, Captain Stephenson's steward.

\* Lieut Beaumont, R.N.



"Look well after the road we have to go; if thou thinkest it is possible, we will proceed to-morrow." When we had eaten we went to sleep here. Early the next morning, while the Captain slept, I rose and went up the hills to con the ice. From the top I discovered that farther off the shore it was quite smooth. When I came down to the tent I found our cook at his work. The Master asked me: "How is our road?" I answered: "Farther outside it is excellent." After breakfast we started. When we had passed the hillocks we came to level ice, advanced quickly the whole day and went ashore in the evening, reaching our ship the following day.

Some time later we set out for the harbour where we wintered [Polaris Bay] when I was engaged with the Americans, on the coast of our country [Greenland], whereas now I was wintering on the west coast. We crossed the sound and arrived in three days. We found the house and put up our tent at its side. We took out the provisions [?] and examined them, the bread, the casks with smoked beef, one with molasses, also onions and several other kinds of eatables, whereupon we returned.

Afterwards we went off in three sledges. First, two drawn by men and carrying a boat; then we others followed three days after in a dog-sledge. At this time the sun began to give warmth, for which reason we slept by day and travelled in the night. We left in the evening, slept once and then reached the others who moved on foot drawing their sledges. We joined them and went in company to the opposite coast [Greenland] where we put up three tents on a cape, it was very pleasant indeed. Here we spent many days waiting for the party from the other ship. I had to drive with two officers, the second boatswain Fransmand Telle\* and Mister Fulfut† and Kapine,‡ a young surgeon [?]. When at length they arrived, four sledges started on their return [?], whereas I with the two officers and the second boatswain set out for the south, to explore the interior of the firch.

At first we got along quickly and slept on the smooth ice. The next day we reached the glacier at the head of the firch. On the following we went out on foot, the two officers and I, along a steep cliff. In returning, the officers said to me: "Go to the tent and say: the officers want thee as cook: they are coming and will soon be here." I did as ordered, and when they came in, we ate and rested, smoking, whereupon off again to the glacier. During the night we walked over it [?]. In the morning when the sun gave warmth, we rested on the glacier. While the officers took a walk, I went off shooting, as I expected there might be a bear. I left my own gun and took along with me a breech-loader belonging to the ship. I went down upon the ice and came to a fissure. Here I shot at a big seal but missed it, when it emerged I missed it again. Next day I went off with my own gun and met with a large seal lying upon the ice. I crept towards it hiding myself behind my shooting curtain, and shot it, whereupon I went to fetch the sledge and dogs. The man who had remained came to assist me; we boiled some seal flesh, and had an excellent meal.

\* Frank Chatel, Captain of the Forecastle, H.M.S. 'Discovery.'

† Lieut. Fulford, R.N.

‡ Dr. Coppinger.

Our two officers had tried to walk over the glacier but found it very difficult, its surface being both slippery and terribly traversed by fissures. Before we started I went to fetch some of my seal flesh, whereupon we repaired to the edge of the glacier and rested there. The next day I brought the rest of the seal to the shore, and we crossed to the opposite side of the bay over an even ice field. Also from this side we found the glacier difficult of access, on account of its ruggedness. From hence I went with only one companion, Mister Fulfut, to look for the provisions we had deposited last year in a place thereabout. We found one bag with bread removed from the others; I think a bear must have tried to bite it. We returned to the rest and soon proceeded to an island in the mouth of the firch. I went hence with one man to fetch my seal flesh. On returning I got sight of an Utok [seal upon the ice]. I passed our tent, made for the seal and succeeded in shooting it, but left it to be taken away afterwards. The next day we examined the island.

From this spot we travelled to where I had wintered some years before, and where our house still stood [Polaris Bay]. We camped on the ice. On our arrival we found a sledging party without dogs, headed by an officer who last year had been with our other ship. They were in a pitiful state, suffering from scurvy, one of them having died, and only the officer and one man being able to walk properly. We made this place our temporary settlement, while I undertook to catch seals for them. The doctor ordered them to eat seal flesh to recover strength. At the same time we expected another party under the first lieutenant. After several weeks, as we began to grow anxious, I set off to look for them, accompanied by an officer, named Mister Rulsen,\* and the doctor. We travelled all night, and when we approached our resting place, I left my companions, to look for the provisions placed there by me the other day. On my way back I fell in with a hatching ptarmigan. I seized it and likewise took the eggs, I believe there were six, and they were without young.

Next day we continued our searching for the missing party. I told my fellows I preferred driving overland, as there was too much snow on the ice. We took the strand and followed the shore-ice, but found it frequently inundated and almost impassable on account of the streams from the hills. My companions therefore walked over the land, while I continued along the shore-ice. They soon shouted to me to stop, as it was time to dine. Consequently we halted and took to cooking. When they came down to me, I said; "Look at that black point yonder, it appears to be a tent, and close by it I see something like a sledge." I grasped my spy glass and to our great joy made out the tent, the sledge and the two men.

When we had finished our meal, we left our tent and hastened to them. On drawing nearer, they came towards us, three men pulling a sledge. They stopped, and one of them advanced. We soon recognised him, Mister Bluman,† the officer next the Captain. He reported that they had four men sick, two of them on the sledge, two in the tent. Moreover, of the remaining three, one could scarcely walk, so

\* Lieut. Wyatt Ranson, R.N.

† Lieut. Beaumont, R.N.

there were hardly more than two to pull the sledge, and the leader looked very emaciated. We came up to them, and found their condition appalling. After having taken two on my sledge, I brought them to our tent, whereupon we fetched the others, with the tent and some provisions, my companions assisting by dragging. When we had rested, we removed to the place where we had our provisions [?]. I first had two [sick men?], and then returned to take the other two, just as the day before. Here we stayed awhile. I went out to shoot seals on the ice, but got none, on account of the deep snow mixed with water.

We started, I carrying the luggage on my sledge. I was obliged to stop at times, to enable them to come up. I therefore proposed to fasten the other sledge to mine. When we had done so, we moved on quickly, both sledges being dragged by the dogs, and the hindmost, moreover, pushed forward by men. We travelled the whole night; when the sun began to grow hot, we rested. Next morning I started, with the doctor and two sick men, to reach our friends, whom we had left at the late wintering station of the Americans. We travelled the whole night under great difficulties, on account of the streams running down from the land and the inundated valleys. Having arrived, and given rest to the dogs, I went back again with two men; but before we started, one of the ailing men whom I had brought died. First we travelled over the ice, but as we were unable to proceed for water, we went ashore. I drove as much as possible over snow, although it was very soft and filled with water from below, whereas my companions preferred a snow-bare road.

When we reached the tent, the two officers came out to us, and when they were informed about the one who had died, they asked us not to mention this to their patients. When we had eaten we lay down in the resting-place of the officers. One of them wanted to use my dogs to fetch what they had deposited. When we awoke he had already returned, and was sleeping upon the sledge. We placed the two sick men and the tent on the sledge, and started with two sledges, both of them loaded [?]. When we were to go down upon the ice we left the other sledge and reached the house.

We now had three tents here a great part of the summer. I caught seven Natsek and three Ugsuk seals. Their flesh was a sort of medicine to the invalids. In June, hunting on the ice was hindered by its being covered with water. As soon as this began clearing off, I said to our officers that it would be better to cross the sound with the dogs before the ice broke up, as there was not sufficient room in the boat. They consented, and I believe two days after they went off [?]. I followed to assist them, but returned to hunt for those who remained. Four days after their departure the ice broke up; I believe it was the day after they had reached the opposite shore.

Thereafter we waited many days for those who should come to fetch us. At length we sighted people dragging a sledge and a boat. It was our Captain, who arrived with a number of sailors. After having stayed some days, he said to me: "To-morrow we will repair to the ship; go with us as our guide." Next morning we went off, leaving the sick, who had begun to walk about. When we were going, our Captain said: "Now, show us the road; go ahead of

us, and we will follow." Thereupon we started, and crossed the open water in a boat. When we came to the heavy ice, I searched for the best road, accompanied by the Captain. He used to question me: "Which way are we to go?" I answered: "Look here; this will be better." It was lucky the Commander treated me as a comrade; I did not feel shy in speaking with him, as with other gentlemen. So we travelled partly over ice, partly by sea; I don't know how many days it took us to cross the sound. When we had reached the Westland, we proceeded by land to the ship. On approaching it we met with two men who were sent out to bring us something to eat—one of them the shoemaker, the other an engineer. We rested and cooked, glad to see each other again, both of them belonging to my particular friends. After having finished our meal, we proceeded on board.

After reposing for two days, I went out to look for hares and wild geese. There were also many owls in this place, young as well as old. Of hares and geese I sometimes got as many as I could carry on my back [?]. But pretty far off the Tuluks had a tent on the top of a hill, to watch the approach of the other ship, which was now expected, and at the same time look for the men we had left on the opposite coast. Once it was said our other vessel was close by, only stopped by ice. This gave us much pleasure, the boat which was expected from beyond the sound now being our only care. Again they reported that our other ship had run ashore, but would be able to get off at high tide. Others believed it could not get off. To our great joy, it arrived. Now people were sent to fetch those on the opposite coast. They were turned back by ice, but then the others arrived of their own accord, and now at length we were ready to start on our return voyage, though the ice was still very bad.

The Captain of the other vessel kept a good look-out for the road; he went up the hills incessantly without being tired. At length we started, although it appeared as if there was no thoroughfare in the direction we were to go. However, farther off there was more open water, and this we reached. During one day and night we traversed a tolerably ice-free sea, but then again had to force our way close along the shore, going on whenever the pack retired a little. The Captain of our other ship was beyond all praise, one might think he neither slept nor ate. Sitting in his look-out in the mast he sometimes took his meal there. On account of his extraordinary skill in ice-navigation he was our leader. During this passage I caught two seals, one Natsek and one Ugsuk. While we thus struggled with drift-ice, new ice began forming, thick enough to be walked over, but at length we came to open sea.

During the night they wakened me and gave me a letter; I directly recognised it to be from Upernivik, from my homestead. When I had read it, I learned that my wife and children were well, and now I felt consoled. We proceeded against a southerly wind and searched for whaling vessels on their fishing grounds, but did not see any. We sighted land about Tasiusak and tried to touch at Natsilivik, where lived natives, but were obliged to turn seawards, and to my disappointment passed Upernivik without approaching the coast on account of the heavy gale. When the wind abated we landed at Kekertarsuak [Disko].

Here I was allowed to remain, and I felt consoled to know that I could stay with the Inspector, as he was very friendly towards me. He desired me to write what I had seen, and though unskilled in composition, I have tried to give this account of my voyages, while engaged thrice with the Americans and once with the Tuluks. Four times in all I travelled to the North.

And now I bid farewell to all who have read my little tale. I minded my business, sometimes under hardships, sometimes happy. May all who read this live happily in the name of the Lord!

Written in the year 1877.

### DOUBLE DELTA OF THE WHANG HO, OR YELLOW RIVER IN CHINA.

THIS erratic river has made for itself the unusual, if not unique geographic feature of forming two deltas by the sedimentary deposit of its turbid waters. From a given point in the lower course of the stream, the channel bifurcates almost at right angles, each extending for a distance of more than 300 miles, through the alluvial seaboard of Northern China. Bifurcation itself is no isolated feature in the river systems of the earth, which is exemplified in the Orinoco of South America, where a branch of that river, named the Casiquiare, mingles its waters with those of the Amazons, through the Rio Negro. But in that and other examples of streams dividing into forked branches the channels continue supplied with water from the main river. The remarkable phenomenon, therefore, of the Yellow River, is the fact that when one channel is thoroughly charged with the supplies from the upper sources, the other is waterless, and forms a dry bed, abandoned by the native shipping, while it is available for land traffic only.

As the length of these two channels from their point of departure approximate, so does the area of each delta, the one trending in a south-east, and the other in a north-east direction. However, without being too precise, we may appropriately denominate the former the Eastern Delta, and the latter the Northern Delta of the Whang Ho,\* commonly called "China's Sorrow," in figurative language, as the most wayward child among her numerous and noble family of rivers. Ever since Europeans have been at all conversant with the topography of China—now more than three centuries—the south-eastern channel which disembogues into the Whang-Hai, or Yellow Sea, has been the recognised course of the river, on maps and in gazetteers, until recently, when the fact was ascertained that the embouchure had shifted to the Gulf of Peché-lee, along its north-eastern channel, the two outlets being separated from each other by a distance of not less than 640 miles along the coast line round the rocky promontory of Shan-tung. The intervening region being of a bold, mountainous character, naturally divides the main current of the river, and prevents the amalgamation of the dense sediment deposited by its waters, so that the two deltas are distinct in their alluvial lands. At the same time,

\* *Ho* is the Chinese for "River" in the northern provinces, and *Kiang* in the south; hence it is also named *Ho*, *par excellence* just as the Yangtze is termed the *Kiang*.

the entire area of plains and hills within the boundaries of this binary delta, from the angle of bifurcation, assume an oblong form approximating to 70,000 English square miles. The sub-divisions are nearly equal, allowing one-third for the hilly peninsula, and the same for each of the deltas, which assume more or less the usual triangular form.

On referring to a map of China with the highlands of Shan-Tung well defined down to the frontiers of the lowlands, the cause of this deltaic phenomenon is abundantly evident. In accordance with the Chinese system of topographical nomenclature of the eighteen provinces, which is based upon their geographical characteristics and compass direction, Shan-Tung literally translated signifies "Mountain-East," but as the two Chinese characters are read from right to left, their proper interpretation means "East Mountain," or freely rendered the Province of Eastern Mountains. At present the rocky region which gives its name to the province, forms a conspicuous peninsula of not less than 23,000 square miles, and there are sufficient data in the surrounding plains to the south and north-west, that at no distant geological epoch, these were under the sea, and the hill country formed an island in the Whang-Hai, or Yellow Sea, about two-thirds the size, of Ireland.

We are not in possession of any historical data to infer that it was an island when the country was first occupied by the ancient Mongols; but the following significant passage occurs in Ogilby's translation of passages from the writings and journals of Arnoldus Montanus, being the second part of the *Atlas Chinensis*:—"Xantung, the fourth in number among the Northern Provinces, may justly be esteemed a great Island, being on the North, East, and South wash'd by the Sea, and on the West by several Rivers, so that it is round about Navigable." This writer accompanied the early Dutch embassies to Peking in the beginning of the seventeenth century, when they had audiences of the Emperor Kang-Hi, and the "Netherlanders assisted the Tartars against Coxinga, and the Chinese Fleet, who till then were Masters of the Sea." However, he does not mention whether he personally visited Shan-Tung, on which his description of the province is based, or whether he obtained it from the "Chineses," in their ancient topographical works. We incline to the latter supposition. Be that as it may, there were about this period, in the Imperial Library at Peking, maps of the empire, showing that the peninsula of Shan-Tung was only separated from the mainland by a narrow neck not more than 5 leagues wide, and the greater part of the two deltas formed deep gulfs. Of these maps a copy appears in the English translation from the Italian of a work on China written by Alvarez Semedo, a Portuguese Jesuit Father, "after he had resided twenty-two years at the Court, and other famous Cities of the Kingdom." On the map the following note is inscribed:—"An exact Mapp of China, being faithfully copied from one brought from Peking by a Father lately resident in that City." This, we presume, was Semedo himself, whose work treats but little on the geography of China.

Although the Chinese, from time immemorial, have zealously studied the geography of the empire—which forms one of the chief subjects of the literary examinations—and the divisions of executive government

throughout the provinces are based upon a comprehensive topographic system, still they have been always deficient in correctly surveying the country, or delineating its features upon maps. Hence the wise Emperor Kang-Hi, seeing that the Jesuit Fathers were capable of performing the task which the most talented of his subjects could not undertake, employed them in surveying the empire, which occupied twenty-seven of them, with large staffs of native assistants, upwards of eleven years in traversing the realm, and four years in mapping it out; the result of which we find in the well-known work of Du Halde, where the numerous maps and topographical descriptions have in a great measure formed the basis of European maps of China, and do so at this day in delineating the inland provinces not yet visited by our maritime surveyors. The map copied by Semedo from the original at Peking was, doubtless, one of the ancient maps, which the Jesuit survey superseded, and many centuries old. We have seen others of equally ancient construction of the provinces separately, and, on all, the attempt to reduce them to anything like a correct scale is miserably deficient. This is especially the case in laying out the relative areas of land and water, and giving undue prominence to the dimensions of the great rivers. Probably this arose from the Chinese being essentially a maritime people. It was considered more important to show the water communications of the country than the roads, for the purposes of traffic. Be that as it may, the preponderance of water over land in Semedo's map is so great as to render its evidence of the Shan-Tung peninsula assuming an island form within the Chinese historical period exceedingly vague; although, no doubt, the "Bay of Hang," now the Gulf of Pe-che-lee, reached many miles inland from its present shores, and so also the "Bight" of Whang-Hai.

Turning our attention to the unwritten geological record, there are indubitable data in the formation of the alluvial lowlands round the rocky highlands, that the latter formed a natural barrier to the onward flow of the Yellow River, and the triangular wedge-shaped form of its mountain chains, divided equally the deposit of deltaic sediment along their flanks, and thus established the unique hydrographic basis of a double delta. In this instance, we have an example of the formation of sedimentary strata on a vast scale, and in a comparatively rapid course of time, on account of the unusually large proportion of yellow sediment *in situ* brought down from the Ortous plateau at an elevation of 8,000 feet, and rushing along impetuously at rates ranging from 5 to 9 miles an hour, even at its lower course, where the gradient is much less than along the upper courses. On this head, Arnoldus Montanus observes:—"This river at first sight seems to be a pool of flowing mud, but the swift current of its waters manifests the contrary. Those that frequent this river make the water clear by casting in allom, which drives the lees to the ground, and fills the fourth part of the vessel. It is a great wonder from whence such abundance of clay or mud proceeds, considering that it never hath been seen clear or bright; nay, the *Chinese* say, that its waters cannot be cleared in a 1000 years, insomuch, that they have a proverb from thence amongst them, *viz.*: when they speak of things that are never likely to happen—as altogether impossible—they say, 'When the Yellow

*River shall be bright.*'" On some of the native maps the course of this turbid river, from its sources in the mysterious region of fabulous spirits and genii, among the snow-covered mountains which form the western boundaries of Koko-Nor, to its old embouchure into the Whang Hai, it is painted of a yellow tint, to give significance to the peculiar colour of its water; occasioned by the yellow mud, or clay earth, which from the spring to the sea it glides over, and carries along in its erratic course.

Sir John Barrow, private secretary to the Earl of Macartney and one of his suite, when that nobleman was Ambassador from George III. to the Emperor Kien-Lung in 1793, took great interest in the geographical phenomena presented by the Yellow River, examining these with his well known acumen. Regarding the nature and extent of the deltaic deposits, he entered into the subject in a practical manner with the following results:—

"To avoid all possibility of exaggeration, let it be supposed that the breadth of the Yellow River, where the Embassy passed it, was only three-quarters of a mile, the mean depth 5 feet, and the velocity of its course 4 miles an hour. From thence it follows, that in every hour, there is discharged from that river into the Yellow Sea, a volume of water equal to 418,176,000 solid feet, or 2,563,000,000 gallons of water, or 1,100 times as much as appears to be furnished by the Ganges. In order to be able to form some idea of the quantity of mud suspended in the water of the Yellow River, the following experiment was made:—A gallon and three-quarters, ale measure, was taken out of the middle of the stream where it was running at the rate of 7 or 8 miles an hour, and at a depth of 9 feet, deposited a mass of matter, which, when compact and pressed into the form of a brick, was equal to 2 solid inches and a third. The sediment of which this mass consisted, was a fine loamy mud of a yellowish tinge, which when dry is reducible to an impalpable powder by rubbing it between the fingers. . . . According to the method followed as to the water of the Yellow River, it appeared to contain of mud, but a two-hundredth part of the original bulk. A considerable portion of the mud must have, indeed, been wasted, from the nature of the experiment. According to this proportion, however, of mud suspended in the waters of the Yellow River, a quantity equal to 3,420,000,000 solid inches, or 2,000,000 of solid feet of earth is wasted to the sea in every hour; or 48,000,000 every day; or 17,250,000,000 in a year. Supposing the mean depth of the Yellow Sea to be 20 fathoms, or 120 feet, and it was seldom found to be so much, the quantity of earth brought down from the Yellow River, would, if accumulated together, be sufficient to fill up, even to the surface of the sea, an island 1 mile square in 70 days. By extending the calculation, a curious enquirer may find in what space of time the Yellow Sea itself might be filled with the successive depositions from the Yellow River alone; for supposing that sea to extend northward from the river, and to include the gulfs of Pe-che-lee and Lea-tong, the number of square miles on the surface of this extent, would be about 125,000, which multiplied by the number (seventy) of days necessary for consolidating 1 mile square, would make 8,750,000 days or 24,000 years." Without entering into the details of Sir John Barrow's experiments and

computations, there can be no doubt that the shifting of the outlet of this rapid land-forming river from the Yellow Sea to the Gulf of Pe-che-lee will materially assist in the increase of its shallow waters, already extensive from the dark muddy deposits of the Pei-Ho, or North River, with impeded navigation to Tien-Tsin, the river port of Peking.

When that anomalous geographical change commenced we have no exact data to rely on, yet there is sufficient from the testimony of recent European travellers in Shan-Tung and the Kiang-Soo northern districts, to furnish a reliable account of the phenomenon, and the period when it occurred. Before entering upon that branch of our subject we will briefly refer to what has been stated by foreign writers, on Chinese authority, regarding the changes and inundations of this remarkable river. On the copy of the ancient Chinese map referred to in Smedo's book, the lower course of the Yellow River has the embouchure of the main stream on the shore of the Yellow Sea, where its channel has inter-communication with that of the Yangtze Kiang, with smaller intervening rivers, the whole forming a series of ramifications between the two gigantic streams which separates the alluvial seaboard into fourteen large islands. As already remarked, we do not place much confidence in this rude sketch map; but as it must have been projected before the construction of the Grand Canal by Ghenghis Khan in the beginning of the thirteenth century, it points out an interesting fact in the ancient topography of Kiang-Soo, namely, that the two deltas of the Yangtze Kiang and Whang Ho were assimilated by the sediment of their united waters, or, rather, that section between the north bank of the former and the south bank of the latter. At the same time, this map shows that the Yellow River had a branch flowing through Shantung, much in the same course as the present channel, but with two mouths, from a bifurcation beginning about half the distance. Moreover, there is another subsidiary branch laid down, connected with the river system of the Pei-Ho; showing that at one period, within the antique historical era of China, the whole of this vast systems of rivers were linked together by a chain of outlets and channels that has no parallel in any other region of the world. That the basis of this map was founded on fact is partly confirmed by the geological evidences of the deltaic formations now seen in the same latitudes; while the native boat traffic throughout the entire area—irrespective of the Grand Canal and smaller artificial channels—shows that there remain vestiges of the ancient river-courses. Moreover, there are documentary data, translated from the ancient Chinese classics by learned sinologues, especially in the writings of Confucius and Mencius, which go to support the topography of this and other antique maps, that the lower channel of the Yellow River has altered from time to time during the course of centuries back to the period of Yaou, something like 2000 years before our era, to which the Chinese carry back their tradition of a devastating flood over the northern delta, which was relieved by the engineering genius of the great Yü, whom Mencius states "opened nine channels," and was eight years engaged in regulating the waters, so that the inhabitants returned to their renovated dwellings in safety.

Although not specified, where he states that by his

works he "led them to the sea," we may infer that the main channel was carried through the eastern delta, recently deserted by the Whang Ho, and consequently the river has returned to its early natural channel. Further, there is both written and geological evidence that it has alternately visited the shores of the Yellow Sea and the Gulf of Pe-che-lee at intervals of time more or less regular. The distance from the City of Kai-fung, below which the double delta begins, being approximately the same, it is logical to infer that the changes have been alternate and equal in time. Moreover, it is not to be supposed that this deflection of a great river, estimated at 2480 miles in length, about a mile wide, and twenty feet deep in mid-channel at the angle of bifurcation, could be effected by one fell swoop of its current during a year or so. Like all mighty transformations of submerged regions into dry land, and *vice versa*, no doubt these changes were gradual, and spread at each recurrence over a term of years. There can be no doubt, however, that they have been more rapid than under ordinary riverine phenomena, in consequence of the strong and dense sedimentary volume of water carried along tumultuously to the sea by the Whang Ho.

These remarks lead us to the consideration of the time and circumstances, attending the change of the river bed from its eastern to its northern delta. On this head the data is not so precise as might have been expected, especially as it must have occurred between fifteen and twenty years ago, but our wars with China, and the internecine strife of the Taiping rebellion, during that period, absorbed the attention of both natives and foreigners, to the exclusion of all peaceful investigation of natural phenomena. Since the cessation of these foreign and civil wars in the maritime provinces, travellers have been enabled to visit this interesting region, a British settlement has been established in Shang-tung, and Protestant missionaries allowed to pursue their peripatetic labours, who have thrown light on this interesting subject.

Those who have perused the graphic narratives relating the progress of the embassies of Macartney and Amherst, both of which crossed the Whang Ho, will have noticed that the Yellow River was in full flood along its straight channel through the eastern delta to the Yellow Sea. Staunton, Barrow, Abel, and Davis each describe the turbulent stream as it was, and only casually refer to the old Chinese maps and annals, where it "has been represented as flowing into the Gulf of Pe-che-lee, north of the Shan-tung Promontory," as Sir John Davis has it. It was in 1816 when he saw it, but, though there are no subsequent minute descriptions of the river, yet there is later evidence, on the best authority, that it had not altered its course thirty-five years afterwards. From these we select the account of the eminent American topographer and sinologue, S. Wells Williams, who writes as follows in the *Chinese Repository*, Vol. xix.:—"There are many reasons for supposing that the Yellow River once flowed through the Wei Ho, into the Gulf of Pe-che-lee, and that the deluge of Yü, spoken of in the Book of Records, was an inundation of the Great Plain by the forcing of the present passage. . . . At present the Hwang Ho runs in one channel eastward, and near the town of Kaifung-fü it borders on a very flat country, which is exposed to occasional overflowings. As the adjacent

country is very low, it was at an early period considered necessary to protect against the inundations by dikes built of quarried granite of great strength. These dikes extend about a hundred miles along the southern banks of the river. This had the effect, which has also been experienced in the Po and Rhine, of raising the bed of the river, so that even when the river is low, its surface is considerably above the adjacent plain. This plain, whose soil is exclusively formed by alluvial detritus is of extraordinary fertility, and covered with almost innumerable villages and towns. When, therefore, the river being unusually swollen, breaks through the dikes, the loss of life and property is immense."

That account was published at Canton in September 1850; after which, to the close of the following year, a monthly "Journal of Occurrences in China" is recorded, but no mention is made of any unusual alteration of the lower course of the Whang Ho, so that we may accept it as a fact that the river was running in one channel eastward during 1851. We now come upon data furnished by D. J. Macgowan, M.D., an American medical missionary, well versed in the Chinese language and of scientific acquirements, as shown in many valuable contributions to periodicals on the geology and natural history of the country. In one of these, published in a Miscellany at the *North China Herald* office, Shanghai, for 1857, and headed "Notes and Queries on the Drying up of the Yellow River," the following remarkable statements appear:—"In the latter part of 1852 the people of Whai-ngan found the river fordable. In the spring of the ensuing year travellers crossed it dryshod. Since that time it has been—to use the Chinese term applied to it—'as dry as dust.'" This city is situated on the Grand Canal, within about 20 miles of its intersection of the Yellow River, and 80 miles from the embouchure into the Yellow Sea. It is the chief city in the Department of Whai-ngan, Province of Kiang-Soo, and was formerly in danger of being submerged, for the ground on which it stands is lower than the canal. "Six miles off," says Du Halde, "it has a borough named Tsing-kiang-pú, which is, as it were, the port of the Yellow River, large and populous; and there resides the Surveyor-general of the rivers" and canals.

In corroboration of his statement that the waters of the Whang Ho had disappeared from its lower channel, Dr. Macgowan cites the evidence of a native eyewitness, formerly belonging to the above-named department, who had entered into the service of the American Mission, to which he was attached. "We have in our employ," says Dr. M., "the former Secretary of the Commissioner of the Grand Canal, who resided in Whai-ngan from February to September 1853. Nearly the whole of the following year he spent further up the river, at Süchaü (Sui-cheu, 50 miles above the junction). The dryness of the channel at the former place attracted his attention, but he found prevailing such a superstitious dread of the subject, that people avoided conversing about it. It was believed that even politics might be discussed with less danger; the fear being that if not let alone altogether, the dangerous stream might re-appear, and with greater power. At Süchaü, (says our informant,) only a few puddles might be seen (in the river-bed) and a rivulet which a child could ford." When we

contrast this diminution of a mighty stream ranking among the greatest rivers on the terraqueous globe, it confounds all our previous convictions of fluvial permanency, the very prospect of such a phenomenon befalling any of the great European streams, or even our comparatively small rivers, would be of incalculable injury to the adjacent country, and to maritime traffic.

At this point it may be appropriate to quote Sir John Davis's account of the river and canal at their junction to illustrate the volume of rushing waters, which was in the course of a few years reduced to dribblets. "On our left (proceeding south)," he narrates, "was a stream called the 'New Salt River,' which, like the canal, opened into the Yellow River; and on our right we had for several days very close to us the Yellow River itself, which just before this point of junction with the canal suddenly turns north-eastward, after having run in a south-easterly direction. When we had been a short time at anchor, during which interval some of the chief mandarins visited the ambassador, we all got under weigh, and prepared to cross the famous Hoang Ho. All the boats, on entering the river, struck right across the stream, without observing any order, and gained the opposite bank in less than an hour. . . . The breadth of the river in this part was about three-quarters of a mile, the direction of the stream north-east by east, with a current of 3 or 4 miles per hour. . . . The stream was certainly violent, and carried us down a considerable way before we could reach the opposite bank, which was lined with a great number of boats of various shapes and dimensions, some of them being constructed exactly in the form of oblong boxes. Many of these were stationary, and laden with straw or stalk of the *holcus sorghum*, and with coarse reeds ready to be transported to different parts of the river and canal for the repair of the banks. . . . When the current had carried us down some distance to the eastward, we had a mile or two to re-ascend the river, before we came to the opening through which we were to pursue our route to the south; and the passage in the vicinity of the bank, to which we kept, on account of the current, was so obstructed with boats that this was not effected under four hours from our first getting under weigh. The worst part was now to come, in passing through a sluice on the hither side of the water, which had been confined in its passage through the abutments, raged with such fury as to suck down large floating substances in its eddies. This sluice, upon a large scale was near 100 yards across, and through it the waters rushed *into* the river, at the rate of not less than 7 or 8 miles an hour." Yet this vast volume of water entirely disappeared between the years 1852-54 according to the testimony of Dr. Macgowan's native informant, which there is no cause to doubt; so that the broad, deep, impetuous expanse of waters between the banks of the Hoang Ho and its mouths disappeared, while the river bed became "as dry as dust." To realise such a remarkable phenomenon among the rivers of Europe, we may suppose the Danube dried up in its lower course so as to be crossed on foot at Galatz, and then striking out a new channel west of the Balkan mountains, changing its embouchure from the Black Sea to the Adriatic. This strange, mysterious fluvial phenomenon exercised a similar reticence on the Govern-



ment as it did on the people, and the subject was seldom referred to in the *Peking Gazette*. All that the learned Doctor could find was a notification in an issue of May 1856, wherein "the Commissioner having charge of the lower portion of the Whang Ho, reported that out of twenty-two *ting* under his jurisdiction, nine were entirely dry." During the same month, "the Emperor, in a sentential document enumerating the calamitous occurrences of his short reign, says, "The river does not flow as hitherto," evidently regarding that as an evil omen. He adds, that perhaps a careful search of the *Gazette* might throw more light on the subject, the foregoing being all that he had noted.

We now come to consider a still more remarkable phase of this fluvial phenomenon, advanced on the authority of Dr. Macgowan and his Chinese informant, that while the Yellow River had disappeared from its eastern channel, leaving the delta dry, there were no data to show what had become of the erratic waters. "We have, indeed," he states, "received verbal accounts from travellers, to the effect that the stream now passes through the prefecture of Tsauchan, in the S.W. part of Shan-Tung, and thence as of old, in what particular way is not stated, to the Gulf of Pe-che-lee. On the other hand, the above-mentioned secretary states that in his journey from Peking to Whai-ngan, made in February 1853, he found, from Tientsin to that point on the canal where it receives the waters of the Yun Ho, less water than usual, and from thence, where the current turned in his favour, the quantity of water in the canal became less and less, until he reached its junction with the Yellow River, where it was dry. Moreover, the waters were nowhere less pellucid than ordinary. From various other sources we have received similar accounts, which, like this, palpably contradict the statements which represent the Whang Ho as having taken a north-east course." Nevertheless, and notwithstanding the learned speculations of the *savant*, which include subterranean agencies from earthquakes which happened about that time, we have now the broad, palpable fact before us, through the testimony of unimpeachable travellers who have visited and navigated the new lower course of "China's Sorrow," which has once more claimed its ancient northern delta as the future field for its fertile, inconstant current.

Shortly after the publication of these particulars the second and third foreign wars distracted the nation, so that little or no notice was taken, by either natives or foreigners, of any changes taking place in the course of the Whang Ho. After peace was proclaimed, in 1860, several British civil and military officers returned south from Peking by way of Shan-tung, so as to embark at the new settlement of Chefoo. Among those travellers was Captain Harcourt, *aide-de-camp* to General Staveley, who wrote a lively and interesting account of his journey, which appeared in the columns of the *North-China Herald*. He and a companion versed in Chinese undertook the trip on horseback, in January 1861, when the Pei Ho and other rivers in these latitudes are frozen over, and the waters low until the melting of the snow in spring. On the 23rd of that month he enters in his journal:—"We left at twelve for Tong-ho, about 20 miles off, and saw a range of hills quite plain ahead; between was a flat country covered with orchards. Came to a

river formerly called Ta-tsing Ho, but now called Yellow River; ever since the large river of that name broke into it. Met here 300 Tartar cavalry all mounted on rough strong ponies, on which they jumped into the ferry-boat, which was a few feet from the bank. They crammed as many as eight-and-twenty men and horses into the boat at one time. We went across with them." No further mention is made in the diary as to the width, current, depth, colour, and volume of the river, so that we are unable to estimate the magnitude at this time of the Whang Ho in its new channel as compared with that of the old one at its junction with the Grand Canal near Whai-ngan City. At the same time, on referring to the map, we find that the distance between the old and new junctions along the course of the canal, is upwards of 250 miles, about the same distance the former crossing was below Kai-fung. The new ferry being 120 miles north-east of that city where the river diverges.

Nothing of note transpired concerning the renewed course and amalgamation of the Whang Ho with the Ta-tsing Ho, until 1866. After the suppression of the Taiping rebellion at Nanking and the surrounding country in 1865, the remnant of the rebels who had escaped capture, crossed the Yangtze Kiang, and proceeded northwards through Honan province into Shan-tung, ravaging the country, and plundering the peaceable inhabitants, without any religious motive for their warfare; and hence they were called Nien-fei signifying "banditti," as they were nothing more than a horde of robbers and murderers. The Imperialist soldiers endeavoured to stop their progress, but were repulsed, and the enemy advanced into the level country forming the northern delta of the Yellow River, and devastated the land throughout its length and breadth. Without entering into details, suffice it to say that the Government at Peking became alarmed, and sent their troops against the enemy who succeeded ultimately in discomfiting him. At the same time the British Consul at Tien-Tsin, requested the Rev. Jonathan Lees, of the London Missionary Society, to furnish him with some account of these new insurgents, about whom he obtained practical information while travelling with a missionary colleague through the disturbed districts. In his reply to Mr. Morgan, H.B.M. Consul, he writes:—"Sir,—At your request, I have much pleasure in placing at your disposal such information as I have lately gained respecting the movements of the rebels in Shantung, and the state of the districts generally. It may conduce to a clear comprehension of the various details if I say a word or two on the geography of the country we have traversed. . . . 1st. As to geography, going south from this city (Tientsin) along the course of the Grand Canal, it would, until recently, have been found that from a point just beyond the City of Lin-ching in Shantung, the canal bed was dry, at least as far south as the prefecture of Yung-chang, near to which the Yellow River crosses it. The officials have lately filled this dry channel for strategic purposes, by breaking the south bank of the river at this point, thus diverting a large body of water in a north-easterly direction, and thereby separating this part of the sea-board from the interior. The enclosed district has well defined boundaries, having the Peiho on the north, the canal upon the west, the Yellow River upon the south, and the sea



upon the east. The Yellow River has adopted the bed of the river variously known as the Ta-chi, Ta-ching, or Yon-ho, and thus pursues a north-east course north of the provincial city of Chi-ngan, passing the cities of Chi-yang, Chi-tung, Pu-tai, and Li-chu, all of which are on its banks, and falls into the gulf beyond Li-chin. The northern part of this district is the least interesting. Near the sea it is marshy, and sparsely peopled, but the southern half is very fertile and studded with villages, and level as a chess-board. The mass of the population are poor, but there are many wealthy proprietors, and a fair average of educated men. Excepting Te-chin, Lin-chang, Tung-chang, and Wu-tung, the cities are comparatively small, and more or less decayed."

About the same time, or shortly after the journey of the Rev. Mr. Lees, and his colleague the Rev. I. Innocent—who were robbed by the rebels and their lives endangered—the Rev. A. Williamson, of Chefoo, another indefatigable missionary, traversed this alluvial region, now becoming famous geographically as the old northern delta of the Whang Ho. The result of his observations were read at a meeting of "The North China Branch of the Royal Asiatic Society," held at Shanghai on the 13th March 1866, when the first portion of a paper, entitled, "Notes of a Journey from Peking to Chefoo, *via* the Grand Canal," was communicated by the secretary. In it he described the canal as being in excellent repair as far as Lintsing; and crossed the Yellow River, where it was much broader than the Thames at London Bridge. Having attempted to fathom it in the centre he could find no bottom, not, however, because of the depth, but the force of the current. Since then all these and other interesting details of this wayward river and its Shan-tung Delta, are graphically described by Mr. Williamson in his interesting work, entitled, *Journeys in North China*. The information contained in the paper read at the meeting came upon the audience as a matter of surprise, and one member of the society expressed himself so far as to consider it a "discovery." In like manner the foreign residents generally, at the treaty ports, took considerable interest in the new topography of Shan-tung, and some of the merchants resolved to send an expedition to explore the new outlet of the Whang Ho into the Gulf of Pe-che-lee, for mercantile purposes. The result of that journey, and the comparative resources of the new or Northern Delta with the old or Eastern Delta may form the subject-matter of a second paper on the Double Delta of the Whang Ho.

SAMUEL MOSSMAN.

## THE BEGINNING.

GRUITHUISEN.

Two eminent astronomers publish to the world their ideas of world-making—one makes a molten earth, the other a cold earth. They cannot both be right. One formed his world by force, one without it. One earth was formed rapidly, one slowly; the latter by a German, the former by a Frenchman. Both have their disciples, but English science believes in the latter. We call the theory of Laplace "the Nebular hypothesis," and that of Gruithuisen "the

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Aggregation theory." Neither gave the origin of matter; one calls it dust, one a nebula. As far as our means allow, we wish to discover the condition of matter previous to the construction of this earth, as well as the manner of its construction. The subject resolves itself into two simple questions—First. What was the previous condition of the material used in the construction of this earth? Second. How did this material become consolidated into the nucleus of this earth?

First. Looking to that part of the earth's surface with which we are all more or less acquainted, we find that it is composed of hard or soft materials, representing compositions of organic and inorganic dusts, and containing minerals and metals. These materials were left in their varied formations, as sedimentary deposits by water, or as wind drifts. Except as bones, shells, and some perfect vegetable fossils, we find no formation in any way identical with the organic remains that formed it. Under the influence of air and water, heat and cold, all organic matter undergoes decomposition and chemical changes. Organic and inorganic formations undergo another great change by the percolation of water through the mass, carrying with it certain soluble portions from one part to another, so that some parts of a formation may be changed by the loss of original material, while other parts are changed by the addition of its own constituents, or by other matter brought in by water. In whatever condition we find materials, organic, or inorganic, we know that they must have had an origin. Our organisms are supposed to originate in air, water, and dust; they return to these elements again. As far as man knows there was a time when no organisms existed. It is commonly supposed that the first germs were nourished and matured by the inorganic elements of earth, in their trinity, under the influence of light and heat. In the organisms thus produced, we do not recognize inorganic matter, otherwise than by analysis; and, in the inorganic materials of earth, we cannot detect the germs or the direct origin of the organism. We know that the materials of earth are constantly changing their apparent conditions, and that specific organic dusts are mingled with, and lost to sight amidst the materials around them, as thick vapours are lost in the surrounding atmosphere.

In this perpetual change we need not suppose that the nucleus earth represents to us now the visible condition of the material from which it originated, any more than the complete creature represents to us the liquid of the womb from which it came. As far as man knows, our primary rocks are composed chiefly of silicious material of varied aspect. They give evidence in their formations of external forces acting on correlative matter. As the matter and the forces varied, so the condition of the mass varied in hardness or softness, in fracture or cleavage, in retention or non-retention of water or gas. Under manipulation this primary rock is convertible into dust, mud, metal, ashes, and vapour, or many other things. In these changes the natural constituents of the mass become separated, the solid parts tell of the materials which belong to dust; muds and vapours reveal the water and the air. If we continue these manipulations and examinations we extract coloured vapours from known materials; even when these materials are not visible to the eye, careful analysis detects them, but man has no

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means of analysing so carefully as nature. The spectrum analysis has disclosed this faculty in the celestial atmospheres that are occupied by vapour lines, giving out the colours of known materials. From these facts we infer that celestial bodies are composed of materials, similar to those of our earth. It has been shown that these vapours are composed of varying ingredients, much in the same way as various ingredients are found in the strata of this earth. If these vapour lines in the celestial atmospheres emanate from the bodies enveloped by them, then those bodies are formed from materials that can be vapourised; or if those bodies are formed from the vapours that surround them, the vapours can be consolidated. In either way we get evidence that vapours and bodies are closely related to each other. We may therefore assume that this earth, being one body of our solar system, may be composed of materials that were previously in a vapoury condition. As far as man has yet gone into these subjects, this deduction is fair and clear, enabling us to reply to the first question—

The previous condition of the material used in the construction of this earth was vapour.

We may consider this vapour as equivalent to the nebula of Laplace, and as containing in it air and water, divisible from the more solid material the equivalents to the dust of Gruithuisen.

We now come to the second question, How did this vapour become consolidated?

The answer is to be found in existing laws acting on existing elements. It has been lately argued that the laws of nature are not the same as they once were; but as no new system has been suggested, we must adhere to the old. All that we see or know of give evidence of one continued certain system of cosmical law: the forces and the composition of matter change, but the law does not change. In a late lecture on Science, Professor Tyndall asked—“Has this uniformity of nature ever been broken? . . . Not to the knowledge of science!” (*The Mail*, 3rd October 1877). As this earth is, then, ruled by laws as old as itself, from which neither mountain nor molecule can escape, we may infer that the same laws ruled the matter-laden vapour while consolidating into the nucleus of this earth. Looking from the surface earth around us to the lowest deposited stratum, we know that all the materials in that depth were either left *in situ* by animal or vegetable, or deposited by wind or water. These elements therefore moved before any material was deposited on the nucleus. All the organic dusts contained in those strata were once parts of organisms formed from elemental matter. Matter therefore existed before any organism. We are not aware of the existence of any organism previous to the consolidation of our nucleus. We may consequently infer that this nucleus, formed from matter-laden vapour, contained in itself the materials necessary for the formation of organic structures, having dust, air, and water in their compositions. We know that these elements are in every present organism, as well as in those that were: we know that the combinations of elementary matter do vary, and have varied in all organic structures, and that consequently these elements were the origin of every organic body. We are thus forced into the conviction, that as long as air, water, and dust have existed, so long must the laws under which they now

act have existed; and as the nucleus itself gives evidence of formation and consolidation under the influence of elemental action, we have a right to infer that consolidation took place in the beginning exactly as it takes place now. How is that?

If we begin by the consolidation of organic structures, we lead the way to the consolidation of inorganic matter. The seed of a plant throws out roots and a stem; these are the conductors of moisture from the soil, attracted to the sunlight. Under the influence of warmth the light gases are drawn up through the growing foliage, the heavier gases and the moisture are left, and the plant becomes an organism, consolidated from inorganic elements. The egg of a bird, fish, insect, or reptile contains a more or less liquid material, which, under the influence of external heat, becomes consolidated into the respective organic forms. The womb of the animal contains in it a certain quality and quantity of liquid, which, under the influence of external warmth, becomes shaped and consolidated into the animal form. In the liquid of the womb, the matter of the egg, or the sap of the plant, we do not recognise the consolidated organism; but we know that, under the laws of nature, condensation, formation, and organism must ensue. These condensed materials consist of varied combinations of elemental matter, all originating, as far as we know, from what we call inorganic matter in a more or less liquid condition.

By transferring the causation of organic structures to inorganic matter, we seem to arrive unavoidably on the cause of consolidation in the beginning. We have to assume, with Laplace and Gruithuisen, that there was a mass of nebulous dust occupying a certain space in the firmament. We assume that this space was the same as that now occupied by air, water, and dust. There is no occasion to imagine that this nebulous dust was once a part of the fiery mass of the sun, or as originating in an imaginary disturbance in the universe. We assume an independent space for the mass before it became dependent on the law. We are as ignorant as Professor Allan Thomson of the origin of the nebulous dust. As, however, dust, water, and air are all here, it is fair to assume that these elements existed in a previous nebulous condition, put together as the elements of the creature are put together in the egg or in the womb. Having assumed so much of the unknown, we come to the action of the law upon inorganic matter as now going on, to show that air is attracted to the light, that water is attracted from the dust, and dust is here. Between 1870 and 1873 Mr. J. B. N. Hennesey was engaged in celestial observations on the Himalaya mountains at a height of 7100 feet above the sea. The results were given in No. 5, *On the Atmospheric Lines of the Solar Spectrum*, published by Messrs. Trübner, London. The observations were made when, “the rainy season having passed away, the atmosphere on these mountains is exceedingly clear, so that the sun is bright even to his setting, and a spectrum may therefore be obtained through a long stretch of terrestrial atmosphere.” Differences, however, occurred, “in certain parts of the solar spectrum,” which are ascribed “in all cases to the influence of the earth’s atmosphere. As the autumn advanced, Mr. Hennesey found that a “haze” rose from the earth before sunset, “which grew day by day in height until it attained

perhaps 3° or more above the horizon." Mr. Hennesey called this, "my air wall," giving "a visible connection between the air lines and the terrestrial atmosphere." On the mountains of Western India this air wall rises higher and higher as the season advances into the hot weather of April and May, so that the sun sinks into the lurid haze early in the afternoon, and sets above the natural horizon as a monstrous red globe. Following this atmospheric phenomenon into our daily experience, we see, under certain conditions of light, the atoms of dust playing in the sunbeams: the same thing happens in our palaces and our cottages. We see the atoms of dust falling around us, and we know that dust has gathered and consolidated over cities in which man once lived. We see the dust storms and the sand drifts, we know that matter falls in rain, that sediments may be found in dewdrops, matter has been caught on sheets of paper raised in the air, so that we may be sure that dust is sustained in our atmosphere, as vapour, as haze, as nebula, or in an invisible condition.

As dust falls upon earth now, the rain and the dew fall upon it—it settles down by its own gravitation; the sun shines on it, and evaporates its surface moisture, so that, by its natural pressure, by sunshine and moisture, the dust that has fallen either on the surface of dry land, or on the water eventually becomes consolidated. In this consolidation there are as many varieties of firmness as there are of composition; so that as we look upon the heterogeneous character of the earth, we are inclined to attribute the changes to varied laws; but the great law of heat and light, emanating from the sun, rules our elements so beautifully and evenly, that all the changes we see are due to the correlation of varied materials to the varied forces of the law, and not to any change in the law itself.

The complicated duties of elemental matter may be seen in another light, from "Popular Exposition of some Scientific Experiments," *Harper's New Monthly Magazine* for April 1877:—"Nature thus furnishes us with a striking illustration of the transmigration of matter and force. Now matter is in the air, now part of a plant, now back again in the air. The same is true as regards the energy with which it was associated. Derived from the sunbeam, it lay hidden in the plant awaiting re-oxidation, escaping under the form of heat or light, and remingling with the universal cosmic force." The same process goes on with the animal, and so "the same particle is now in the air, now in the plant, now in the animal, suffering a perpetual transmigration." All this is done by law, acting on elemental matter, which is perpetually consolidated, broken up, and again used in reconstruction. Man is scarcely aware that these changes pass before his eyes in endless array. Particles come and go; they belong to the organic world to-day, and mix with the inorganic world to-morrow: the changes are perpetual. The laws are for ever acting, and the elements are for ever obedient to the laws.

Thus we come back to the unknown matter of this sphere, before light and heat had force enough to give motion or energy to elemental matter, while that matter was in its chaotic, motionless condition of inactivity, typified to us by the fresh egg or the incipient womb; the whole forming a colourless cloud

of nebulous character, containing within it the germs of a future formation hidden in its filmy dust. Was this the beginning of the now firm earth, which gives us our food to eat, our water to drink, and our air to breathe? Was this nebulous dust consolidated by one great law, acting on agents, which have the power to separate and assimilate, to construct, destroy, and reconstruct, with a ceaseless energy, but with a harmony only to be found in one Almighty, never-failing rule? Who can say it was not? We dare not say it was! We may, however, say that the atmosphere of this earth does hold, and from its beginning must have held, moisture and dust in one vast embrace. Here we must enter on the ideal. A scanty light and warmth fell slowly, when the nebulous mass was thick and impervious, as Mr. Hennesey's "air wall" is now, when light could not shine through it, and the warmth could not penetrate far beneath the surface of the new-found vapour-mass.

The report of the Astronomer Royal on the transit of Venus in 1874, gives the distance of the sun from the earth at "93,300,000 miles" (*Academy*, 20th Oct., 1877). Were the warmth and light, coming from that distance, sufficient to call the elements of this sphere into action? Were they sufficient to give motion to a nebulous mass, occupying a space of some 8000 miles in diameter, and some 25,000 miles in circumference? Did they cause the mass to rotate on its axis, to revolve in a never-ending course round that distant centre, in perpetual obedience to that visible law? Did that law reduce chaos into order? If these things were done, then the minor actions ensued as certain consequences. The lighter gases of the great mass were perpetually attracted to the centre warmth from the nebulous body, till they attained an unknown rarity—a rarity that lost its power of refraction, its sense of warmth, and its power of motion on the borders of the eternal ethereal space, where rotation ceased, and air, water, and matter rolled round in ceaseless energy, within the cold embrace of that motionless, lifeless æther, perpetually drawn to and repelled from the light, doomed to those never-ending revolutions which give us our seasons, as the rotations give us day and night. We cannot tell when these actions began, but their beginning was the beginning of the law which rules us now. As the lighter gases rose from the nebulous mass, the heavier atoms perpetually sank towards their own centre of gravity. Thus, with the attraction of external warmth, the atoms gradually lost their correlations in the nebulous mass; the gases assumed the condition of atmosphere and water, the other atoms, deprived of these suspending forces, slowly but surely assumed the condition of solidity. The mass of nebulous dust became more clear on its surface, more solid in the interior. There was a transparent atmosphere, a translucent water; the light and warmth penetrated to the shallow solids, and decomposing and oxidising the atoms, reduced them to a second obedience of water and air. Then came on another series of actions, early winds and waves, with initial currents, on an unbounded water, moved the decomposing beds from one place to another, the ever-undulating waters made an undulating bed; the waters filled the lowest levels, and left the higher levels to form the beginning of dry land. The law still prevails, and these actions still go on. Did they begin

as we suggest? We scarcely expect a dogmatic negative: we cannot give a dogmatic yes. The answer to the second question may, however, be given.

The nucleus of this earth was consolidated, because the gases and the moisture were gradually attracted, and separated from the nebulous mass, while the heavier atoms, slowly but perpetually subsiding to their own centre of gravity, became the solid nucleus of this earth.

The Beginning, thus presented to us, is not yet ended: the light and warmth are here, and all the elements of earth obey their laws while they feel them, and are inactive without them. At a distance of 4 or 5 miles above the sea level, vegetation and life are almost extinct on dry land. At a depth of 4 or 5 miles vegetation and life are nearly extinct in the water. The fauna and flora of this sphere flourish in a sun-warmed belt of 8 or 10 miles deep, leaving a surface margin of 600 or 800 miles unoccupied in the Arctic and Antarctic regions. Our atmospheres are purified and rarefied now, moisture is evaporated and mixes with the air, it is condensed in cold, it falls, and is again evaporated, and separated from the dust of earth by warmth. May we not glean from these facts that the sun is now, and ever has been, the ostensible lawgiver and the moving cause on earth? We may go farther than this, and say—The three elements, dust, air, water, are kept separate and distinct by the continued action of the sun, and by their own obedience to the law. In this obedience they become one cosmical trinity, acting together in wondrous harmony and unbroken consistency, so perfect and so intelligible, that while the earth's elements continue as they are now, and as they have continued through many millions of years, with the sun of heaven giving its light and its warmth unto them, we cannot imagine a break in cosmical order in the future, or back to the beginning.

While thus tracing the inevitable action of cosmical laws, we have before us a dry land full of the dusts of organic forms, passing through grades and strata, their only record. Those forms grew or lived, they breathed the air, they drank the water, and were nourished by the earth; there is no date of beginning or ending of many kinds. At last we come to man, who proclaims his reasoning soul: he has no date of his own beginning; he does not know the origin of organic or inorganic matter any more than Charles Kingsley's "shepherd boy,"\* the President of the British Association, or King Solomon. Yet every organism is a type of the cosmical trinity, produced from what we call inorganic matter by warmth and light. We can get no further; we do not know the origin of light, of warmth, of life, of growth; but we know they are inseparable; and so we believe that energy and motion had a beginning in the *nebulous dust* of Laplace and Gruithuisen, at the moment when the mass first felt the influence of light and warmth.

We have not answered the question in the first sentence. We have pointed out how the laws of the present act on present elements. We have claimed for these elements and laws an inseparable beginning. We have shown how the air, the water, and the dust

are separated from one another to perform their distinct elemental functions, and are again united in the cosmic trinity. That trinity was in the nebulous dust, in the matter which first came under the law. We cannot tell the origin of the law, or the origin of matter. The great problem is still unsolved. How did the Beginning begin to be?

Until that question is answered truly, all our so-called natural and physical sciences, dealing with the Beginning, or with structures rising from a supposed Beginning, must be ideal. Every present doctrine on these subjects varies with the Doctor, following the example of the widely-varying teachings of Laplace and Gruithuisen.

May we conclude the subject with a word of warning to the public. If there is any truth in what we have written, we come to a point beyond which we cannot see, an utter ignorance of origin. The materialist endeavours to trace all things, even the reason of man, to matter; in doing this, he does not know what matter is: till he knows this, he teaches falsely. When he can tell us the origin of our elemental matter, it will be time to argue the question—God, or no God? Till then, we will believe in the God of our forefathers; in the sun as His agent in our solar system; and in the elements, as ordained by Him to be subservient to His laws from the Beginning to the end.

Since sending this paper to the editor, a discovery has been made which confirms the theory of a slow, cold Beginning—a gradual clearing of the atmosphere, a gradual accumulation of water, and a gradual deposit and aggregation of matter. M. Cailletet and M. Raoul Pictet have converted air into liquid: oxygen and nitrogen have produced water; hydrogen has been converted into visible vapour; and, says the *Mail* of 9th January 1878—"It is obvious that it is only a question of carrying these experiments further, *in order to reduce these liquid gases to a solid form.*" We put the question to science—Were not the pressure and the cold, under which the gases were liquefied, present in the dark, cold Beginning, and were not these conditions carried on to the solids, as light and sunshine warmed this sphere?

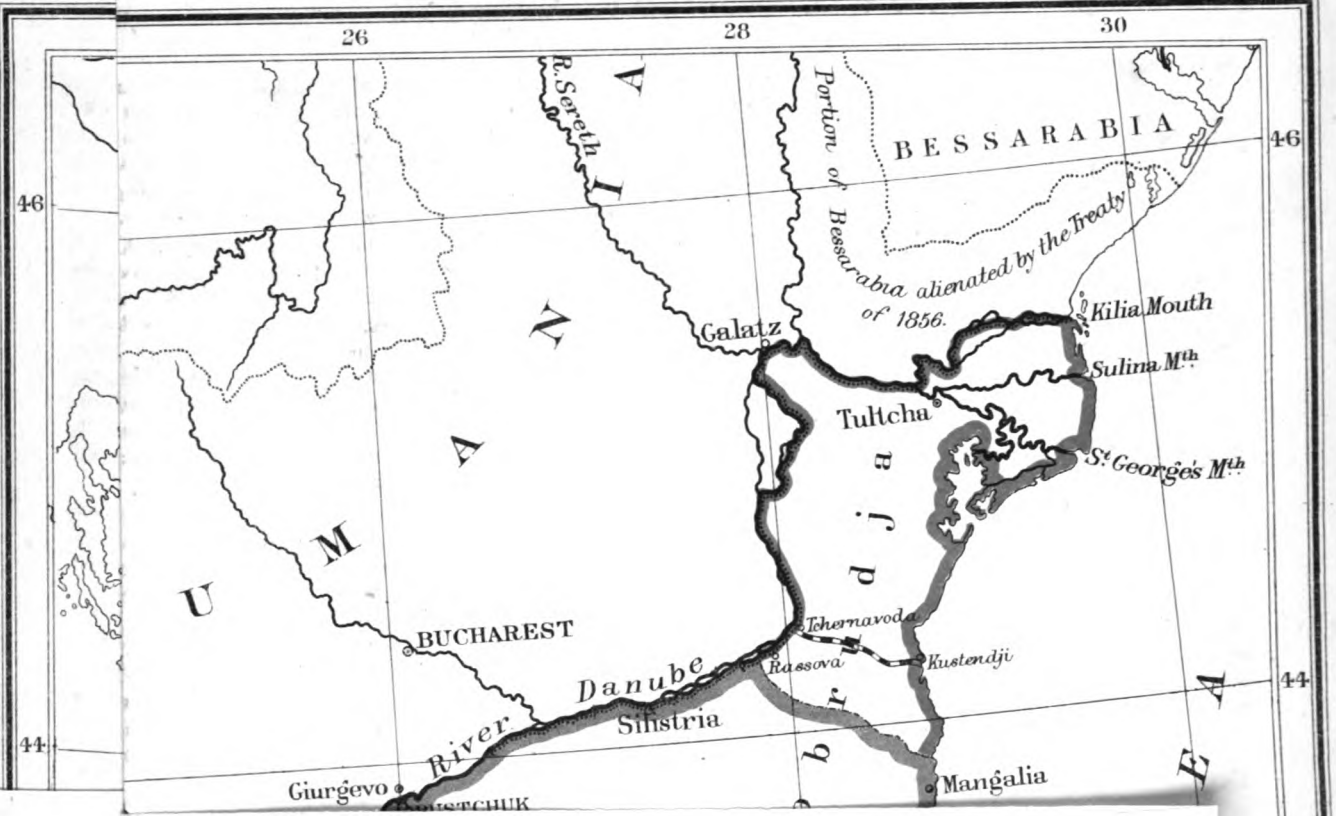
H. P. MALET.

THE COAL-FIELDS OF ASIA. An Extract, Translated from the German of Ferdinand Hochstetter's "Asia: its Future Railroads and its Coalfields." (Simla, 1877.)

THE extent of the coal-fields of the globe, and their possible exhaustion at some future time, is a subject of the highest importance; and it is a matter of congratulation that so learned a geologist as Dr. Von Hochstetter should have devoted his attention to the coal resources of Asia, and to a consideration of how far they may be relied upon to supply the deficiency which must ensue, sooner or later, from the exhaustion of the European beds. Dr. Hochstetter has amassed a variety of most interesting information in his paper, a good deal being derived from Baron Von Richthofen's observations in China, the coal measures of which country are of surpassing richness and abundance. Our general information regarding the Asiatic coal measures is naturally much too vague to form any definite estimate of their extent, but they are obviously large enough to outlast the European ones for many centuries.

\* *Lessons in a Gravel-Pit.*

viage of Radwanzi. Starting from the point the frontier will descend the Morava as far as the River | out on the Danube above KASSOVA.



*[Faint, mostly illegible text from the reverse side of the page is visible through the paper.]*

M.S. Cross. S.W.

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\* *Lessons in a Gravel-Pit.*

extent, but they are obviously large enough to outlast the European ones for many centuries.

PROPOSED CHANGES IN THE TERRITORIAL BOUNDARIES OF EUROPEAN TURKEY.

AS STATED IN ARTICLES I., III., AND VI. OF THE "PRELIMINARY TREATY OF PEACE."

THE proposed new boundaries are shown in red on the accompanying map, while the old boundaries are given in blue.

**MONTENEGRO.**—*Art. I.* "From the mountain of Dobrostitza the frontier will follow the line indicated by the Conference of Constantinople as far as Korita by Bilek, thence the new frontier will run to Gatzko (Metokia Gatzko will belong to Montenegro), and towards the confluence of the Piva and the Tara, ascending towards the north by the Drina as far as its confluence with the Lim. The eastern frontier of the principality will follow this last river as far as Prjepolje, and will proceed by Rozaj to Sukha Planina, leaving Bihor and Rozaj to Montenegro. Uniting Rugova, Plava, and Gusinje, the frontier line will follow the chain of mountains by Zlieb Paklen, and run with the northern frontier of Albania by the crests of the mountains Kopzivnik, Baba-osh, Bor-osh, to the highest peak of Prokleti. From that point the frontier will proceed by the summit of Biskasit-osh and will run in a straight line to the Lake of Tjiceni-Hoti. Dividing Tjiceni-Hoti and Tjiceni-Kastrati, it will cross the Lake of Scutari to the Boyana, the *thalweg* of which it will follow as far as the sea. Niksic, Gatzko, Sponje, Podgoritza, Zabliak, and Antavari will remain in Montenegro. A European Commission, on which will be represented the Sublime Porte and the Government of Montenegro, will be charged with the duty of fixing the definite limits of the principality, noting on the spot in the general map the modifications which it may think necessary and equitable, from the point of view of the respective interests and of the tranquility of the two countries to which it will accord in this respect the equivalents deemed necessary. The navigation of the Boyana having always given rise to disputes between the Sublime Porte and Montenegro will be the subject of a special regulation, which will be prepared by the same European Commission."

**SERVIA.**—*Art. III.* "Serbia is to be recognised as independent. Its frontier "will follow the *thalweg* of the Drina, leaving Little Zvornik and Sakar to the principality, and running along the old limit as far as the sources of the stream Dezvo, near Stoilac. Thence the new line will follow the course of that stream as far as the River Raska, and then the course of the latter as far as Novi-Bazar. From Novi-Bazar, ascending the stream which passes near the villages of Mekinji and Srgovisje as far as its source, the line will run by Bosu Planina, in the valley of the Ibar, and will then descend the stream which falls into this river near the village of Ribaritz. The line will then follow the course of the rivers Ibar, Sitnitza, and Lab, and of the brook Batintze to its source (upon the Grapacknitza Planina). Thence the frontier will follow the heights which separate the waters of the Kriva and the Veternitza, and will meet the latter river by the shortest route at the mouth of the stream Miovatzka, which it will ascend, crossing the Miovatzka Planina and re-descending towards the Morava, near the village of Kalimantzi. Starting from this point the frontier will descend the Morava as far as the River

Vlasina, near the village of Staikovtzi. Re-ascending the latter river as far as the Linberatzda, and the stream Kakovitzze, the line will follow the Suka Planina, will run along the stream Vrilo as far as the Nishava, and will descend the said river as far as the village of Krupatz, whence the line will proceed to rejoin by the shortest route the old Servian frontier to the south-east of Karaul Bare, not leaving it until it reaches the Danube. Ada Kale will be evacuated and razed. A Turko-Servian Commission, assisted by a Russian Commissary, will, within three months, arrange upon the spot the definite frontier line; and will definitely settle the questions relating to the islands of the Drina. A Bulgarian delegate will be admitted to participate in the work of the Commission when it shall be engaged on the frontier between Servia and Bulgaria."

**BULGARIA.**—*Art. VI.* "Bulgaria is constituted an autonomous tributary principality, with a Christian Government and a national militia. The definitive frontiers of the Bulgarian principality will be laid down by a special Russo-Turkish Commission before the evacuation of Roumelia by the Imperial Russian Army. This Commission will, in working out the modifications to be made on the spot in the general map, take into account the principle of the nationality of the majority of the inhabitants of the border districts, conformably to the bases of peace; and also the topographical necessities and practical interests of intercommunication of the local population. . . . Leaving the new frontier of the Servian principality the line will follow the western limit of the Caza of Vranja as far as the chain of the Kara-dagh. Turning towards the west, the line will follow the western limits of the Cazas of Koumanovo, Katzanik, Kalkandele, to Mount Korab, thence by the River Veshu as far as its juncture with the Black Drina. Turning towards the south by the Drina and afterwards by the western limit of the Caza of Ochrida towards Mount Linas, the frontier will follow the western limits of the Cazas of Gortcha and Starovo as far as Mount Grammos. Then by the Lake of Kastoria, the frontier line will rejoin the River Moglenitza, and after having followed its course, and passed to the south of Yanitza (Wardar Yenidje), will go by the mouth of the Wardar and by the Galiko towards the villages of Parga and of Sarui-kio. Thence through the middle of Lake Besik Göl to the mouth of the river Karasu (Struma), and by the sea-coast as far as Bara Gol. Then going further north-west towards Mount Tchaltepe by the chain of Rhodope as far as Mount Krushova, by the mountains Eshek Kuladji, Tchipeli, Karakolas, and Ishiklar, and then as far as the River Arda. Thence the line will be traced southwards in the direction of Adrianople by the villages of Sogudlu, Kara-Hamsa, Arnaut-koi, Akarji, and Yenijeh as far as the River Teike. Following the rivers Teike and Tchoru as far as Lule Burgas, and thence by the River Sudjak to the village of Sergen, the frontier will go by the heights straight towards Hakem Tabiassi, where it will terminate on the Black Sea. It will leave the sea-shore near Mangalia, running along by the southern boundaries of the Sandjak of Toultscha, and will come out on the Danube above Rassova."



## Reviews.

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### Dr. HUNTER'S STATISTICAL ACCOUNT OF BENGAL\*

THE first-fruits of the Statistical Survey of India, under the direction of Dr. W. W. Hunter, are worthy of the grandeur of the undertaking to which we have already invited attention in these columns. The twenty volumes now before us form as splendid a seven years' literary achievement as we know of, and Dr. Hunter is to be warmly congratulated on this additional laurel added to his wreath. Not many men in India or in England would have cared to face the task he has now set behind him, and it may be confidently said, that the number of those who could have successfully brought to a conclusion a work of this magnitude in the time stated is extremely limited. Everything was against the worker in this field, and an experienced Indian Governor, still living, pronounced the task, of the completion of which we have visible demonstration, an impossibility. To most men, indeed, it would, we believe, have proved so, but Dr. Hunter has special qualifications for the work for which he was selected. Combined with an acute sense of the comparative value and importance of different kinds of information, he has shown that he possesses powers of assimilation and organization which can only be characterized as wonderful; rare tact in dealing with men whose assistance was essential to success; and—most important, perhaps, of all—an adequate conception of the shortness of life. The great temptation in such a work as this Statistical Account was over-elaboration, and this would have been fatal to the success of the undertaking.

We have on a former occasion† referred in some detail to the numerous attempts made since 1765 (when the Civil Administration of Bengal passed into the hands of the East India Company) to obtain a knowledge of the country and the people. We then tried to show that the failure of these efforts might be attributed to several causes, chief among which were undue elaboration, and want of a single central controlling power. The latter of these causes of failure, which was also undoubtedly the principal cause, was removed by the appointment of Dr. Hunter as Director-General of the Statistical Department in India, with entire control over the operations of the Statistical Survey. The elimination of the other elements of failure was, of course, left to Dr. Hunter, and the successful issue of this first instalment of the work abundantly justifies his appointment, and affords additional evidence, though none is required, that Lord Mayo possessed that most valuable and rare instinct of selection to which Garibaldi has recently so pointedly alluded, and to which the veteran soldier justly attaches so high a value. Dr. Hunter began his work by carefully studying the causes of previous failures, and the *Statistical Account of Bengal* shows how he has profited by the study.

The result being so satisfactory, as we have thus indicated, it will interest our readers to have some account of the plan by which this success has been attained before we enter upon a brief description of the work itself. Dr. Hunter's plan can be best described in his own words. "It was found necessary in the first place," he writes in the preface to the first volume, "to provide that the materials collected by each of the Local Governments should afford a common basis for the comparative statistics of the country, when eventually consolidated into one final work for all India. In the second place,

to devise measures for ensuring the compilation of the materials thus obtained within a reasonable time, and on a uniform plan. The District forms the administrative unit in India, and I took it as the unit of the Statistical Survey in the work of collecting the materials; the Province forms a large administrative entity, and was taken as the basis of the organization for compiling the materials when obtained. With a view to securing uniformity in the materials, I drew up, under the orders of Government, six series of leading questions,\* illustrating the topographical, ethnical, agricultural, industrial, administrative, medical, and other aspects of an Indian District, which might serve as a basis for the investigations throughout all India. With a view to securing certainty of execution, provincial editors were appointed, each of whom was made responsible for getting in the returns from the District officers within the territory assigned to him, supplementing them by information from the Heads of Departments and local sources, and working them up into the Statistical Account or Gazetteer of the Province. In this way the unpaid co-operation of the whole body of officers throughout the 225 Districts of India was enlisted, the best local knowledge was brought to bear, and in each Province there was an editor directly responsible for the completion of the Provincial Account on a uniform plan and within a reasonable time. The supervision of the whole rested with me as Director-General of Statistics to the Government of India.† The lists of enquiries referred to were circulated by the Bengal Government in 1869—70, and during the next three years the District officers collected the information required in order to reply to them. "In some cases," says Dr. Hunter, "their reports have amounted to several hundred pages for a single district." These reports were tested as they came in by comparison with the returns from adjacent districts, and, when necessary, by personal visits. The proof sheets, after being passed by Dr. Hunter, were read by the Bengal Government, and received the official sanction before being printed.

Such, then, is a brief sketch of Dr. Hunter's plan of operations—a sketch, however, which gives but a faint idea of the amount of conscientious labour involved in the production of these 20 volumes. Great attention has been paid to points of detail which are essential to the practical utility of such a work as this. The plan of each of the 48 District Accounts is absolutely uniform, the subjects treated of being invariably introduced in the same order and under the same general and special headings. Each account of a District is complete in itself, and each volume has its map, its table of contents and its index, while a general and more elaborate index to the whole work occupies 200 pages of the last volume. The advantage of all this is evident. We have said that one of Dr. Hunter's principal qualifications for the task which he has undertaken is an adequate appreciation of the shortness of life, and busy men will know what we mean, and will appraise at its true value the compliment we meant to convey in the expression. This Statistical Account of Bengal is written primarily for men who are, or ought to be, busy—Indian officials of all kinds in Bengal and in England. It will also be read principally, out of official circles, by men

\* Subsequently circulated to the Local Governments under the title of 'Heads of Information required for the Imperial Gazetteer of India.'

† The above narrative is as accurate as a comprehensive sketch can be made without going into very minute details. Thus, in one Presidency (Madras) a more elaborate system of separate District accounts has been adopted; while the Gazetteers of one of the minor administrations (the Central Provinces), and of the Haidarâbâd Assigned Districts (the Berars) were commenced and practically done before the introduction of the system above described. Again, with regard to Native States, considerations of public policy have rendered anything like rigid uniformity in any demands for information impracticable.

\* *A Statistical Account of Bengal.* By W. W. Hunter, B.A., LL.D., Director-General of Statistics to the Government of India. Twenty Volumes. London: Tribner and Co.

† *Geographical Magazine* for September 1876.

both in India and this country whose time is valuable and who will be grateful for the uniformity and attention to detail to which we have referred. And it is but natural that the reviewer should lay special stress upon an apparently small point which nevertheless greatly facilitates his task. A very cursory examination of the work will show the reader what we mean; and, if, besides being a reader, he is a student, he will rapidly discover that for purposes of comparison this uniformity is not only extremely valuable but absolutely essential.

The principal general headings under which the information given in each district is ranged are:—Topography and General Aspects—The People—Agriculture—Natural Calamities—Means of Communication—Manufactures—Commerce, &c.—Administrative, &c.—Meteorological and Medical. The manner in which these headings are amplified and subdivided may be most simply shown by noting the chief sub-headings of a District Account. Taking, for example, the District of Cuttack (Vol. xviii), we find in the index the following headings (we omit the page references):—

CUTTACK DISTRICT.—Geographical Situation, Area, and Headquarters; Boundaries; Jurisdiction; General Aspect of the District; Hills; River System; Estuaries and Harbours; False Point—History of the Harbour; Its Trade; Its Future Capabilities and Improvements; The Bráhmání and Dhámrá Estuaries; Distribution and Control of the Water Supply; The Orissa Canal System (High Level, Kendrápára, Taldandá, and Máchhgáon Canals); Irrigation Capabilities; Financial Aspects; Embankment; Utilization of Water Supply; Fisheries; Lines of Drainage; Jungle Products and Pastures; *Fera Nature*; Population—Early Estimates; Census of 1872, its Agency and Results; Classification according to Sex, Religion and Age; Infirms; Ethnical Division of the People; List of Hindu Castes; Aboriginal Tribes; Religious Division of the People; Division of the People into Town and Country; Cuttack (Katak) City; The Citadel of Cuttack; Jájpur; Sivaite Temples and Sculptures; Kendrápára; Jagatsinhpur; Antiquities of the Cuttack Hills; Material Condition of the People—Dress, Dwellings, Food, &c.; Agriculture—Rice Cultivation and List of Crops; Other Cereals; Pulses and Fibres; Miscellaneous Crops; Cultivated Area and Out-turn of Crops; Condition of the Peasantry; Rent-law; Domestic Animals; Wages and Prices; Agricultural Implements; Weights and Measures; Landless Labouring Classes; Land Settlement; Land Tenures—Tributary States, or *kilajáts*; *Zamindáris*; Intermediate Estates, paying Revenue through the *Zamindárs*; Resumed Revenue—Free Tenures; Quit-rent Tenures; Cultivating Tenures; Religious and Charitable Tenures; Service Tenures; Rates of Rent; Manure, Irrigation, and Rotation of Crops; Natural Calamities—Blights, Floods and Droughts; Famine Warnings and Preventive Works; The Famine of 1866; Road and other Means of Communication; Manufactures; Commerce and Trade; History of Orissa—Pre-historic Period: The Buddhists; The Sivaite Dynasty; The Vishnuvite Dynasty; The Muhammadan Conquest; The Marhattá Rule; The English Conquest; Revenue and Expenditure; Land Revenue; Civil and Criminal Courts; Police and Jail Statistics; Educational Statistics; Postal Statistics; Administrative Divisions; List of *Parganá*s with chief Villages in each; Climate, Temperature, and Rainfall; Endemics and Epidemics; Charitable Dispensaries; Cuttack Lunatic Asylum; Vital Statistics; Fairs; Cattle Disease; Indigenous Drugs.

A similar list of references, *mutatis mutandis*, is found against the name of each of the forty-eight Districts of Bengal in the General Index; and as the whole work has been planned by one mind and upon one unvarying system, with a view to comparative study, the difficulties in the way of reference are reduced to a *minimum*. It is hardly necessary to say that the skeleton analysis given above affords a very inadequate notion of the amount of labour which has been devoted to the work; and it is impossible for us in the space at our disposal to give anything but a general idea of the manner in which the skeleton is clothed. It is almost universally supposed, and not without reasonable and good foundation, that to make statistics interesting is an impossibility, but Dr. Hunter has in this work

disposed of more than one "impossibility" and we venture to affirm, without much fear of contradiction, that if the incredulous reader will devote a couple of hours to the sixth volume of this *Statistical Account of Bengal*, (dealing with the Districts of Chittagong, Noákháli and Tipperah, the State of Hill Tipperah and the Chittagong Hill Tracts) he will admit that statistics are not such dry reading after all. Although "historical disquisitions or opinions on the social and economic conditions of the people were deemed unsuitable in a work which was to be revised by the Government and to receive its official imprimatur," Dr. Hunter has not failed to light up his pages whenever occasion offered, and his volumes contain much that is extremely interesting even to the ordinary reader. This remark applies in a special degree, perhaps, to the sections on the People. We are first told their numbers, and after we have followed them through all their subdivisions—according to race, caste, religion, sex and age—we are presented with a picture of them in their homes; their dwellings, furniture, and dress are minutely described, and in most cases some account is given of the ceremonies and customs on domestic occasions—birth, marriage and death—which form so interesting and characteristic a feature in their lives. In the case of aboriginal tribes or semi-Hinduized castes, very curious details are noted. A vivid—we might almost say photographic—picture of the Bengal peasant may be extracted from these volumes in which we find the minutest details of his life and work—the instruments with which he tills the ground and the cost of the cattle which he requires for that purpose. Not less carefully filled in are the details of the other sections of the work, and there is valuable matter in these volumes to suit all tastes. The portion of each District Account which will probably most interest our readers is the introductory one dealing with the geographical and physical aspects of the country. As readers of Dr. Hunter's *Orissa* will expect, much space is devoted in the introductory sections to the Rivers, which forms so important and striking a feature in the physical geography of Bengal. The general characteristics of the deltaic rivers are described with great clearness, and in each District Account we have first a general survey of the river-systems, line of drainage, &c., and then a detailed account of each river; a description of its bed and banks; the depth of water at different seasons of the year; and a history of the known changes in its course. As a good instance of the careful manner in which this whole subject is treated we may cite the excellent description in the second volume, of the difficulties experienced in keeping open the great Nadiyá rivers, the Bhágirathí, the Jalangí, and the Mátábhángá. If left to themselves, these rivers form enormous sand-banks and shoals, which render traffic impossible soon after the commencement of the cold weather. To remedy this state of things, the Government annually expends a large sum of money, recouping itself by the levy of tolls at Nadiyá and Krishnaganj. The history of the efforts made by Government to keep open these important channels of communication and the record of the difficulties with which it has to contend in doing so, are full of interest and exhibit in a very striking light the stupendous natural forces at work in the great Indian rivers.

It is, as we have said, impossible for us to review in detail this elaborate work; but, before bringing our notice of it to a close, we must express the great satisfaction and relief with which we notice the official introduction in a popular work of reference of a uniform system of spelling Indian proper names. These volumes, published under Government sanction, will do more to familiarize readers of all kinds with the simple system (for the establishment of which some years ago we have also to thank Dr. Hunter) than many Orders of the Governor-General in Council, and all Indian students have reason to be

grateful to the author and to the Government for setting happily and finally at rest that once-vexed question.

The *Statistical Account of Bengal* is in every sense of the word a great work, and the Government of India and of Bengal, not less than Dr. Hunter, are to be warmly congratulated on its successful completion. These Governments owe, we are convinced, a deep debt of gratitude to the Director-General of Statistics for the manner in which he has achieved a task which, we repeat, we think few men could have brought to a successful issue. We look with the greatest interest, and, we can now add, with perfect confidence, for the appearance of the new *Imperial Gazetteer of India*, on the preparation of which Dr. Hunter is at present occupied.

#### THE COUNTRY OF THE MOORS.\*

MR. RAE gives us a narrative of his visits to the states of Tripoli and Tunis. Of the towns of Tripoli and Tunis there is not much that is new to be learned, nor can they be considered outside the influence of civilisation, inasmuch as the traveller will find the English Church service on Sundays, at the consulate at the former, and the latter town is approached from the coast by a railway, the time-table of which figures in *Bradshaw*.

The whole country visited by Mr. Rae positively swarms with ancient remains, and it is shocking to read of the uses to which antique columns are put. At Leptis, he says—"We ascended the hill, and found on its crest a gang of fifteen or twenty negroes, with a Maltese overseer, hard at work excavating. They had come upon the site of a temple, of which the noble red granite columns still stood erect under the sand. They had excavated a huge hole, and length by length the columns were being removed, and placed ready for transport to Homs. This disgraceful traffic is destroying what remains of Lebda's glories. Maltese and low Mediterranean traders in Homs are growing rich upon the sale of columns. They have been doing this since the beginning of the century; and unless some one interferes, future travellers will have to seek for the ruins of Leptis in the olive-mills of Tripoli, Sfax, Susa, and the other Barbary ports. Invaluable as olive-crushers, the shafts are being shipped wholesale, for sale to the oil-merchants."

Roman copper coins are so plentiful that they pass current in many of the bazaars for their equivalent copper value.

One pretty custom of the Moors of Tunis is new to us. Mr. Rae says that in dress and manners they show a grace and refinement not to be seen amongst other Moors, and that they have a general habit of wearing under the turban, and above the ear, a small bouquet, sometimes a couple of lovely rosebuds. This recalls Shakespeare's

"That in mine ear I durst not stick a rose."

We recommend this coincidence to the commentators.

The really valuable part of Mr. Rae's book is the account of his visit to the sacred city of Kairwán. The fanaticism of its inhabitants has hitherto been supposed to render it dangerous for a Christian to enter within its walls. Our author, however, found no difficulty in doing so. Indeed, the ease with which he obtained permission from the Government, and the promise of an escort of soldiers to protect him, caused him *extreme disappointment*: he fills more than five pages with a description of the precautions he would have adopted

\* *The Country of the Moors: a Journey from Tripoli, in Barbary, to the City of Kairwán.* By Edward Rae, F.R.G.S., Author of "The Land of the North Wind." (London: John Murray. 1877.)

had they been necessary. He was hospitably entertained by the Kaid of Kairwán, and in his walks through the town was attended by his escort: this saved him from any attack from the townspeople, who seemed very ready to annihilate any unprotected unbeliever. The great mosque of Kairwán is a building replete with interest. Fergusson, in his *History of Architecture*, writes:—"The Mosque of Kairwán is one of those buildings about which it would be especially interesting to know something." This *something* Mr. Rae now gives us, in the fullest account of the mosque which has hitherto appeared. He was able to take the outside measurements, and to make a careful plan of it. He did not venture to enter it, but the great doors of the courtyard and prayer-chamber being open, he was able to see the interior pretty clearly. There is much similarity in the plan of this mosque and that of Cordova, and both have the same court in front, which would seem to militate against Fergusson's suggestion that the court at Cordova was borrowed from the Christian basilica. Mr. Rae calculates the number of columns in the interior of the mosque to be 415: he tried to get a native to count them, but in vain, as a superstitious notion obtains that whoever counts them is held to be accursed. This does not seem to have been the case 150 years ago, for Dr. Shaw states that the natives told him there were no fewer than 500. Mr. Rae gives an etching from his sketch of the eastern angle of the mosque: we wish he could also have shown us the Minar.

#### PERAK.\*

THE Malayan Peninsula is a very interesting region, and a large extent in the interior and on the eastern coast is unexplored. It is divided into numerous petty kingdoms, and the greater part of the country is still covered by primeval forest, rivers affording the only access to the interior. On the western coast the principal native State to the north is Quedah, bordering on the British Province of Wellesley, including Pulo Penang. Proceeding southwards, the next State is Perak, then comes Salangore and the British settlement of Malacca, and lastly Johore.

There is an account of Quedah, written by Admiral Sherard Osborn in 1857. This is one of the most charming narratives of adventure, interspersed with life-like descriptions of scenery, that has been published for the last fifty years, and conveys an admirable impression of the most northern of the Malayan States. An account of Johore and of its enlightened ruler, by Mr. W. E. Maxwell, will be found in our number for September 1872 (p. 184); and an article on piracy in the Straits of Malacca, also by Mr. Maxwell, is in our number for January 1873 (p. 312).

Perak, the central Malay State, has found an able and thoroughly efficient historian in Major McNair. His work has the character of a monograph. He describes Perak as covering 4000 square miles, with 90 miles of coast and 45 of depth inland. The Perak river is the great fluvial highway intersecting the wide central plain from north to south. On the west side fertile lands extend to the sea, while to the east there is a gradually rising country to the central ridge. The Malay *campongs* or villages, consisting of bamboo houses embedded in groves of cocoa nut and fruit trees, occasionally with a mosque, are along the river banks, the interior being covered with jungle. Major McNair gives a very interesting *resumé* of ancient knowledge of the mineral wealth of the Malay peninsula, and describes the tin mining stations and gold washings.

\* *Perak and the Malays—Sarong and Kris.* By Major Frederick McNair, Colonial Engineer and Surveyor-General of the Straits Settlements. Maps and Twenty-three Engravings, from Photographs; pp. 454. (Tinsley Brothers. 1878.)

Then follow chapters on the vegetable productions, including fruits, on the animals, and on the people, their manners and customs. There are also chapters on the Malay language, and on the history and government of Perak. The last chapters give an account of the murder of Mr. Birch, the British Resident, of the operations which ended in the death of that gallant and lamented young officer, Captain Innes, and of the subsequent events ending in the installation of the present Sultan Yusuf, with Mr. Low as Resident. The book is an exhaustive, and at the same time a very ably written monograph on a Malayan State of which our knowledge was formerly very deficient.

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THE INDIAN FORESTER. Vol. ii., Nos. 2, 3, 4; and Vol. iii., Nos. 1 and 2 (Oct. 1876 to Oct. 1877, inclusive). (Calcutta.)

SINCE we last noticed *The Indian Forester*, in our number for November 1876 (p. 308), five new numbers have been received, which fully maintain the useful character of the periodical. It has, under the able editing of Dr. Schlich, become a marked success. The number for October 1876 contains papers on the cultivation of the *Eucalyptus globulus* in India by Mr. O'Connor and Dr. Brandis: that for January 1877 is chiefly occupied with the consideration of the demarcation of forest areas, of supply and demand in their relation to working plans, and of the political value of forest conservancy, the latter important article by Mr. Baden Powell. The number for July 1877 contains a paper on the forests of the Tinnevely district, by Colonel Beddome, and one on working plans, by the editor.

In the number for October 1877 there is an account of the Conolly Teak Plantations in Malabar, by Mr. Atholl MacGregor, who was recently Collector of the district. It gives a history, from the commencement by Mr. Conolly in 1840, of these plantations, which are certainly the most important in India. Eventually they will contribute an immense stock of fine timber, and reimburse the State for the whole of its outlay, with interest. The paper contains full statistics of the plantations, and is illustrated by a map.

## Cartography.

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### Chavanne's Wall Map of Africa.\*

DR. J. CHAVANNE, the able Secretary of the Vienna Geographical Society, has given us a most admirable physical wall map of Africa, which is the most recent and accurate one that we have yet seen. The heights are shown by graduations of colour from dark brown to green, the different shades representing differences of a thousand metres; the rivers are clearly and prominently marked and the topography generally laid down with that care for which German geographers are pre-eminently noted. We note that Stanley's latest discoveries are duly exhibited, but we question the compiler's right to show the "Alexandra Nyanza," the greater portion of the particulars of which were obtained from hearsay, as if it had been actually surveyed, and we must protest most strongly against the adoption of the term Livingstone, instead of the familiar Congo, for the giant stream which discharges itself into the Atlantic. The plan of conferring fresh names on rivers, islands, or other geographical features, which may happen to receive partial exploration at some one's

\* *Physikalische Wandkarte von Africa*. Entworfen und gezeichnet von Dr. J. Chavanne. Maasstab 1 : 8,000,000. (Wien, 1878, E. Hölzel's Verlag.)

hands, is one that will infallibly lead to great confusion, for there is no knowing where it will stop. On the same principle the first traveller who explores the Nile, from its most southern source, might consider himself justified in re-naming that parent of rivers. In the lower margin of Dr. Chavanne's map are smaller maps showing (i.) the river basins of the continent; (ii.) the distribution of forest, cultivated land, steppes, savannahs, and desert; (iii.) the ethnographical, and (iv.) political characteristics. It is altogether a most complete production, and we congratulate Dr. Chavanne on the appearance of a map which we trust may be the precursor of other similar maps of the principal divisions of the world. We must not omit to mention that the map is accompanied by a short explanatory pamphlet, giving a chronological list of all explorations during the present century, and an enumeration of the various materials on which the present map is based.

### Indian Land Survey Maps.

THE publications of the Indian Surveys appear with their usual promptitude, and include a vast amount of cartographical productions of an important character, some being executed with considerable taste. The Indian Atlas quarter sheets recently completed include Nos. 23 N.W. and 23 S.W. exhibiting parts of Kattywar, No. 130 N.W. (Brahmaputra river, Bisnath Jorhat and Golaghat in Assam). These are preliminary editions without hills, and call for no particular remark. Besides these are No. 124 S.E. (Kamroop, Nowgong, &c.) a remarkably good specimen of hill engraving, and No. 72 N.W. (Chindwara, Baitul and Nagpore) preliminary, without hills. Of the Punjab Revenue Survey (Bahawalpur State) sheets 28, 33, 39, 40 and 44; and of the Gurgaon District Revenue Survey, sheets Nos. 1 to 12 have appeared. The great deviations made by the River Indus are here graphically shown in the Bahawalpur sheets by dotted lines indicating the former course of the river. These are fairly good specimens of cartography, the delineation of the hills on the former alone wanting a little in clearness. Of the Bheerbhoom District sheets, Nos. 1, 2, 3 and 5 are published, and this completes the tale of the Revenue Survey sheets. The usual promptitude in the publication of the results of the surveys does not seem to have been observed in the case of the Bheerbhoom sheets, the survey having been made in 1853-55, and sheets 4, 6 and 7 being still due. The same remark is applicable to certain plans of cantonments and stations, viz., Sebsaugor, Kyouk-Phyou and Kooch-behar, though in these cases the need for the sheets was probably not urgent.

The Topographical Survey sheets are very numerous, comprising Nos. 58, 59, 62, 63, 64, 66, 67 and 73 of the curiously monotonous survey of the Rajputana sardy steppe-like country. The Bhopal and Malwa Survey is represented by sheets Nos. 19, 20, 21, 37, 39 and 37; and the Gwalior and Central India Survey, by sheets 76, 77, 79 and 80. The Ganjam and Orissa series is divided into two categories, the two-inch and the one-inch surveys. Sheets 20, 24, 33, 42, 43, 46, 48, 52, 69, 71, 73, 74 and 98 have been published, and the series will very shortly be completed. The Kattywar Survey (one inch to one mile) sends sheets Nos. 10a, 36, 37, 38 and 45 which are clearly and delicately drawn, and show most usefully all cultivated waste areas, and even footpaths. The Guzerat Survey, of which we have seen sections of sheets 14, 80, 81 and 82 is on a much larger scale (four inches to the mile), and is most elaborate and clear, showing as it does the fields with their fiscal numbers, village boundaries with the area and population of each. Of the Topographical Survey of Dehra Dun and the Sewaliks (on the same scale as the preceding one) sheets 25, 30 and 35 have appeared with an index map. The other publications of the Indian Surveys, useful

though they be, do not appear to call for detailed notice.

#### Indian Marine Survey Charts.

ALONG with the new report on the operations of the Marine Surveys of India there is an interesting Index map showing the surveys completed and in progress. The number of completed surveys are seven: Kolachel, Madras, Coconada, False Point, the Hooghly river, Rangoon river and Maulmain; the partial surveys are ten: Goa, Calicut, Cochin, Palk Straits, Pt. de Galle, Chittagong, Akyab, Kyouk Phyou, Tavoy and Kopah Inlet; the compiled charts twelve: the coasts of India from Karachi to Coconada (three general charts) southwest coast of Guzerat, Angria Bank and the Laccadivhs (five charts), Quilon roads. False Point to the Sandheads and Junkseylon. There are also three general charts in preparation dealing with the whole coast of India and the Malay peninsula from Coconada to Pulo Penang. The index gives a good idea of the excellent work done by the Marine Survey Department since its establishment in 1875.

## Log Book.

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**Colonel Yule and Mr. Stanley.**—In a pamphlet published by Colonel Yule and Mr. Hyndman, entitled, "*Mr. Henry M. Stanley and the Royal Geographical Society, being the Record of a Protest*," our argument in defence of Mr. Stanley, in our number for March 1878, p. 53, is thus described. "That it would probably have been wrong in Mr. Stanley to shoot negroes on his own responsibility; but as he had got authority to do so from two gentlemen, A. B. of London and C. D. of New York, he was quite justified in doing so, provided he did not do it when he himself judged it to be unnecessary." A reference to our article will show that this is not a fair representation of our contention. We maintain that an explorer sent out into a lawless and savage country has a right to defend his life, and the lives of those for whom he is responsible, by force if necessary; whether he is employed by gentlemen of London and New York or not. We also maintain that such explorer is bound to refrain from using force except under circumstances of absolute necessity, and that of this, by the nature of the case, the explorer alone can be the judge. But we propose to discuss this question more fully in our next number.

**Death of an Arctic Explorer.**—We have to record the death of one of that gallant few which attained the highest northern latitude ever reached by man on the memorable 12th of May 1876. (For the names of the ten see our number for January 1877, p. 2). DANIEL HARLEY was born at Madras in 1849, he entered the Navy before the mast, was a seaman gunner, served in the Ashanti war, and was one of Commodore Commerell's gig's crew when he was wounded. In May 1875 he was selected for the Arctic Expedition, and became Captain of the Foretop of H.M.S. 'Alert.' He was away autumn travelling from September 11th to 14th, and suffered severely from the gale of wind and intense cold. But he soon recovered, and was full of zeal for the spring travelling, when he formed one of Captain Markham's sledge crew, in the northern division. Harley was one of the ten who planted the Union Jack in 83° 20' 26" N. Attacked by scurvy he still continued to struggle against the insidious disease, resolute to do his duty until he dropped. When unable to drag he refused to be put on the sledge, and managed to walk over the ground. Of all that heroic band none displayed higher qualities than poor Harley. On his return to England he joined the 'Eurydice' as a first-class

petty officer, and was drowned when that ill-fated vessel went down off the Isle of Wight, on the 25th of March 1878. Daniel Harley was a fine specimen of a British seaman. He was married shortly before he sailed for the Arctic Regions.

**Lieut. G. A. Giffard, R.N.**—In our December number we gave the appointments of the officers of the Arctic Expedition, showing that all, below the rank of captain, were already employed on active service except Lieut. Giffard. That officer was appointed first Lieutenant of H.M.S. 'Pelican,' on the Pacific Station, on November 29th, 1877. Lieut. Giffard commanded the sledge party, which was auxiliary to Lieut. Aldrich, and which subsequently laid out a depôt for his return journey. He was absent from the ship for twenty days in the intense cold, from April 3rd to April 23rd, and again from the 7th of May to the 2nd of June. His second journey is important because it furnishes a part of that mass of evidence which refutes the conclusions of the Scurvy Committee. The Committee's conclusion was that the outbreak of scurvy among the sledging parties was due to the absence of lime juice. During Lieut. Giffard's second journey, at a time when it was possible to use it, daily rations of lime juice were regularly served out, yet two men were attacked with scurvy, and got daily worse and worse in spite of the lime juice. Lieut. Giffard also assisted Captain Markham with the magnetic observations.

**Journey to Sana in Yemen.**—Signor Renzo Manzoni has recently made a journey from Aden to Sana, and has published the particulars thereof in the *Esploratore*. Signor Manzoni left Aden in company with an Italian and an Englishman, Richard Howorth, of Liverpool, on the 20th of September last, and arrived at Sana on the 15th October, the distance traversed being 244  $\frac{7}{10}$  miles. Along this route Signor Manzoni made a careful survey on the scale of about 8 or 9 miles to the inch, which is reproduced in the February (No. 8) number of the *Esploratore*. According to his survey, Sana is situated in lat. 15° 15' 30" N. and 44° 34' E. of Greenwich. Its height he fixes at 2130 metres above the sea. The population he gives as 15,000, 2000 of whom are soldiers and form the garrison. Signor Manzoni gives various other interesting particulars regarding the place in a series of letters which are appearing in the *Esploratore*.

**Surveys in Shiraz and Khorassan.**—Dr. Franz Stolze's explorations in March and April 1875, of the country lying south and south-east of Shiraz, forms the subject of a short article, in the *Zeitschrift* (No. 69-70) of the Berlin Geographical Society. The article is accompanied by a map, exhibiting Dr. Stolze's route survey, which is of value, as it lies through a region only imperfectly known to us, by the accounts of Dupré (1808), Ouseley (1811), and the English telegraph officers. Several noteworthy ruins were observed, particularly those of a fine temple in the neighbourhood of Firuzabad, and of a massive structure called "The Prison of Isfendiar," situated on a hill, between Fâsa and Darâb and dating from the Sassanian era.

The same number contains a detailed account of a route between Semnan and Mash-had in Khorassan, by General A.H. Schindler, of the Persian Service. The General's instruments were, an azimuth with an English-made prismatic compass, an aneroid and a thermometer. His survey, which is reproduced on the scale of about nine or ten miles to the inch, runs by way of Damghan, Shahrud, Abbasabad, Sebzevar and Nishapur. It contains numerous heights and a good deal of new topographical detail, which will form fresh material for a new map of Northern Persia whenever such may be undertaken.

**Survey Work on North-east Frontier of India.**—The present season's survey work in India will probably add considerably to our geographical knowledge

of the north-eastern frontier. Lieut. H. J. Harman, of the Indian Trigonometrical Survey Department, has been deputed to explore the upper course of the Subansiri river as far as the first high range. Lieut. Maxwell ascended the course of the river for three or four days during the month of January 1877, and reports the Miris, who inhabit the country, as a quiet and peaceful people. Lieut. Harman also proposes to explore the gorge to the extreme east of the Assam valley, where the Brahmaputra valley debouches into the plains. A survey of the country between the Duhong and the Brahmakund is to be carried out by Lieut. Woodford.

**Indian Coast Surveys.**—The survey of Ratnagiri and adjacent bays (on the West Coast of India), has just been completed by Lieut. Jarrad, R.N. and party. The survey is an elaborate one, and has been charted on a scale of 4 inches to 1 nautical mile; and the topography and other shore detail, bordering on Kalbadevi and Ratnagiri rivers minutely mapped, in order that the great value of this port as a safe anchorage, during the south-west monsoon, may be more clearly demonstrated.

Now that Mr. Crawford, the collector of Konkan, has succeeded in obtaining sanction for the completion of the Amba ghat (over the Western ghats), Ratnagiri becomes of the greatest importance as an anchorage, as it will be placed in direct communication with the Dekkan, the road from it, *via* the Amba ghat, being the shortest and easiest, as it is almost dead straight from the coast. The Amba ghat, will in all probability be opened to cart traffic in 1879, and had it been so when the country was stricken by famine last year, seventy or eighty thousand tons of food grain, could have been landed in Kalbadevi Bay (Ratnagiri), and from it could have been transported to the remotest of the famine districts of the Dekkan.

Vessels at present calling at Ratnagiri during the fine season, anchor south of the fort off the town, but this is a dangerous anchorage, as that corner of the bay is studded with rocks, and during the south-west monsoon no boats can land there. The anchorage in Kalbadevi Bay,  $4\frac{1}{2}$  miles north of the town, is however, perfectly safe, and affords good shelter under Meria head-land during the south-west monsoon. A cart road is in course of construction, between it and Ratnagiri, so that goods landed there, can be easily and quickly conveyed to the town. Kalbadevi Bay, is in fact, an anchorage, which may be resorted to by vessels all the year round, an advantage it possesses over all the small ports of the Bombay Presidency, between Bombay and Carwar, with the exception of Viziadrog.

Both Viziadrog and Ratnagiri (Kalbadevi Bay), *the safest ports along the whole line of coast*, appear to have been overlooked in the various schemes of communication with the interior, which have been carried out during the past few years, although previously their importance had been fully proved. During the mutiny in 1857, Kalbadevi Bay and Viziadrog, were the principal places at which the steamers, of the Indian Navy landed troops, stores and treasure, but from ill judged schemes of communication with the interior, these ports have now little or no trade. The principal roads, from the Dekkan to so called ports, such as Vingorla, Malwan and Dioghur, &c., have monopolised the traffic, as they afforded the only routes for it. Yet both the former places are dangerous anchorages, even in the finest weather, and both are encumbered with numerous rocks. Dioghur is even worse, yet over 80,000 rupees were spent on a cart road to connect it with the interior. To show the use of this road, it will only be sufficient to say, that Viziadrog, with no road, sent 1,000 tons of grain to the Dekkan during the famine of last year, against 555 tons sent from Dioghur, with a cart road.

A direct route from Viziadrog, *via* Waghota, was commenced years ago, but stopped for some extraordinary reason or other, and the above mentioned use-

less road constructed. The road *via* Waghota, had only about 15 miles to be completed, when it was abandoned, now however, there are hopes of these mistakes being rectified. Seven-and-half miles of the Waghota road were completed last year, as a famine relief work, and there only remains about the same to finish the Phonda ghat road. Had this road been opened, 20,000 tons, instead of 1,000 tons, would have been the famine contribution last year by the Viziadrog port, which would have been open all the year round.

The survey party under Lieut. Jarrad, will now be ordered to proceed to Viziadrog, and execute a similar minute survey of that port. The surveys of these really important anchorages when published will be valuable additions to the charts of the Indian Coast, as they will enable vessels to anchor in perfect safety there, and in the most convenient situations for transshipping goods, while from the largeness of the scales on which the surveys are charted, they may prove most valuable for any future harbour improvements.

**Dr. Pogge's Itinerary from Kimbundo to Quizememe**, in Western Africa is reproduced in the Berlin Geographical Society's *Zeitschrift* (Nos. 69, 70). Dr. Pogge crossed the Kassay, where it was 350 yards wide and 20 feet deep, and the Lulna which varied between 200 and 250 yards in width and between 16 and 20 feet in depth. The course of both lies to the north. His most easterly point was Inchibaraka, 8 or 10 days beyond which, to the east, is the Lubilash, which bears a different name in the southern (upper) part of its course. This he considers may be possibly identical with Cameron's Kuvari. The Lualaba river is well known in Quizememe. Lieut. Lux, Dr. Pogge's companion, adds the particulars of two routes, one 35 and the other 27 days in length, between Kimbundo and Quizememe (Mussumba). The information was derived from Saturnino, a native caravan trader. The first route appears to be nearly the same as that followed by Dr. Pogge.

## Proceedings of Geographical Societies.

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ROYAL GEOGRAPHICAL SOCIETY.

*Meeting of 25th February, 1878.*

ARMENIA AND MOUNT ARARAT.

SIR RUTHERFORD ALCOCK, K.C.B., in the chair.

The paper of the evening was by Mr. J. Bryce. "On Armenia and Mount Ararat. Armenia, he said, was perfectly undefined, and it was impossible for any geographer to lay down either a natural, political, or an ethnological limit in which geographers could acquiesce. Speaking generally it consisted of the upper valleys of the three great rivers Araxes, Euphrates, and Tigris, and occupied a lofty ground which lay round the sources and upper courses of these great streams. It also included three remarkable lake basins—the basin of the Gokcha Lake, which discharges itself into the Araxes, and the lakes of Van and Urumgah, which receive streams but discharge none, their surface being reduced by evaporation. These, Mr. Bryce went on to say, were the dimensions of Armenia,—about 400 to 500 miles each way. The country he described as very barren, and of great elevation, no part being less than 2500 feet above the level of the sea, and the climate was extremely dry and hot in summer and intensely cold in winter. Armenia was divided between three empires: the greater part, including the whole southern and western portion belonged to Turkey, the south-eastern to Persia, and the portion lying between Lake Gokcha and the



Turkish borders to Russia. The people inhabiting the country were various, the indigenous people being the Kurds. The total number of Armenians in the world was estimated at between four and five millions, one half of whom, Mr. Bryce was of opinion, resided in Armenia proper. They were short of stature, quiet and mostly given to agriculture; but out of their own country were quite a different people. The Kurds were a great contrast to the Armenians in most respects; they were extremely stalwart, and rather inclined to be short than tall, with black hair and small fierce eyes. Besides these a considerable population had from time to time flowed in from the east and north, and Circassians had settled in north-western Armenia round about Kars and Ardahan. Nearly in the centre of this country rises the great Mount Ararat, which was next touched upon by Mr. Bryce. The mass of Ararat was about 25 miles long from north-west to south-east, and from 12 to 14 wide, the total circumference being from 70 to 80 miles. It consisted of two peaks joined to one another by a sort of neck. The greater of the two, or Great Ararat, rises to 17,000 feet above the level of the sea, and 14,500 above the Araxes, while Little Ararat was about 12,800 feet above the level of the sea. Both were of volcanic origin, and were separated by a depression averaging in height from 7000 to 8000 feet. There was no permanent settlement or village anywhere upon the skirts, except on the north-eastern face, in the direction of Aralykh, where there was a small village, inhabited by Tatars. From this place, in September 1876, Mr. Bryce, in company with a friend, made his ascent of the mountains. At a height of about 11,500 feet, his friend, not being in trim for mountain climbing, left him, and Mr. Bryce proceeded with a Cossack and Kurd. The upper part of the mountain was perfectly bare either of snow or vegetation. Large beds of snow were running down for a great distance from the top, to a height of 11,000 to 12,000 feet, which one had to ascend, or else along slopes of bare, loose, broken stones. The latter course Mr. Bryce chose. At a height of 15,000 feet, the Cossack and Kurd refused to go any further, so he was compelled to journey alone. The last part of the ascent was upon a slope of rotten rocks, rather soft and sulphurous, which crumbled away from under his feet, and therefore gave an extremely bad hold, which proved very fatiguing. Near the top of this long slope Mr. Bryce could just discern the edges of the plateau of snow, and hanging on this a curtain of clouds. After getting on the snow and into the clouds, and walking for about five minutes, two strong blasts of wind swept away the clouds, and then a wonderfully grand and extensive view lay before him. The Caucasus could be seen to the north, a distance of about 250 miles; the highest ranges of mountains round Erzerum to the west; the mountains of Assyria, South Kurdistan, the mountains in the direction of Nineveh, and the valley in the direction of the Zab, to the south; to the east, the enormous mountain masses in Persia, and north, as far as the Caspian.

Mr. Bryce felt greatly relieved in having accomplished the object of his enterprise; but was much disappointed in finding no fragments of the Ark. Finding a shorter way down, he succeeded in joining his friend just before sunset, and next day they made their way homewards. Mr. Bryce is of opinion that the Armenian nation, its prospects, history, position and its character, had hardly received sufficient attention from the English public. He considers the Armenians by far the most hopeful and vigorous race in the East, and one which had retained its national character, its individuality, and its faith through a thousand persecutions and a thousand wars. It was a race which now showed extraordinary aptitude for commerce, and also for the work of civil government, because the large majority of Russian, and a very large proportion of Turkish officials belonged to the race, and were said, even by the Russians themselves, to make better administrators than the Russians.

In the discussion which followed, Sir HENRY RAWLINSON, who had been more or less connected with Armenia during forty-five years, was glad to bear testimony to the value and correctness of Mr. Bryce's observations.

A vote of thanks was proposed by the PRESIDENT, and the meeting then adjourned.

*Meeting of 11th March, 1878.*

#### MAGNETISM OF THE EARTH.

MR. F. GALTON, F.R.S., in the chair. Captain F. J. EVANS, R.N., C.B., F.R.S., Hydrographer to the Admiralty, delivered a lecture on "The distribution and direction of the Earth's magnetic force at the present time: the changes in its elements, and on our knowledge of the causes." The lecturer commenced by describing the mariner's compass and referred to the discovery, about three hundred years ago, of the peculiar properties of the magnetic needle. He explained the two elements of *dip* and *variation*, and stated that Dr. Gilbert, of Colchester, physician both to Elizabeth and James I. published a Latin treatise "On the magnet (or loadstone) and magnetical bodies and of that great magnet, the Earth." During the seventeenth century our seamen diligently made observations at sea of the dip and variation of the compass. Towards the close of the century, Halley presented two papers to the Royal Society on the subject of the variation of the compass, and after a voyage of research compiled a magnetical chart for the Atlantic and Indian Oceans. But as he was sorely perplexed as to the true cause of magnetic forces and disturbances he appealed to all navigators to aid in accumulating observations on the subject. His appeal was not in vain, and the Norwegian magnetician, Hansteen, compiled a series of magnetic charts for different epochs ranging between the years 1600 and 1787. The voyages of Ross, Parry and others to the Polar Regions, passed near the magnetic pole, where the dipping needle stood vertical, and in 1831, James Ross discovered the North Magnetic Pole. Gauss gave great impetus to the study by his researches, and "Magnetic Storms" were soon detected. Observations were established in various parts of the world, and to Great Britain fell the task of collecting observations in oceanic regions. In 1843 James Ross's expedition returned after having attained the high dip  $89^\circ$ , being very near the South Magnetic Pole. Sir Edward Sabine closely analysed the results of observations, and his researches formed a solid and enduring foundation for future enquiries.

The lecturer then entered at length on the characteristic features of magnets, on the compass and dipping needles; on the "Lines of Force" over the globe, and the distribution of magnetic force over the earth's surface. He also enlarged on the nature of terrestrial magnetism and its distribution, and on the continual state of change of which magnetic elements are susceptible. Having touched upon the action of the sun and its position upon the magnetic needle, he dealt slightly with the perplexed subject of the disturbances of the latter, and their probable connection with auroras and earth currents. The lecture concluded with a reference to the greater magnetic changes, known as secular, and certain hypotheses concerning them.

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THE  
GEOGRAPHICAL MAGAZINE.

MAY, 1878.

PREJEVALSKY'S EXPLORATIONS IN  
CENTRAL ASIA.

COLONEL PREJEVALSKY, known for his explorations in the Amur country and Mongolia and Tangut, has recently accomplished a third journey of still greater geographical importance (of which we have hitherto been able to give only brief particulars) across the Tian-Shan mountains to Lake Lob-Nor and the Altyn-Tag range southward of it. The report has now appeared, translated *in extenso*, as an extra number of Dr. Petermann's *Mittheilungen*, and we are enabled to give the substance thereof in these pages.

Colonel Prejevalsky, accompanied by two Cossacks who had been with him on his former journey in Mongolia, besides four others, and a Kirgiz, who could speak the Sart tongue, left Kuldja on the 12th August 1876. They had twenty-four camels and four horses, and were each armed with a Berdan rifle and two revolvers. Their way lay first up the valley of the Ili, which they crossed over to its left bank at the confluence of the Kash, where it is about 140 yards across, and has a swift stream. For 12 versts above Taranchi, villages are to be found on the right bank; but on the left bank there is no settled population. The Tekes stream, a tributary of the Ili, and rising in the vicinity of the Muzart pass, was crossed, and the party journeyed eastward through the valley of the Lower Kunges for some considerable distance (as far as 84° E. longitude of Greenwich), crossing the Zanma on their way. Up to this point the flora of the plain proved very poor, and the fauna not much richer; but beyond the confluence of the Zanma, though the height increased, the vegetation became richer. Black poplars, growing to a height of 80 feet occasionally met the eye; apple, birch, and apricot trees were more or less common. Here two Cossacks and the Kirgiz interpreter proved unsuited for the journey, and were accordingly sent back to Kuldja to be replaced by others. The wealth of fruit-trees (apple and apricot) in the forests of the Kunges and other wooded ravines on the northern slope of the Tian-Shan is a characteristic feature in the vegetation; while, as regards the fauna, some fine specimens of a dark-brown bear were shot. The ornithology calls for no particular remark.

A moderately high range, with a pass of about 6000 feet high, divides the valley of the Kunges from that of the Zanma, the latter being 2000 feet above the level of the former. The Zanma valley is about 4 versts wide and overgrown with thick high grass,

and its east end leads up to the foot of the Narat mountains, which with their western spurs form the northern edge of an extensive plateau called Yuldus in the heart of the Tian-Shan mountains. The pass over the Narat was 9800 feet high, and the ascent to it was not particularly steep though very fatiguing for camels. The Yuldus (*i.e.* star) consists of two parts, the Lesser Yuldus, which Prejevalsky and his companions followed for the whole of its extent along a steppe-plain 135 versts long and averaging 30 versts broad and 8000 feet above sea level, and the Greater Yuldus, which is traversed by the river of the same name which discharges its waters into Lake Bargratchkul (the Bostan Nor of the maps and Tengis Nor of the Calmucks). Both in birds and in mammalia the Yuldus is very rich, and Prejevalsky mentions, amongst others, the following: gyps himalayensis, vultur monachus, ursus leuconyx and isabellinus, ovis poli, cervus maral, cervus pygargus, canis lupus and canis vulpes. The population, which eleven years ago inhabited the two Yulduses, have dispersed, since the Dungan uprising, part towards Ili and part towards Karashar. At the Yuldus, one of Prejevalsky's companions fell ill and had to return, but luckily the other one, Eklon, proved to be a most energetic young fellow. Here also the party remained three weeks and shot several large game, including two arkare or ovis poli, a noble animal which frequents the Yuldus in herds of thirty or forty. The Maral stag is also to be found in the Yuldus, as well as in the Tian-Shan forests, and attains large dimensions, its antlers fetching, in the case of a large pair, the high price of from 50 to 70 rubels first-hand. The ascent to the pass (9300 feet) is very gentle, and, beyond, the road leads along the ravine of the Balgantai-gol. The neighbouring mountains are scant of vegetation, the adjoining desert giving the side of the Tian-Shan a most lifeless aspect. Here also the rainfall, which is plentiful on the northern side, is wholly deficient, and this characteristic is probably common to the whole southern face of the eastern Tian-Shan. The height of the Chaidu-gol is only 3400 feet, and here a report was spread on the arrival of the Russians that a Russian army was approaching, which caused the panic-stricken Mussulmans to abandon their houses and flee to Karashar. At this point Tochta-achun, the guide, was sent back to Kuldja with the collections.

On the third day after their arrival in Charamoti, six Mussulmans appeared, sent by the Governor of Korla to ascertain the object of the Russians. The latter replied that they had permission from Yakub-

beg to visit Lob-Nor. This answer caused the natives to return to Korla, but they made their appearance again the following day, with a message that the Governor had applied for instructions to Yakub-beg, and, till receipt of a reply, the party could not be allowed to advance.

This gave the Russians the opportunity of making geographical and other researches about the vicinity of the Chaidu-gol, which stream, as well as the Bagarash (Bargratch) lake, is very rich in fish. This lake, which is not very far westward of Karashar, is said to be very deep, and eight or nine days' journey round.

At the end of seven days, permission was given them to proceed to Korla (65 versts), before entering which the last spurs of the Tian-Shan were passed. In Korla the Russians were provided with attendants, but these appeared to be charged with the sole duty of preventing any malcontents from approaching the strangers. In spite of fair words, all inquiries as to the town of Korla, its inhabitants, trade, character of the neighbourhood, received evasive or evidently untruthful replies; and this happened commonly in their sojourn in the country of the Badaulet, or "the fortunate one," as Yakub-beg is called. The inhabitants of the Tarim and Lob-Nor districts, however, the travellers found better disposed towards them, and, according to these, Korla has about 6000 inhabitants: it consists of two parts, surrounded with earth walls, inhabited by the merchants and soldiers respectively. At the time of the Russian visit the latter were few in number, as they had nearly all marched to Toksum, where Yakub-beg was building a fort to withstand the Chinese.

An individual named Saman-beg, a native of Trans-Caucasia and well acquainted with Russian, joined the party at Korla, in obedience to Yakub-beg's order. He was nominally a guide, but really a spy, though his suspicions were subsequently quieted. On the 4th of November the party started from Korla for Lob-Nor. The guide led them along unfrequented paths and across a loop of the Konche-daria—two crossings which turned out to be quite unnecessary. The route was first southward, for 86 miles, in the direction of the valley of the Tarim. The country is at first undulating, covered with flints and gravel, and quite destitute of vegetation. The southernmost spurs of the Tian-Shan are the Turuk-Tag range, which stretches south-east of Lake Bagarash, and finally loses itself in the desert. At the base of these hills is the same stony strip of country as that previously mentioned, and Colonel Prejevalsky is of opinion that it is the shore of a former sea. Beyond lies the Tarim and Lob-Nor desert, which consists of either barren salt-containing clay or shifting sand. It was the poorest and most desolate region Prejevalsky had ever set eyes on.

With regard to the hydrography of the region, he observes that the Konche-daria flows out of Lake Bagarash, breaks through the outer spurs of the Tian-Shan, and eventually joins the Kuk-ala-daria, an arm of the Tarim. The Inchike-daria, which loses itself in salt marshes, but when full probably reaches the Tarim, turned out, after much questioning, to be an arm of the Ugen-daria, which rises near the Muzart pass and eventually joins the Tarim. At the confluence the latter river is 50 or 60 fathoms wide and

at least 20 feet deep. Its water is tolerably clear and the stream very swift. It reaches its most northerly point here, and then turns first south-west then south before it reaches the lakes Kara-buran and Lob-Nor. The natives call it by the name of Yarkend Tarim or Yarkend-daria, "tara" meaning an arable field, and this being in all probability a reference to the lands irrigated by the Yarkend river. East and west of the Tarim are salt marshes, from which the natives obtain fish and rushes, the only fodder for their cattle. Both the bed and the banks of the river are continually being raised by the masses of sand, dust and *abris* conveyed thither by the spring storms, and to make a breach in the bank and draw off a supply of water is hence an easy matter.

Westward a desert covered with sand-hills extends parallel with the Tarim, and north of the oases at the foot of the Kuen-Lun as far as the town of Keria. On the left bank of the Tarim the deserts are more unfrequent and not so extensive. The soil is a clay impregnated with salt, occasional tamarisk bushes and haloxylon are to be seen, and sand-hills similar to those in Ordos and Alashan.

In the immediate vicinity of the river the vegetation is somewhat richer. The *populus diversifolia* (?) is common, the halimodendron and asclepias cover a good deal of ground, but of meadows, grass, or flowers not a trace is to be seen. Of animal life Colonel Prejevalsky mentions fifteen mammalia, which include the royal tiger, lynx, wolf, fox, otter, maral deer, hare, wild boar, and the wild camel, the last three being very rare. Forty-eight specimens of birds were noted, two of which, the *Rhopophilus deserti* and the *Podoces tarimensis*, were new, though the last bore a great resemblance to the *Podoces* of Henderson. Only two fishes were observed, the schizothorax and another of the family cyprinidæ, both of which are common and form the chief food of the natives.

The inhabitants are divided into two administrative divisions: the Tarim or Karakul and the Lob-Nor or Kara-Kurtchin people. The present inhabitants of the Tarim valley (met with below the confluence of the Ugen-daria) lived originally about Lob-Nor, and about 100 years ago spread along the Tarim, owing to the diminution of fish and the raids of the Kalmucks. It is probable that they mingled by this means with previous inhabitants of the Tarim valley, perhaps fugitives or exiles from different parts of Eastern Turkestan, and this would account for the variety of types found among the Tarim people, who, however, undoubtedly belong to the Aryan stock. They are as a rule pale-faced with sunken chests and weak of frame: the men are of medium height and the women smaller. The difference between the Tarim, Taranchi and Sart tongues cannot be great, as the Taranchi interpreter from Kuldja could make himself understood easily. Their religion is that of Islam. Their dwellings are rude structures made of poplar trunks and canes or reeds. A dozen or so of these houses form a village, but these are not occupied for long, as the inhabitants change their locality when in want of fuel or fodder, and also on an attack of small pox, which usually occasions great ravages. The number of inhabitants amounts in all to about 1200.

One day's journey from the mouth of the Ugen-daria lies the village of Achtarma, the latitude and longitude of which were determined by Prejevalsky.

From thence the way lay along the course of the Tarim, which is fringed by a strip on either hand running parallel to the river, and covered with trees, reeds, and marshes. After proceeding for a distance of 190 versts along the Tarim, they reached the confluence of the Kuk-ala-daria and the Tarim, where the latter assumes a breadth of from 30 to 35 fathoms, which it maintains up to its mouth in the Kara-buran lake. At a distance of 15 versts from the lake the party diverged southward to the village of Charchalyk, built about thirty years ago by outlaws from Khotan, of which there are at present 114 engaged in tilling fields for the State, the water being derived from the Charchalyk-daria, which rises in the lofty range called Altyn-Tag, south of Lob-Nor.

Three hundred versts, or eleven days' journey for a pack-ass, south-west of Charchalyk, is the little town of Cherchen, on the Cherchen-daria, under the same ruler as Charchalyk. South-west of Cherchen is the oasis of Nai, at a distance of ten days' journey, beyond which lies Keria, containing about 3000 houses, Chira, and Khotan; the latter, as well as Cherchen and Keria, being under the rule of Yakub-beg. One day's journey from Keria, gold is found in the mountains, and also five days' march from Cherchen, near the sources of the Cherchen-daria. The yearly yield is about 60 puds, which all goes to Yakub-beg's treasury. Where Charchalyk now stands, and also at the distance of two days' journey from it, are the ruins of two towns, called Ottogush-shari (from Ottogush, a former ruler) and Gas-shari respectively. Close to Lob-Nor are the ruins of a third and pretty extensive town called Kune-shari.

From inquiries, Prejevalsky ascertained that about 1861 or 1862 a colony of Russians, numbering about 160 or 170 people, including women and children, with their pack-horses, and armed with flint-lock muskets, settled on the Lower Tarim and at Charchalyk, but that they made no long stay, and soon returned to Urumchi, *via* Turfan.

After a week's rest in Charchalyk, the Colonel left the greater part of his baggage with three of the Cossacks, while he and Eklon started at Christmas for the Altyn-Tag mountains in quest of wild camels. They took with them eleven camels and one horse, a felt tent, and provisions for a month and a half, their guides being two of the best hunters about Lob-Nor.

The Altyn-Tag range is visible from Airylgan, a distance of 150 versts, and from Charchalyk appears as an enormous wall rising above the limits of perpetual snow to the south-west. Prejevalsky and his companion explored the northern face of this chain, which forms the edge of a lofty plateau, for a distance of 300 versts eastward of Charchalyk. Without doubt it forms the northern escarpment of the Tibetan plateau, as the natives say that it extends south-westward without a break to Keria and Khotan, and eastward beyond their knowledge. On the desert side the Altyn-Tag sends out spurs, with valleys between, ranging up to 10 versts long and 4 or 5 in breadth, and sometimes as much as 11,000 feet above sea level, while the summits of the mountains rise about 2000 or 3000 feet above. The summits of the main axis of the range no doubt attain this height, though the drop on to the plateau on the southern side is much slighter. Although the Russians did not explore the southern side, they learned from their

guides, who had often hunted there, that in following the old road to Tibet, used by the Kalmucks before the Dungan insurrection, one crossed first a plateau 50 versts wide and about 13,000 feet high. Next came a range about 20 versts across, bearing no particular name, and then a plain 40 versts wide, beyond which an enormous mountain chain, crowned with perpetual snow, called the Chamen-Tag, rises. Westward these three ranges unite into one, which reaches the limit of perpetual snow near Cherchen, and is called Tugus-daban. The outer edge of the Altyn-Tag consists mainly of sandstone and limestone, while at the higher altitude is to be seen porphyry and, more rarely, granite. Water is scarce, and what springs there are have a brackish taste. These mountains are characterised by great sterility, and it is only in the valleys and ravines that vegetation grows; yet, nevertheless, large swarms of locusts are here to be seen. In the summer of 1876 they committed great ravages, and rose to a height of 9000 feet in the mountains. The fauna of the northern slope of the Altyn-Tag is not rich, only fifteen species being heard of by Prejevalsky, ten of which are not to be found in the Tamir valley and around Lob-Nor. Three of the first-named category—Pseudois Nahoor, *Poëphagus grunniens*, and *Antilope Hodgsoni*—are peculiar to Tibet, and reach their northern limit here. There were eighteen kinds of birds found by Prejevalsky. The climate of the Altyn-Tag is characterised, on its northern side at least, by great cold and little snow. In summer, according to the natives, it rains frequently and is very windy.

With the exception of paths for hunting there are only two roads in these mountains, one to Sha-chow and the other to Tibet, but since the Dungan uprising both have been abandoned. From the 26th December to the 5th February one wild camel only was seen by Colonel Prejevalsky, and this one he unfortunately missed at 500 yards.

During his sojourn in the Altyn-Tag he experienced great discomfort from the scarcity of animal food and the want of water. At Chaglyk observations for latitude and longitude were taken while the hunters returned into the mountains to look out for wild camels, a skin of which Prejevalsky was very desirous of securing. The native reports were unanimous in declaring the Kum-Tag desert to be the most likely place for these animals. Twenty years ago they were said to have been very common, and the guide affirmed he had seen herds of dozens and even of upwards of a hundred together, but that with the increase of the population of Charchalyk and of hunters they had much diminished. A skin is now worth at Lob-Nor ten *tenge*, or about 1 rouble 30 kopeks (4s. 2d.). The animals seek the upper valleys of the Altyn-Tag in the summer and the most inaccessible deserts in the winter. Their sight, sense of hearing and of smell are exceedingly quick, a striking contrast to the domesticated camel, which is just the opposite.

The hunters despatched by Prejevalsky returned on the 10th March to Lob-Nor with the skins of a male, female, and a young one, to which was added the skin of a fourth, shot on the lower Tarim. This one, however, had been bred in a warmer district, and had already begun to shed its hair. With regard to their origin, Colonel Prejevalsky argues at some length that the preponderance of evidence is in favour of their

being of wild stock, the descendants of which, however, have mingled with tame camels.

Turning to the Lob-Nor lake, which the travellers reached in the early days of February, it should be observed that the Tarim discharges itself first into a smaller lake (from 30 to 35 versts in length and between 10 and 12 versts in breadth) called Kara-buran (*i.e.* "black storms") into which the Cherchen-daria flows as well. A great part of the Kara-buran, as well as of Lob-Nor, is overgrown with reeds, the river flowing in its bed in the centre. The name Lob-Nor is applied by the natives to the whole lower course of the Tarim, the larger lake being called Chok-kul or Kara-kochun. This lake, or rather morass, is in the shape of an irregular ellipse running south-west and north-east. Its major axis is about 90 or 100 versts in length, its minor axis not more than 20 versts. This information is derived from the natives, as Prejevalsky himself explored only the southern and western end and proceeded by boat down the river for about half the length of the lake, further progress being rendered impossible by the increasing shallowness of the water and the masses of reeds in every direction. The water itself is clear and sweet, though there are salt marshes all round the lake, and beyond them a strip of ground parallel with the present borders of the lake and overgrown with tamarisks. It is probable that this strip was formerly the periphery of the lake, and this conclusion is corroborated by the natives, who say that thirty years ago the lake was deeper.

At the western end of the lake the Tarim is 125 feet broad and 14 feet deep in its deepest place at medium height, but it soon diminishes in size and depth, and finally loses itself in swamps in the north-east, the reeds, which are 18 feet high occasionally and 1 inch in thickness, preventing any further exploration.

The inhabitants about Lob-Nor, called Karakurchins, occupy eleven villages, and number about 300 in all. Their language, as they say, is most akin to that of Khotan. Their habits, appearance, dwellings, and mode of life are described at considerable length.

The flights of birds of passage which make a resting-place of Lob-Nor in their migrations, were very carefully observed by Prejevalsky; and during the fortnight succeeding the 8th of February millions passed on their way across the desert. None of these come from the south across the lofty and cold plateau of Tibet; but they cross it where it is narrowest, *i.e.* in the direction of Khotan.

On their return journey, at Korla, the Russians had an audience of Yakub-beg, who appears to have received them kindly, though Prejevalsky expresses his indignation at having been asked for a certificate to the effect that he had been hospitably and well treated during his journey in Yakub-beg's territories. The party re-entered Kuldja at the beginning of July, having been most fortunate, as Colonel Prejevalsky remarks, in achieving the exploration during the brief period following on Yakub-beg's annexation of that portion of the country and its invasion and conquest by the Chinese.

#### HIMALAYAN EXPLORATIONS.\*

DURING the year 1876, the Mullah, one of the explorers of the Great Trigonometrical Survey of India, made a survey up the course of the Indus, from the point where it enters the plains above Attok, to the point where it is joined by the river of Gilghit. All other portions of the course of the Indus—from the table-lands of Tibet, where it takes its rise, down to its junction with the ocean—have long since been surveyed; but up to the present time this portion has remained unexplored, and has been shown on our maps by a dotted line, the usual symbol for geographical vagueness and uncertainty. Here the great river traverses a distance of some 220 miles, descending from a height of about 5000 feet to that of 1200 feet above the level of the sea. Its way winds tortuously through great mountain ranges whose peaks are rarely less than 15,000 feet in height, and culminate in the Nanga Parbat, the well-known mountain, whose height, 26,620 feet, is only exceeded by a very few of the great peaks of the Himalayas. The river in many places is hemmed in so closely by these great ranges that its valley is but a deep-cut, narrow gorge, and, as a rule, there is more of open space and culturable land in the lateral valleys, nestling between the spurs of the surrounding ranges, than in the principal valley itself.

The positions and heights of all the most commanding peaks in this region had been long fixed by Captain Carter's observations at trigonometrical stations on the British frontier line; but no European has ever yet penetrated into it.† Very difficult of access from all quarters, it is inhabited by a number of hill tribes, each independent and suspicious of the other, who are in a great measure separated and protected from each other by natural barriers and fastnesses. As a whole, the region has never been brought into subjection by any of the surrounding powers. Each community elects its own ruler, and has little intercourse with its neighbours; and with the outer world it only communicates through the medium of a few individuals who have the privilege of travelling over the country as traders. The Mullah possesses this privilege, and thus, in the double capacity of trader and explorer, he traversed along the Indus, and through some of the lateral valleys, leaving the others for exploration hereafter.

This work done, he proceeded, in accordance with his instructions, to Yassin, marching through the Gilghit valley, but not surveying it, because the labours of the lamented Hayward, who was murdered at Yassin, already furnished us with a good map of that region. From Yassin he surveyed the southern route to Mastuj through the Ghizar and Sar Laspur valleys; this has furnished an important rectification of a route which had hitherto been laid down from conjecture only, and very erroneously; for the road, instead of proceeding in a tolerably straight direction from Yassin to Mastuj, as was supposed, turns sud-

\* From the *General Report on the Operations of the Great Trigonometrical Survey of India during 1876-77*. By Col. J. T. Walker, C.B., Surveyor-General of India, &c.

† Several itineraries which were obtained from native information are published in Dr. Leitner's *Da-distan*, and they have been combined together, with considerable ingenuity and very tolerable success, by Mr. Ravenstein, in a map published in the *Geographical Magazine* for August 1875.—J. T. W.

denly from south-west to north-north-east at Sar Laspur, which is situated at some distance to the south of the direct line, in a valley lying parallel to the valley of Chitral. At Mastuj the Mullah struck on to his survey of the route from Jelalabad, *viâ* Dir and Chitral, to Sarhadd-i-Wakhan in 1873, and then proceeded along that route towards the Baroghil pass, as far as the junction of the Gazan, with the Yarkhun river, and then along the northern road from Mastuj to Yassin. This road turns up the Gazan valley, crosses the Tui or Moshabar pass—which is conjectured to be probably not less than 16,000 feet in height—and, after traversing a deep crevassed glacier for a distance of about eight miles, reaches the point where the Tui river issues in great volume from the glacier; the road then follows the course of the river down to its junction with the Warchagam river, a few miles above Yassin.

Returning to Sar Laspur, the Mullah next surveyed the route to the south-west, up the valley leading to the Tal pass. This pass is situated on a plateau of the range which connects the mountains on the western boundary of the valley of the Indus with those on the eastern boundary of the valley of Chitral, and is generally known by the people of the country as the Kohistan. The sources and most of the principal affluents of the Swat and the Panjkora rivers take their rise in this region, all the most commanding peaks of which were fixed by Captain Carter's triangulation; but of the general lie of the valleys relatively to the peaks, nothing at all definite has been known hitherto. The Mullah has done much to elucidate the geography of this region. On crossing the Tal plateau he descended into the Panjkora valley, and traversed its entire length down to Dodbah, at the junction of the Dir river with the Panjkora, where he again struck on his route survey of 1873.

It would have been well if he could then have gone down the Panjkora to its junction with the Swat river, but circumstances prevented him from doing so. He therefore travelled along the Havildar's route of 1868 as far as Miankalai, and then surveyed the road to Nawagai and on to Pashat in the valley of Kunar; and, finally, returning to Nawagai, he surveyed the road from there down to the British fort of Abazai.

Thus the explorations of the Mullah have added much to our knowledge of the geography of the interesting regions lying beyond our northern Trans-Indus frontier. A good deal, however, still remains to be done before our knowledge of these regions is as full and complete as it should be, and every effort will be made to carry out further explorations as soon as possible.

The accompanying sketch map has been constructed to illustrate the Mullah's operations; it also shows the localities where more information is wanted. In the north-east corner the results of a recent reconnaissance of portions of the Karambar and the Nagar valleys by Captain Biddulph are given, but somewhat modified from his map of the country.

## THE COSSACKS.

OF late years the labours of a certain school of historical inquirers have been frequently employed in the "rehabilitation" of those characters which, by the pretty general consent of the writers of every period, have been consistently blackened for ages. Now that King John—the "trifler and coward" of Macaulay—has been made out by a recent historian to have possessed an unusual share of boldness and astuteness, and to have been led into an antagonism with his barons and people by the consciousness of political virtues, of which he had a larger share than fell to the lot of even the more illustrious Plantagenets, the work of historical "white-washing" will probably cease from the want of objects to which to devote it. One consequence of the Russo-Turkish war has been the discovery of virtues, hitherto unperceived or denied, amongst several of the minor races or communities of South-eastern Europe. The Roumanians are no longer to be regarded as a soft and effeminate people, careless of all political questions save those involved in the pursuit of place, and with an *insouciant* indifference to military glory. The Montenegrins are not only gallant warriors and hardy mountaineers, they are the professors of enlightened opinions upon self-government, and more than ordinarily alive to the benefits to be derived from extended primary education. The recently-discovered virtues of the Bulgarians have been made almost a *casus belli* between different sets of writers and observers, and their unhappy race has been the object of wordy contentions almost as fierce as the terrible physical struggles which for so many months have desolated their unfortunate country. There is one community, however, with which each of the above have often been brought in contact, whose bad name has, if possible, been made rather worse of late. That community is known by the name of "The Cossacks." The remarks of some very recent observers may be construed as almost denying them the possession of the one virtue which has scarcely ever been questioned before—the military virtue of courage. It is true, indeed, that Mr. Laurence Oliphant, who travelled amongst them just before the Crimean war, spoke of their valour in action as one of those fictions which the Russian Government found it convenient to keep up. But he spoke, not after personal observation of their conduct in war, but—as he informs us—upon Russian authority, and of the Don Cossacks more particularly, whom other families of Cossacks are accustomed to look down upon and disparage.

The prevalent idea in Western Europe of a Cossack is of a half-barbarian plunderer—a kind of wild horseman but half reclaimed by the stern military discipline of the Czars from the savagery of the nomad state. Even a special correspondent of one of the London newspapers with the Russian armies in Bulgaria has represented the Cossacks—on Russian authority, be it noted—as little better than a set of mere plundering freebooters. The terrors of a Muscovite invasion owe much of their intensity to the dread which the character of ruthless marauders, given to these auxiliaries, always inspires. An incursion of the Turcos was not more feared in Germany in 1870 than would be a Cossack inroad by any Western nation now. Phrases which have become



almost proverbial support the feeling with which the Cossack is regarded. In his spitefully epigrammatic prophecy of the fate of Europe, Napoleon, who could hardly have been expected to look very kindly upon the species, declared that in fifty years it would be either Republican or Cossack. The whole point of the antithesis lies in the belief that "Cossacks" are the very antipodes of "republicans." Amongst seamen the most opprobrious intensification of the disparaging term "land-lubber" is Cossack, preceded, of course, by a suitable procession of adjectives. The decline of Cossack military virtue is attributed, in a recent discussion of the armed strength of Russia, to the civilisation which of late years is supposed to have overtaken that hitherto semi-savage people.

Surprising as it may seem, the unvarying testimony of travellers and inquirers who have visited their homes and consulted native authorities has, for many generations, uniformly represented the Cossacks as exactly the opposite of what we so persistently believe them to be. Perhaps there are few matters upon which travellers have been so frequently in agreement, and even fewer on which their unanimity has had so little effect in the direction of removing prejudices and preconceptions. It is not putting it at all too strongly to say that all visitors to Cossack abodes represent them as having long been a highly-civilised and cultured people, living under a Government of an almost ideally perfect democratic form, and having at several periods of their history exhibited an amount of maritime enterprise and daring not much inferior to that of the early Scandinavian pirates whose deeds at sea are so universally celebrated. If we examine the reports made after personal observation by visitors of our own and other foreign nations during the last and the present centuries, we shall see how unjust is the reputation which the Cossacks have acquired, and how distinctly it can be traced to the malevolent invention of their ungrateful Muscovite fellow-subjects.

In speaking of the Cossacks it is not easy to use a satisfactory collective appellation. They are not, strictly speaking, a race, a people, or a community. Ethnologically they spring from a mixture of races; politically they are subjects of the Russian Czars, whose language they speak, and they consist, not of one, but of several distinct communities. Every one has heard of the Don Cossacks, the Orenburg Cossacks, the Cossacks of the Ukraine, &c., the prefix always indicating some special, and often altogether independent, division. These divisions are sometimes as ethnically distinct as the territories they occupy are geographically remote, allowance being made for the predominant Slavonic element present in all instances. The origin of the Cossacks has been a matter of some discussion. Klaproth held that it had "been by no means satisfactorily solved." And though most writers now agree in the account they give of it, their agreement to a great extent results in what is in effect a begging of the question. A recent German writer, von Drygalski, has had the courage to admit that, "whence they came, and how in general the name Cossack arose, no historian has yet been able convincingly to explain." The various explanations and derivations of their name would go a long way towards making up, by themselves, a treatise on etymology.

The historian Karamsin understands the word "Cossack" as meaning a volunteer or free partisan. Klaproth refused to admit that it could be derived from the Turco-Tartar word *Ckazack*, signifying a robber, or even from a synonym meaning a sledge. "Some say it is a Tartar word," writes Clarke, the learned traveller of the beginning of this century, whom many subsequent visitors to Russia have copied without troubling themselves to acknowledge it, "Some say it is a Tartar word meaning an armed man; others, a rover; others, that the Poles called them Cossacks from a word in their language signifying goat." This he stigmatises as a "wild pursuit of etymology;" an opinion in which most people will be disposed to agree with him. Mr. Oliphant, who believes the Don Cossacks to be "the most compound beings in the universe," says that he has met with derivations of their name "from words in other languages which signify respectively an armed man, a sabre, a rover, a goat, a promontory, a coat, a cassock, and a district in Circassia." The most recent attempt to settle its etymology has been made by a German writer, who tells us that—"It is known that in Western Asia there exists an extraordinarily-numerous and wide-spread nomad people of Tartar origin, the so-called Kirgis-Kaisaks, who in reality distinguish themselves from the Kirgis proper, or Kara-Kirgis, and for a century have given themselves the name of Cossacks—in German, *vagabund*." This word, it is probable, has found its way from Asia into Europe, and is used to denote people of similar habits to the Kirgis tribe above mentioned. Grekov, a Russian, declares for this hypothesis, and observes that in Russia it was customary to designate homeless wanderers by the same term.

The progress of philology will probably sooner or later settle this etymological puzzle; but the question of the origin of the people by whom the name is borne will not prove quite so easy of solution. Clarke says that the Cossacks have been known as a distinct people for nearly a thousand years. Constantine Porphyrogenitus had written—"Beyond the Papagian country is the country called *Cusackia*, but beyond the *Cossacks* are the summits of the Caucasus." Jonas Hanway, who travelled in the reign of George II., regarded them as "a species of Tartars." Clarke opposes to this the view of the German Storch, who insisted that they were of Russian origin; and his own opinion is that they were a "mixture of various nations, principally Circassians, Malo-Russians, and Russians, but also of Tartars, Poles, Greeks, Turks, Calmucks, and Armenians." Klaproth believed that the Cossacks of Little-Russia, whose history could be traced back only to 1340, were the most ancient. After the reduction of Red Russia by the Poles, he says, it is "probable that many Russians emigrated from that country to seek an asylum lower down the Dnieper, where they intermingled with the Tartars and Tscherkessians." The invasion of Russia by the Tartars in the fifteenth century, and the fall of Kiev, increased the number of these refugees. In blending with the other races, the Cossacks of Russian origin, being the more numerous, retained, and imposed upon the others, their language and religion. This view is corroborated by the statement of another writer, that Russian is the groundwork of their dialect: "in military matters there is an infusion of Turkish

words," the speech of their earliest enemies; "in legal, of Polish," that of their early rulers.

The Circassian element in the composition of the Cossacks must have been of importance, though not equal in degree to that of the Russian. Chazackia, or Cazackia, we learn from Clarke, is a part of Circassia; and from another authority, that the Cossacks "were long known by the appellation of Tscherkassi, and to this day they call their capital Tscherkask." Their early history is as fragmentary as their real origin seems to be obscure. The first mention of them represents them as taking an important part in the proceedings of the peoples of South-eastern Europe. There is little doubt that they existed as a sufficiently organised body to make their presence felt wherever they presented themselves some centuries before the time usually assigned to their first appearance. Before the middle of the tenth century they had already been heard of on the frontiers of Poland as it then was. Their numbers received a considerable accession in the many Polish wanderers who came amongst them. Their first notable armament was in the year 948, "when the Greek Emperor employed them in his war against the Turks." For their services on this occasion, we have the authority of Clarke that he sent them "recommendatory letters to the Polish Sovereign, requesting that in future their appellation might be Cossacks."

The term was probably applied in subsequent times to people whose mode of life resembled that of the original Cossacks, though there was between them no other connection. Mr. Mackenzie Wallace tells us that to protect the agricultural population of the steppe upon their borders from the annoyances of their nomad neighbours, the Kings of Poland and the Czars of Muscovy built forts and palisades, and kept up a regular military cordon. "The troops composing this cordon were called Cossacks, but they were not the Cossacks best known to history and romance." These, the Free Cossacks, lived beyond the frontiers. "Though," says Mr. Wallace, "Russian by origin, language, and sympathy, the habit of kidnapping Tartar women introduced among them a certain admixture of Tartar blood." Originally they might have been divided into two distinct divisions, of which one looked to the Czars of Muscovy as in some respect their superiors, and the others to the Kings of Poland. Migrations, revolts, the extension of the Russian Empire, and other causes, have ended in making the Czar alone the Lord Paramount of all the Cossack communities.

Sir Archibald Alison, whose literary touch is not often of the lightest, has drawn a somewhat fanciful parallel between the origin of these strange people and that of the Venetians. The rise of the "Cossack nation" he fixes in the midst of the misery and devastation caused by the Tartar inroads, which lasted for two centuries. Crowds of fugitives fled before the invading hordes. "Two corners of land, overlooked in the great streams of conquest to the south-west, remained as places of refuge—one beyond the Don towards the Sea of Azov, and the other beyond the islands of the Dnieper towards the Black Sea. They formed the cradle of this singular people." On these islands of the Dnieper, as on the islands of the Adriatic, arose a free and powerful community. At the time of the first general invasion of the Tartars,

and again during the Lithuanian wars, many fled to them for shelter; and there flowed in also adventurers guided by necessity or the love of change, deserters from Poland, Lithuania, Hungary, and Wallachia, fugitives from Tartar bondage, and serfs flying from their Muscovite masters.

So many authorities place the origin of the Cossack people at or near the period of the Tartar domination in Russia, in spite of the evidence in favour of its greater antiquity, that we may accept their statements as proof of the date they assign being really that when the Cossacks came to be regarded as a power in South-eastern Europe and on the confines of Asia. The destruction of Kiev, in 1415, undoubtedly added enormously to the strength of the Cossacks of the Ukraine, and enabled them to make head against the Tartar oppressors of the different parts of Russia. About the time that the Tartar dominion was overthrown the number of refugees from its oppression had been so great that the country from the Bug to the Dniester became comparatively populous, and on it many towns and villages were built. Of these the inhabitants all claimed to be Cossacks, and waged almost continuous wars with the Tartars and the Turks. Their appearance as a powerful military confederacy was so unexpected that they seemed to be a new people, who had suddenly sprung up on the wide steppe, just deserted by the Tartars, which separated the Muscovite territory towards the Black Sea from the Empire of the Sultans of Stamboul. Krassnov, himself a Cossack, asserts that—"It was not known whence they came; but speech, religion, and, still more, inviolable attachment and devotion to the Czars, disclose a Russian origin." Still, perceptible signs and inveterate habits prove the "long previous existence" of this confederacy.

It was not only fugitives from Tartar despotism, and inhabitants of disorganised countries from which their conquerors had just been driven, that swelled the ranks of the community. Many who had experienced the republican freedom of the free state of Novgorod fled before the sharp discipline of the Muscovite Czars to the steppes of Southern Russia. Thus a democratic spirit and a knowledge of democratic institutions, which became so marked a feature of the Cossack polity, allied themselves to the warlike and adventurous genius of the earlier members of the body. The genuine "Free Cossack," as we learn from Mr. Mackenzie Wallace, lived beyond the frontiers of Muscovy, or Russia, or Poland, and there formed "self-governing communities." Every river flowing towards the south was held by some Free Cossack confederacy, which permitted neither Christian nor Tartar to pass through its territory without its leave. Officially, they were Russians by race, Christians by religion, and—except the Cossacks of the Dnieper, who owned the sway of the Kings of Poland—loyal subjects of the Czars. In effect, they were anything but the last. They obeyed the mandates of the Czar, and were acknowledged by him as his subjects, whenever it was convenient to both parties. If disobedience were more pleasing to them, they readily disclaimed their allegiance; and, on the other hand, if they had proved unduly troublesome to neighbours with whom Muscovy was at peace, they were unhesitatingly disavowed.

South of Russia (before the empire reached the

Euxine and the former dominions of Poland) extended a wide tract of country in the neighbourhood of the Dnieper known as the Ukraine, a word which—as Jonas Hanway wrote a hundred and twenty-five years ago—signifies frontier. This was the chosen home of many Cossack confederacies. An important branch was known by the name of Zaporoghes or Zaporovians. They established their *setcha* or capital on an island on the Dnieper, the Korlitz-koi-Ostrof. The married people lived in villages on the steppe and the river-banks, and the single in their fortified head-quarters on the island of Karlitzkoi. Mr. Wallace's description of their mode of life is very interesting. The *setcha* contained thirty-eight enormous wooden sheds or barracks, in each of which lived a troop of Cossacks, some 600 strong, called a *kurén*. These buildings must have borne a considerable resemblance to the extensive timber structures which surrounded the courtyard of a Japanese Daimio's *yashiki*, and which housed his numerous retainers. Each *kurén* assembled at common meals—a reminder of the *ovocóvia* of the ancient Spartans. No woman was admitted within the enclosure of the citadel. The members of this military brotherhood called themselves *Lytsars*—a corruption of the German *Ritter*, or knight, in acknowledgment of the similarity of their mode of life to that of some of the ecclesiastico-military fraternities of the Middle Ages. All offices were elective, and the period of incumbency was a year. The head of a *kurén* was chosen by his fellows, and any member was eligible to the post; any head of a *kurén* might be elected Attaman (Hetman).

Cossacks of all branches were ready to turn their arms against any power with whom they had a quarrel, even against that to which they professed allegiance. At one time they were in the habit of furnishing troops to the Voivodes established in the Ukraine by the Lithuanian princes. The expenses of these troops they bore themselves, to be recouped, it should be understood, for their outlay by the plunder of the enemy's country. In the sixteenth century the Muscovites seem to have strengthened their hold on some important branches of the great Cossack confederacy. In 1579 they made their appearance for the first time in the Russian armies. In 1580, those who served the Polish kings were first divided into *pulks*, or regiments, whilst defending Tshegrin against the Tartars. A few years later, King Stephen divided them into ten regiments of infantry and a body of horse numbered at 2000. The sovereigns of Poland requited their services by what they considered encroachments on their rights. These gave rise to a long series of contentions, and in the end they sought the protection of Russia, to which they transferred their allegiance in the middle of the seventeenth century. They remained faithful to their new masters until the period of the invasion of Russia by Charles XII., when they offered their services to that monarch. It is with this branch of the Cossack family that the romantic fable of Mazeppa is connected. Peter the Great disbanded and remodelled the Cossack regiments. Their spirit of freedom was again outraged by the harsh measures of the Russian ruler, and they went over to the Khan of the Crimea. They soon became disgusted with their new masters, and succeeded in obtaining pardon from the Empress

Anne, who allowed them to settle again on Russian territory. Fresh cases of turbulence provoked the Empress Catherine to destroy their *setcha*, and to form the Ukraine Cossacks into regiments of Hussars. The bulk of the Zaporoghes were banished to the peninsula of Taman. Count Razumoffski, the last Attaman of the Ukraine, was dismissed by Catherine II. In her reign their organisation may be said to have come to an end, though the Emperor Nicholas re-established certain Ukraine regiments under a different name.

The most important of all the branches is undoubtedly the Cossacks of the Don. They may be taken, says Drygalski, "as denoting the primary type" of the whole body of Cossacks. Alison estimated the extent of their territory as being equal to nearly two-thirds of that of the British Islands, and it is "incomparably more level and fertile." The beginning of their historical existence as an organised community may date from the reign of Ivan the Terrible. He issued a ukase, which is considered as constituting the first title-deed to the territory which they held on the River Don and the neighbouring streams. This ordered them, in return for the possession of the specified territory, to engage in an "unending pursuit of the Tartars, the former oppressors of their country and enemies of the Christian faith." Fighting was, almost of a necessity, the chief business of their lives; and in old times, according to Mr. Wallace, the Don Cossacks prohibited agriculture on pain of death: possibly more on account of the temptation that fertile and cultivated districts offered to the raiding nomads of the neighbourhood, than because of any enervating effect attributed to it.

The Don Cossacks, since they have been of any historical importance, at all events, were always supposed to be subject to the Czars. They have, however, been rather disobedient dependents, and have twice raised formidable insurrections; the last in 1773. The origin of the Siberian Cossacks is attributed to the restlessness of a portion of the Don Cossacks under the pressure of Muscovite rule. A large body of them, between six and seven thousand in number, under the leadership of their Attaman, Yermak Timovief, began to move towards the East during the latter half of the sixteenth century. They are said to have reached first the Government of Perm, and whilst halting there discovered the country now known as Siberia. In their desire to move farther away from their Muscovite oppressors they thought of penetrating to this newly-found territory, but the wide deserts, as seen from the elevation of the Ural mountains, intimidated them, and they professed an intention of remaining where they had already arrived. Yermak, by his eloquence, persuaded them to go on. They passed the mountain barrier, and, defeating a vast host of Tartars who attempted to oppose their passage, extended their conquests to the Tobol, the Irtysh, and the Ob. Their wonderful march, or migration, was terminated by the subjugation of all the tribes dwelling between the Ural and the Altaic chains. In 1581 Yermak ceded his conquests to the Czar. "Thus," says Clarke, "was Siberia added to the extensive possessions of Russia by a Cossack of the Don."

Each Cossack community possessed the right of self-government, which was exercised much in the

same way as in that of the *setcha* in the Dnieper, subject to the duty of military service under the banner of the Czars. This was the tenure on which they held their liberties. Amongst themselves the spirit of equality perhaps never was less restricted: yet there was a proper regard to order. Any Cossack, by passing through the minor offices, might arrive at the highest place. When in the execution of his office the most perfect respect was paid to the official. When not on duty he was no more than any one of his companions in arms. Clarke noted how "amusing it was to observe the temporary respect they paid to their Attaman." If he convened any number of the inhabitants on any business, however trivial, they made obeisance before him, remaining uncovered and standing as though they found themselves in the presence of a sovereign. The moment the meeting was over he passed amongst them almost unnoticed, receiving no other mark of respect than that paid to a private individual. Though still freer than most of their fellow-subjects, the greater part of their privileges have been withdrawn. The right of electing their Attaman was abolished by Nicholas, and the dignity is now hereditary in the Imperial family, being attached to the titles borne by the heir to the throne.

The maritime enterprise of the Cossacks whose territories lay near the Euxine rendered them formidable to the Turks who had taken possession of the last remains of the Eastern Empire. Their habit of frequenting the banks of the rivers and islands lying in mid stream had necessarily familiarised them with the use of boats. They depended for their food chiefly on their fisheries, which down to our own time have continued to be very considerable. The popular idea that a Cossack in his natural state is simply a horseman is quickly dissipated when we know that more than one traveller has compared their capital to Venice. "Though not so grand as Venice," wrote Clarke, "Tscherkasski somewhat resembles that city." The entrance was by broad canals intersecting it in all directions. On either hand houses built on poles appear, during the periodical inundations of the Don, to float on the water. The inhabitants seem to be amphibious. Children may be seen to leap from the doors and windows of the houses and swim about like so many frogs. The capital was moved by the Hetman Platoff early in the present century to a spot a few miles off. Those of the inhabitants who left their old homes for Novo Tscherkasski retained the custom of building in force in their former abode. Though removed from the influence of the inundations the "houses," says Oliphant, "are still raised above the ground."

The amphibious habits of the Don Cossacks have apparently not yet forsaken them. During Mr. Wallace's voyage down the Volga, he had, as fellow-passengers on board the steamer, Cossacks, who "worked" their passages by jumping into the river, whenever the vessel got aground, to lay out hawsers and assist to haul her off. Their aquatic habits enabled the Cossacks of the Euxine and the Sea of Azov to carry on a long series of piratical or buccaneering campaigns against the Turks. Indeed, they sometimes extended their ravages almost to the waters of Stamboul. At the present day, when we hear so much of submarine warfare, it is interesting to find that the Cossacks had anticipated us by the adoption

of a remarkable system of under-water tactics. On the faith of a Roman Catholic missionary we have it that in the seventeenth century they were in the habit of proceeding upon their excursions, warlike or predatory, in a number of small boats, which could be readily sunk and easily raised again. When pursued by any of the armed vessels of the Grand Signior, which they were unable to attack with any prospect of success, it was their custom to retreat into shallow water, and there allow their boats to sink to the bottom. The crews remained on board, and drew a supply of air for breathing through long tubes which were attached to floats lying on the surface. Thus concealed, they were rarely discovered; and when the enemy had retired, they would leave their places, and rise above water to obtain assistance to drag their boats into still shallower water, where they could be more easily got again afloat. The memory of these deeds still lingers in the breasts of the Don Cossacks, many of whom have told recent travellers that had they been permitted to fit out a flotilla of small boats during the Crimean war, they "would have captured the British fleet, as their ancestors used to capture the Turkish galleys on the Black Sea."

The history of the various Cossack families, and the system of polity adopted by each, show how great a measure of freedom they enjoyed, and how truly democratic was their mode of government. Their natural disposition, and the pitch of civilisation to which they have long attained, will be easily seen from a comparison of the various accounts of those who have visited them. In 1743, Jonas Hanway found them a "civilised and a very gallant, as well as sober people." The latter attribute we must take to be comparative, and the Cossacks, though, according to all accounts, infinitely the superiors in sobriety of the Russians proper, and of our own ancestors, perhaps, under the early Hanoverian kings, seem now to be able to imbibe a very fair share of strong liquors. The traveller, Clarke, is very lavish of his praise of the Cossacks, and equally exasperated with the Russians of the capital for representing them as uncivilised. As he spent some time amongst them, and as his book may be still regarded one of the classics of Russian travel—especially, too, as he has been corroborated by all subsequent visitors—we may summarise the result of his observations.

Travellers about to visit the Ukraine, and the districts traversed by the Don and its kindred streams, were warned by "an unprincipled race of men," the Russians of the northern provinces, that they would find the Cossacks little better than savages, and were bold in venturing their lives amongst them. In every respect, when compared with his fellow-subjects of the Empire, the Cossack has the advantage. His physique is finer. He is cleaner, better dressed, and more highly educated. In his own country no people can be found more honourable and hospitable than he is. On warlike expeditions and far from home he is a robber, because "plunder is part of the military discipline in which he has been educated." But he lays aside such habits when he again gets amongst his own people. Jonas Hanway had found the Cossacks "very clean and well clothed." His successor asserts that there is no nation in the world more neat in regard to dress, and none—"I will not

except even my own"—more cleanly in their apparel. A Cossack in a dirty suit of clothes is never seen. In conversation the Cossack is, emphatically, a "gentleman;" he is well-informed, free from prejudice, open, sincere, and upright. "Place him by the side of a Russian," exclaims the traveller, "and what a contrast!" Yet it is on the authority of these very Russians that tales of Cossack barbarism have been circulated throughout Western Europe. They not only took an intelligent interest in all the processes of their democratic constitution, but in many circles of their capital were to be found all the pleasures and elegancies of a highly-refined society. He was invited to dinners which were magnificent and in good taste. In the drawing-room—the phrase *Cossack drawing-room* must seem a contradiction in terms to many—were to be seen elegant and accomplished women assembled round a pianoforte. In this remote corner of Europe were to be met with a wealthy and polished people, enjoying not only the refinements but even the luxuries of the most civilised nations. "The conversation had that enlightened and agreeable turn which characterises well-educated military men."

The pleasant disposition and social virtues of these reputed barbarians have been noted by more recent visitors. Mr. Schuyler, in his work on Turkestan, strongly corroborates the favourable account of them given by his predecessors, and repudiates the opinion of their barbarism held so widely in the West. Mr. Wallace, our latest authority, found them "agreeable and interesting fellow-travellers." Information collected by Alison established the fact that their industry was very considerable, their villages clean and thriving, and the houses comfortable. The manner in which the younger Cossacks acquitted themselves at the examinations of their university—for it seems there was even a Cossack university—Klaproth reported to be highly creditable. Mr. Laurence Oliphant found them richly endowed with that enterprising spirit in which Russians in general are so deplorably deficient. The Don Cossacks, in spite of the interruptions caused by frequent calls upon them to go upon military duty, were amongst the most energetic and enterprising of the subjects of the Czar. The wealth of some of the richer Cossacks is very considerable. Much of it naturally consisted in horses, and not many years since a stud of one thousand stallions was not an uncommon possession. There are stories also of vast treasures of gold and silver ducats hoarded by wealthy widows.

All travellers concur in speaking highly of the stalwart appearance of the men and of the good looks of women. To Hanway the latter seemed "gay and comely." Clarke found the women of Kasanskaia very beautiful. The German traveller, Moritz Wagner, though admitting that "amongst the girls there were some perfectly lovely forms," was surprised, considering how good looking the men are, to find comparatively few handsome women. Clarke was struck by the "dignified and majestic look of the Cossacks, and the ease and elegance of their gait." And Klaproth considered their features more handsome and expressive than those of the other Russians. Our latest author says that he had nowhere met—unless it were in Montenegro—"such magnificent specimens

of the *genus homo* as amongst the descendants of the Zuporavian Cossacks."

These are the people of whom it is generally believed that they are mere semi-savage, marauding horsemen, good at pillaging and foraging, but of small worth as components of a regularly-organised and well-disciplined army. To many they are but few degrees superior to those terrible Turkish irregulars, the Bashi-Bazooks. When, during the Crimean war, complaints were made of the treatment of our wounded on the field by the enemy, a Russian officer is reported to have said that the rich adornments of some of our cavalry uniforms would prove too strong a temptation for most Cossacks to resist, though the plunder of their fallen foes would have to be preceded by massacre. This was actually used as an argument in favour of a plainer style of military dress. How true this is likely to be of the Cossacks of reality, and what right the Russians, who have deprived them of much of their freedom and scarcely conceal their jealousy of their polish and civilisation, have to give them such a character, the foregoing pages have perhaps in some measure tended to show.

CYPRIAN A. G. BRIDGE.

## SALANG ISLAND

(Generally called by Navigators "Junkseylon").

So far back as the year 1350 (when the Siamese King Phya Utong laid the foundation of Ajuthia, the old capital), Salang is mentioned as one of the most important provinces of Siam. The Siamese were at that time in possession of the whole of the Malay peninsula. The principal places in addition to Salang on the west coast of Siam are mentioned as Malacca, Quedah, Nakon Si, Thamaralh (Ligor), Tanaosi (Tenasserim), Thavoi (Tavoy), Motama (Martaban), and Molamlong (Moulmein). About A.D. 1511 the Portuguese took possession of Malacca, and subsequently, in their wars with Burma, the Siamese lost also Tenasserim, Tavoy, Martaban, and Moulmein. The first Europeans mentioned as residing in Salang are the French missionaries, who arrived there about the year 1670, and from this date the number of Europeans would appear to have increased rapidly, for in the latter part of the eighteenth century it amounted to nearly one hundred, principally Portuguese and Dutchmen.

The Siamese appear to have been in undisturbed possession of Salang till 1796; but in this and the following years the Burmese made several attacks on the island, and finally, in 1809, after a long and sanguinary campaign, succeeded in conquering it. Most of the population then fled to the southern part of the island, and took refuge amongst the mountains. The Burmese did not follow them there, but left the island, after having laid everything in ruins and killed a large number of the inhabitants, many of whom they carried away with them as slaves. Stories are told in Salang about the bravery with which the Governor defended the island, and a large plain, close to the Governor's present residence, is shown as the place where his last army was conquered.

The Governor, after this defeat, fled to Bangkok, leaving his people to shift for themselves. The last

battle must have been very sanguinary: the place is still shown, close to some high trees at one end of the battle-field, where the Burmese are said to have killed their prisoners after the victory. When the Burmese left, many of the fugitives to the southern part of the island, who had settled in the low land between the mountains, now remained in the vicinity of Puket, in preference to returning to the scene of their burnt houses and destroyed plantations. Thus Puket, which was before almost unpopulated, got its first inhabitants.

Previous to 1796 the whole island was only a province of Siam, whilst all the surrounding districts, viz. Takuatung, Panga, Takuapah, and Koh Gao, were under the Governor of Salang. Salang was at that time moderately populated and well cultivated. Marks of prosperity are still to be found in many places, where dense jungle now covers the beds of former plantations of cocoanut and other fruit trees.

The principal place in the island, where the Governor then resided, was Ban Takien (now a village with about thirty houses), standing close to the Governor's present residence at Bandon, and nearly in the centre of the island.

Tharua (*i.e.* ship's anchorage), on the east coast, on a small river of the same name, was then the principal seaport,\* and the town in which the Europeans lived. This place is said at that time to have been frequented by ships from Europe, and the many ruined houses show that the number of Europeans there must have been considerable. The Governor of Takuatung, now an old man, informed me that, some ninety years ago, his grandfather (at the time Governor of Takuatung) was very sick, and given up by the native doctors. Having heard much about marvellous cures effected by European doctors, he went to Tharua, where he found a ship with a doctor on board, and placed himself under his care. In a short time he was perfectly cured, and returned to his place. The present Governor attempted to give the names of both ship and doctor, but the pronunciation had been so much altered by being handed down *vivâ voce* from one generation to another, that it was impossible to make anything like a European name out of either.

Junkseylon must at one time have consisted of two islands, separated by a tolerably broad channel running across where now the villages of Tharua and Dint hale stand. This part is still very low land, and for the greater part of the year is nothing but a mire, only separated from the sea by fringing sand-banks along the east coast of the island. In this stretch of land many patches, only a little higher than the surrounding country, are still called islands (Koh). The Europeans living in Salang previous to the Burmese invasion are said to have worked the tin mines themselves: this is not unlikely, as in many places there are still traces of old tin mines which have been worked underground, following the tin layers, and not after the fashion of the present Chinese miners, who carry away all the earth on top of the tin layers to get at the ore. When the Governor of Salang returned after the Burmese had left, he found all the

villages in ruins and the country almost depopulated. Since that time Salang has never risen to any importance, and this low fertile land, capable of sustaining a large population, had about a year ago only 2000 to 3000 inhabitants, mostly Siamese and Malays, who lived partly by fishing, and cultivating about as much rice and vegetables as kept them from starving.

Subsequent to 1809 the several provinces formerly under Salang made themselves independent of this place, and the island of Salang was divided into two governorships, the southern one of which was called Puket (from the Malay, *Buket*, a hill), whilst the northern one has retained the old name of Thalang (Salang). Some time after this both Puket and Salang were placed under the Governor of Panga, which at that time was rising to some importance. The governorship of Puket included at first only the high land in the southern part of the island, all the low land around Tharua and Dint hale still belonging to Salang.

The Siamese provinces are, according to their size and importance, placed under Governors of three different ranks: the most important by a Phya, the second class by a Phra, and the third class by a Luang.

Salang has from olden times been the seat of a Phya, whereas the first Governors in Puket were Luangs only.

In 1846 Phya Thalang died without leaving an heir, and the Luang Puket was promoted to Phya Thalang. Puket was thus left without a Governor, and Phya Panga sent therefore one of his higher officials to Puket, who by the Siamese Government was appointed Governor, with the title of Phra Puket. In 1853 this Governor died, and was succeeded by his son, the present Governor, who was permitted to assume the same title as his father.

Puket was at that time only a village with 450 Atap houses and some few dwellings scattered over the country, the inhabitants gaining their living principally by fishing.

Phra Puket now commenced working tin mines himself, and advanced money to Chinese miners to enable them to start business: this course he followed for years, and in consequence of the richness of these mines in Puket, the influx of Chinese continued to increase, till it reached its maximum some five years ago, when there was said to be the large number of 35,000 Chinese miners.

Since that time there has been a slow, but steady, decrease in the population, caused by a great rise in the prices of all necessaries of life, and a simultaneous decline in the prices given for tin. The value of tin was five years ago about 35 dollars per pikul = 133½ lbs.; and at present the value is only 19 dollars per pikul. In the year 1857 the King of Siam raised Phra Puket to the rank of Phya, and made him at the same time independent of Phya Panga. Some years after this the two villages of Tharua and Dint hale, with the low land between them, were taken from Thalang and added to Phya Puket's territory. In 1875 the whole of Salang was placed under Phya Puket, and Phya Thalang is now in the same position towards the Governors of Puket as these formerly were to him.

Phya Puket has several times attempted to improve the Chinese method of working the tin mines, and even once went to the expense of buying steam-pumps for pumping the water out; but the Chinese showed so much opposition to this, that the boiler

\* Lieutenant Blair, who afterwards was employed on the first sketch survey of the Andamans, made a rough sketch of Tharua port and Pak-prah Strait, which was published as a chart by the East India Company.



and engines are now lying piled up opposite the Harbour-master's office, as a monument of the Chinese adherence to old customs, and of their prejudice against all new systems. The consequence is, that the old water-wheels and chain-pumps are still at work day and night in the wet season, but standing useless in the dry season for lack of water to drive them, the result being that all mining operations are stopped for two or three months in the year.

At present it is estimated that Puket has about 25,000 Chinese miners: these are divided into different sections, of which the Toopikongs and Geehens are the largest. These two parties were formerly always at variance with each other, and in 1866 there occurred a regular fight between them, in which many hundreds were killed on both sides. Since that time the Governor has always maintained a force of 100 men, under the command of a European, and the Siamese Government has constantly kept a man-of-war on this coast, to protect trade and assist the Governor in case of disturbances.

The principal places in the governorship of Puket are Puket town, Kathu, and Tharua.

Puket town, where the Governor resides, stands on the east side of the island on a small creek, and is connected with a landing-pier at the mouth of the creek by a good road, about  $1\frac{1}{2}$  mile long. Close to this pier stands the Harbour-master's office. The buildings in Puket are mostly wooden houses with Atap roofs, but still there are not a few brick houses, of which structures those erected for the reception of His Majesty the King of Siam, on the occasion of his visit to the island in 1871, are principally worth mentioning. These buildings are now the residence of a Siamese Royal Commissioner, lately sent to Puket to assist the Governor, who has been blind for some years. The Commissioner has done much to beautify the buildings, and has made a good road in front of them. Close to them stands the Governor's residence, including a number of larger and smaller buildings, mostly built in Chinese style, very solid, but without any pretension to beauty; they are all surrounded by a high brick wall. The so-called Government House is a large and neat brick building, erected on a hill close to Puket: it was built by the present Commissioner, Phya Moutri, who also has made a good road up to it, passable for a light carriage. Other brick buildings worth mentioning are a large stamp-office for tin, many tin-smelting houses, several barracks for the soldiers, and a fine two-storied building for the Commandant of the Governor's soldiers. Many of the Chinese traders and miners have also lately commenced building brick houses, and the market street would be a very fair one, if kept clean.

Puket town (called Tongkah\* by the Chinese) is on all sides surrounded by tin mines, some of which are 50 feet deep—a considerable depth when it is taken into consideration that all the earth above the tin-layers has been carried away in small baskets by the Chinese miners. The Chinese in Puket will not, under any consideration, work underground, and hence the enormous waste of labour and money. They are very superstitious about their tin mines, and about an evil spirit's influence on the thickness and goodness of

the tin-layers. The worst form such an evil spirit can appear in is as a European with boots and umbrella, and such a person would never be allowed to enter their mines, but a European without boots and umbrella is always welcome: he is then supposed to do more good than harm.

Kathu is connected with Puket by a good road, 6 miles long and running in a westerly direction. Kathu has about 8000 inhabitants, almost all Chinese, who work the important tin mines in the neighbourhood. To the northward of Puket another good road, 7 miles long, leads to Tharua, formerly, in Salang's "golden days," a place of importance, but now almost deserted; its fine market street still remains, with good brick-buildings to the number of thirty or forty, as also large ruins of houses belonging to the Europeans who resided here before the Burmese devastated the place.

Besides these three principal towns, there are in the suburbs of Puket a great number of villages of various sizes, inhabited partly by Chinese and partly by Siamese or Malays. Surrounding most of these villages are paddy-fields and plantations, for the productions of which a good market is found in Puket and Kathu. Around these two places, the cultivation of the soil is much neglected in consequence of the tin-mining operations.

The total population of Puket can at present be estimated at 25,000 Chinese, 2000 Malays, and 1000 Siamese.

From 1809 to 1875 the trade of Salang seems to have been at a perfect standstill, with little or no mining going on, and scarcely any cultivation. Since 1875 Salang has been placed under Puket; and Phya Moutri, together with Phya Puket, have re-commenced tin-mining in different places. By their exertions more than thirty mines have already been opened up in Salang, in which a large number of Chinese are employed. Villages, plantations, and paddy-fields are also appearing in many places, where a short time ago there was nothing but dense jungle.

The largest village in Salang is Bandon, which is at present Phya Thalang's place of residence, and contains about 100 Atap houses. Phya Thalang lived formerly in Bangkrong, a village on the east coast of the island, but about three years ago he shifted to Bandon, in consequence of which Bangkrong has almost disappeared. The residence consists of a number of large, very neat, bamboo buildings, surrounded by a brick wall. The Governor is very hospitable, and maintains excellent order in his territory, but with insufficient means he is not likely to develop it in proportion to the richness of the soil and the progress made in the adjoining country of Puket. There can be no doubt that Salang is quite as rich in mineral wealth as Puket, and possesses a large amount of low fertile land; whereas Puket being very mountainous, it is not unlikely that in time Salang will once more become the leading place in the island.

The estimate of the population in Salang is at present—Malays, 2000; Chinese, 1500; and Siamese, 1000; total in Salang, 4500; and in the whole island, 32,500.

Junkseylon is certainly a very rich island, and there is every reason to believe that the land to the northward and eastward of it possesses a like abundance of

\* European merchants now speak of the place as Tongkah.



minerals. With the coast of this land properly surveyed, the interior explored, and some facilities and encouragement offered to miners, the revenue of Siam would rapidly increase. What a single energetic man can do Phya Puket has amply shown, and although blind, he is still the leading genius in almost all enterprises in the island. He has worked hard and honestly for his country, and changed Puket from a mere jungle into a sea-port, where now more than twenty steamers call every month. Tin, to the amount of about 100,000 pikuls, is exported from this place every year, and in proportion to the size of the territory the Siamese treasury receives from it a very respectable revenue.

A. DE RICHELIEU, Captain,  
*His Majesty's Siamese Navy.*

#### DROUGHTS AND CLIMATES AT THE CAPE.

IN addition to the hardships of a Caffer war, the colony of the Cape of Good Hope has been visited by a severe drought during the last summer, accompanied by a fearful visitation of famine, as a scene in the drama of calamities that remote and undemonstrative settlement is sometimes subjected to. This drought seems chiefly to have affected the southern and western districts below the lat. of 30° S., long. 30° E., and, in a less degree, Natal, Transvaal, and the country N.E. of the Vaal river, which border on the semi-tropical regions of Southern Africa, and lie within the isothermal lines of 65° Fahr. This difference will correspond with the exaggeration of the weather elements of the climates of these two sets of countries, which consist mainly in the summer being the rainy season in January, in Natal, and the dry one at the Cape; and the winter season of July being the dry season in Natal and the wet one at the Cape.

The drought existing in the Cape Colonies seems to have been a maximum dry season, therefore, and it may probably be found that the isothermal lines between which it usually lies will have been pitched much further south than in ordinary years, and that the isothermal line of 70°, running through Walvisch and Delagoa Bays, has been transferred to the south of its usual position.

Now, if we speculate further, we may assume that the calms of Capricorn were still hanging during the summer about the Cape, instead of descending, as they usually do, below its latitudes at this time; and they are thus preventing the S.E. winds from emerging on their northern border from the Polar regions, and carrying the vapours of the southern seas to be condensed on the highlands of Southern Africa. It appears that northerly winds have been prevalent in the interior during this summer there, instead of S.E. winds, and the former are those most frequently found to the south of the calm belt; and they blow hot and dry and dust-laden from the Kalahari deserts and Karroo plains, and suck up the waters in all the rivers, valleys, and springs in their course southwards.

The temperature of the air had already been reported to have reached 107°·5 in the shade at Nelspoort, in the Nieuwveldt Beaufort district, lat. 32° S., on February 7th, 1878. We may further assume that the south temperate rain belt had not yet descended

as far south as usual in the Southern Ocean, and that the south tropical rain belt had not yet reached the latitudes of the colonies on the S.E. coast, so as to feed the interior plains and mountains with thunderstorms, and bring up the moisture-laden breezes from the Indian Ocean.

*Cape Argus*, January 22nd, 1878, reports that this year has been a striking exception to the rule, as no heavy rains have fallen since May 1876—that is, nearly two years have elapsed since a saturating, life-giving rain has visited a large extent of this colony. The land has become as hard as a stone, and could not be ploughed, and the scanty crops were scarce worth reaping; vegetation got withered, the fountains dried up, and cattle and sheep perished by thousands from sheer thirst and starvation. Both the southern and western and northern districts have been visited by it, and it has reached from the Buffalo River, in the Worcester Division, to the Orange River, and from the Atlantic to the Indian Ocean. The result is that both the white man and the black man, Europeans and natives, are suffering from the want of rain causing the withering of vegetation and destruction of the cereals; and then comes starvation and gaunt and hideous famine to both man and beast.

In Swellendam the drought has been so severe that there has been no water to turn the corn and other mills.

*Cape Argus*, February 12th, 1878, reports that for the past three years the rains of the colony have been limited and unseasonable, and this year the rivers and streams having run low, and every drop of rain that has fallen lately has been evaporated by the thirsty sirocco of the deserts. Numbers of people in the interior are living on the meat of starved animals, and sheep and cattle die as they go and search for water; stagnant pools of poisonous water are guarded from the stock only to serve to infect the human drinkers with typhoid fever. Educated daughters of hitherto wealthy families seek service in the same kitchen with the native girls, and sons hunt for work as daily labourers and railway navvies; and many others are driven to the criminal alternative of stealing their food and drink. Drivers of waggons complain bitterly of the scarcity of water between Alice and Port Elizabeth, and the poor oxen can only get a drink at the large rivers, and many have died from thirst and starvation on the Bay Road.

It has produced the most curious and tantalising effect, both good and bad, at the great pit of the Kimberley Diamond Mine, as it has dried it up, and thrown the pumps out of employment, and saved the fuel, but has left no water for washing the matrix and extracting the gems.\*

It will have been observed that droughts have affected Australia (*vide Australasian*, December 22nd, 1877) also during much the same periods lately, which leads one to infer that their causes are of a general cosmical character, and, in conjunction with the wet seasons that have prevailed in Britain for the like years, probably point to a vicarious action of the weather forces taking place in the northern and southern hemispheres at the various periods of the

\* The Vaal river dried up so much as to be fordable on foot, its water stank offensively, and large fish passed down over the stones at the drifts.

year. By this it is intended to explain that when the seasons are wet in the northern hemisphere they would probably be dry in the lands of the southern hemisphere, and that, on the other hand, if they were dry in Britain, they might be conjectured to be wet at the Cape. We might not, however, be warranted as yet in inferring that these conditions would be simultaneous in each hemisphere, for that involves a conclusion that if the weather were wet in Great Britain in summer, it must necessarily be a dry winter at the Cape, or on similar meridians or like latitudes on either side of the Equator. But we may go so far as to suggest that a theory of vicarious action between the weathers of opposite hemispheres might be found to apply when the records of a whole year's observations, or a series of them in each extreme, were compared together.

It will be customary, in conclusion, to propose remedies to correct this recurring maximum condition of a dry season at the Cape, which will consist in the oft-repeated suggestion of the establishment of a Board of Woods and Forests in the Cape Government. This should superintend the maintenance of the existing bush and jungle, and promote the formation of new plantations on the remaining Crown lands, and to give encouragement to the landowners, by loans of money from the Treasury, to provide on their estates and pasturages these natural requisites for the formation and sustenance of perennial springs of water. Dams, or artificial reservoirs to catch and store the rain-water, seem to have proved insufficient to stay the effects of a drought, as the report from Graaf Reynet states "that the drought increases in severity, for the sun does not warm, but it burns; the springs are failing everywhere, and the dams were emptied long ago." In order to preserve the water in these dams from the evaporating forces of the drying winds and powerful sun, their banks ought to be thickly planted with the Orange River willows (*Salix Gariepina*) and thatch rushes (*Restio Tectorum*), and other trees and undergrowth, all abundantly flourishing on the banks of the great rivers in the colony, and which thoroughly preserve their secluded pools from heat and exhaustion in straitened seasons.

The loss in money value sustained by the colony by the mortality of sheep, cattle, and horses, and destruction of crops of wheat-mealies, vegetables, and fruits, must far exceed in amount any proposed loans of money that might be advanced to farmers, agriculturists, or stock-holders, to construct means for averting the direful waste of life and property effected by droughts.

The physical conformation of South Africa further favours the desiccation of the country, on account of the steep gradients of the course of the rivers to the sea, which let their waters run off rapidly. But, on the other hand, the geological features offer more promise, as the perpendicular fissures of the horizontal lacustrine shales permit the rains to run into them, and disappear down below into the basin of the Great Karroo beds, occupying the interior of the country inside the littoral rock formations. Now there are no breaks through these coast strata except the gorges of some of the great rivers, which let their waters out from the interior plains to the sea; therefore the Karroo or lacustrine beds probably contain supplies of water down below in their inferior layers.

The dip of these strata on the borders of the great porphyry, conglomerate, or breccia bed of Bain lies to the north or east or west, according as you face the equatorial direction from the south, west, or east: consequently, the water that has percolated from the surface rains should run down to the lower levels northward, and should there be found. Wells may therefore be sunk, or shafts dug, down into the Karroo shales, wherever found, as may be seen on consulting either Bain's or Dunn's Geological Maps of South Africa; and there is likelihood that water may be found there, as amongst our oolitic and chalky strata in England, which lie also horizontal and superficial and unconformable, on the older carboniferous formations below them.

The prospects of water from rock supplies outside the range of the conglomerate bed are less favourable in a geological point of view, as the Silurian slates have too great a dip and are too much broken up. The Table Mountain sandstone formations are, perhaps, better situated, as they are horizontal, and the fissures are therefore perpendicular; but they are placed on the high lands, and are not in continuous sheets, and so cannot gather large stores of water. However, they lie favourable for springs issuing out from their sides exposed in valleys, or from their bases reposing on sheets of granite or basalt below them, as is to be seen at the Platte Klip springs, at Cape Town. There are, besides, numerous tertiary beds scattered in detached areas along the southern coast outside of Bain's conglomerate, which would seem suitable ground for being tapped for rock water supplies for farms and villages, distant from perennial streams or springs.

W. J. BLACK.

## Reviews.

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### THE WAR SHIPS OF EUROPE.\*

IN the present critical state of European affairs, when the war ships of England may be called upon for practical proof that her naval supremacy is in no way diminished since those days when "Hearts of oak were our ships," a perusal of this work, from the pen of a foreigner and an impartial observer, must tend to dissipate any doubts on the subject. No importance can now be attached to the significant words of the late Mr. Ward Hunt, when taking office as First Lord of the Admiralty, he said that "the British navy was composed of a phantom fleet!" The author of this work, Mr. King, Chief Engineer in the United States' navy, was directed by the American Government in the year 1875 to proceed to Europe for the purpose of "personally observing and reporting upon the recent construction and mechanical appliances" of the ships of war belonging to the different European navies. That they selected an intelligent and observant officer must be acknowledged by even the most casual glance at his report, for he not only gives an accurate description of the construction of our largest and most powerful ironclads, but describes the minutest details regarding their internal fittings, and gives a most elaborate description of their machinery. To obtain the extensive knowledge which Mr. King has published, it is evident, on the face of it, that he must have been in direct communication with the officials of

\* *The War Ships of Europe.* By Chief Engineer King, U.S.N. (Griffin and Co)

the different dockyards and others acquainted with the designs and construction of our ships, by whom the requisite information was imparted to him. It is doubtful policy, especially in these days when one powerful ironclad is of as much importance as a whole fleet of wooden ships would have been a quarter of a century ago, to allow foreigners the free run of our dockyards and admission to all the minutiae of our naval constructive department, so that they can not only ascertain for themselves the vulnerable parts of our vessels but proclaim them to the whole world. Perhaps it is in a spirit of sarcasm that the author quotes an extract from our dockyard regulations to the following effect, that "No foreigner is permitted to enter any of Her Britannic Majesty's dockyards without authority given by the Admiralty through application of the Ambassador or Minister of the country to which the person belongs, made to the Secretary of State for Foreign Affairs, naval attachés of the foreign Embassies in London excepted. Foreigners, including officers, whether singly or in parties, are always accompanied throughout the periods of their visits by an officer detailed for the purpose, and while all necessary attention is given, and every proper facility is afforded for viewing the works and ships under construction, sketches or written notes are not allowed to be taken except by special permission."

We must, therefore, conclude that the author obtained the sanction of our Admiralty for making an extensive collection of "sketches" and "written notes," and he has certainly made good use of his permission to do so!

The greater part of the work is devoted to the navy of our country. Whilst treating of it, the author gives a slight sketch of the gradual progress of the construction of iron-plated ships from the year 1859, when the building of the 'Warrior' was commenced, until the year 1877; and he gives a very complete history of the individual construction of our more modern ironclads. Then follow accounts of the navies of France, Germany, Italy, Russia, and Austria; whilst in an appendix is published lists of the Turkish, Dutch, and Spanish fleets. Whether he has placed the European navies in the categorical order of their power it is difficult to decide, but it would appear so by a careful study of their relative strength.

It cannot but be very gratifying for us to be told that "never since the application of steam propulsion to ships of war, has the British navy been relatively so strong as at the present time;" and since Mr. King wrote those words it has grown in strength to a very remarkable degree. He informs us that our private ship-building establishments are "unrivalled," and that our English ship-yards, besides building for our own Government, build yearly for other naval powers, France and the United States alone excepted. "Turkey obtained from the Clyde and the Thames a large proportion of her armoured fleet, including all the most powerful vessels. Russia, Spain, Holland, Italy, Denmark, Greece, Portugal, Brazil, Chili, Peru, and Japan all come to England to have armoured ships of war constructed. The Sheffield works not only supply armour-plates for these ships, but also plates and materials for war vessels built in Continental countries. The Elswick and Whitworth works manufacture guns solely for foreign orders. Besides this, all the nations above-named are customers of the English ship-yards and engineering works for their mercantile marine."

It will be thus seen that nearly every maritime power in the world relies, in a measure, upon English products and English industry to furnish them with the means of conveying their commerce from one country to another, and with vessels for the protection of that commerce.

Mr. King places the effective force of the British navy into three separate divisions. In the first are the ships that henceforth will fight our great naval battles; these he designates very properly as "ships of the

line" (by the way, we are glad to see that the Admiralty have at length seen fit to have under their consideration the revision of the classes and denominations of Her Majesty's ships, originally established when the wooden line-of-battle ship was the fighting vessel of the day); in the second division he places the ships for our coast defence; and in the third our unarmoured cruising vessels, which includes our gun-vessels and small gun-boats. These three divisions comprise a collective fleet of 400 vessels of all kinds, with a total tonnage of 900,000 tons. This, it must be acknowledged, is a very powerful force, and may be relied upon as something tangible, for it does not include 134 others that are "laid up or employed in permanent harbour service which are never likely to be sent to sea!"

The account of the 'Inflexible' cannot fail to attract attention, more especially of those who have interested themselves in the discussion which has recently terminated regarding the stability of that ship. Before any doubt had been thrown on the unseaworthiness of this "floating castle," Mr. King writes: "No war vessel yet designed has departed so widely from pre-existing types, and in none has so enormous a stride been made, in offensive and defensive powers, as in the 'Inflexible.'" It is satisfactory for us to know that the peculiar arrangements in this ship, and others of our navy, although they do not render them absolutely invulnerable to torpedoes, will serve in a measure to protect them from the attacks of these invisible and deadly foes; for we are told that "as a protection against the casualties of war and the sea, the hull is divided by means of the transverse and longitudinal bulkheads into no fewer than 135 water-tight compartments, and arrangements will be made for quickly removing any water that may collect within them through collision or other cause." These water-tight compartments have been tested by hydraulic pressure. Mr. King, in summing up the defensive powers of the ship, says that "it will have been seen that her double bottom is divided and subdivided into an unusual number of spaces, and that water-tight bulkheads have been introduced to an extent not before attempted, and, in fact, almost every conceivable precaution has been taken to make her secure against the ram and torpedo. If, however, she should be fairly struck by several powerful fish torpedoes it is quite probable she would be crippled, water-logged, or possibly sunk." This is certainly very consoling information to receive, when our preconceived notions of the destructive powers of a torpedo were, that the explosion of one in direct contact with a ship's bottom would infallibly destroy her; now we learn that if struck "fairly," by "several" torpedoes, there is only a "probability" of the vessel being crippled and perhaps sunk! It is gratifying to know that something, at all events, can be done to secure our ships from the much-vaunted power of the self-propelling offensive torpedo.

Mr. King enters into very full details regarding the enormous thickness of armour and solid teak backing of the citadel, but he omits to say anything of a very striking and important part of the 'Inflexible's' defensive capabilities, namely, those compartments next to the sides of the vessel, some 4 feet-in width, which are filled with cork chips and shavings; inside this again are other compartments about 2 feet wide filled with layers of oakum and canvas, which have been found, by experiment, to partially close the apertures made by projectiles passing through, and also very materially to check the inflow of water. This is a novel and very important part of the construction of the 'Inflexible,' which, curiously enough, is not alluded to by Mr. King. With regard to the offensive powers of this ship, we find that she is to be armed with "four of the heaviest guns,"—namely those of 80 tons—"ever constructed," and will consequently be the heaviest armed ship afloat with the exception of the two Italian turret ships the 'Duilio' and 'Dandolo,' each of which mount two 100-ton guns! but we are also told that the 'Inflexible'

can be armed with "even more tremendous weapons," each of her turrets, with a slight modification, being able to mount a pair of 160-ton guns, having a length of 30 feet and a calibre of 20 inches! Well may these be termed "tremendous weapons!" There is a limit to all things, and we hope the limit of size for heavy ordnance may be drawn at the 160-ton gun.

In spite of the ponderous nature of the guns, we read that they can be fired, sponged, loaded, and brought to the firing position again in the incredible short space of forty seconds!—and all this is done by hydraulic power. With such strides has the science of artillery been developed, that with these huge engines of war we can maintain the same rapid firing that three-quarters of a century ago, with the guns then in vogue, enabled us to achieve those brilliant naval conquests of which we are so justly proud. The weight of the 'Inflexible's' broadside may be imagined when we are told that, "if ten shots were fired from each of her guns, she would use up 14,800 lbs. of powder and upwards of 30 tons of projectiles, at a cost of about 1320*l.*" During the experiments for range with these guns, "shells were reported to have been recovered from a minimum distance of 6 miles; others were traced still further, until deep water arrested the progress of the explorers."

The construction of the other most important ironclads of our navy is as elaborately gone into as that of the 'Inflexible' Truly does Mr. King remark that the interior of one of our large ships is "a vast engineering workshop, requiring great skill and energy to manage it successfully."

Concerning the 'Alexandra,' our present flag-ship in the Mediterranean, which is fitted with twin screws, and consequently two sets of engines, we read that, "if one side of the ship be damaged, the engines on the opposite side can be worked independently."

There is little to be said regarding the vessels which the author places in the second division, namely, those for coast defence, and which comprise vessels of the 'Hydra' class, except that they are most formidable in every way, and, although classed as non-seagoing ships, are fully capable, should it be necessary, of vindicating the honour of the British flag in the Baltic or Mediterranean seas.

Whilst treating of our unarmoured cruisers, he informs us "that they are faster than the cruising ships of any other navy; besides which they are reputed to be excellent sea-boats, and fast under sail, and they are armed with rifled guns, some of which are of heavy calibre."

Chapter xi. is exclusively devoted to the cost of our armoured ships from the year 1866 to 1874: this embraces original cost and subsequent repairs—very important and very useful statistics.

The accounts of the other European navies, although, perhaps, not so exhaustive as that of our own, will be read with great interest, enabling us, as they do, to compare our strength with that of other maritime powers. The rapid growth of the German navy is somewhat remarkable. Less than thirty years ago they possessed one sailing corvette and two gunboats! Now, they possess a large fleet containing ships of the newest type, although they have nothing to match our 'Thunderer,' 'Devastation,' or 'Dreadnought,' to say nothing of the 'Inflexible.'

With regard to the Russian fleet, we are told that they have only "two vessels on the list of sea-going armoured ships which approach the modern standard of fighting efficiency." The description of the circular ironclads 'Novgorod' and 'Admiral Popoff' cannot fail to be of interest.

Mr. King, being an engineer, may perhaps be pardoned for having written at great length on compound engines, marine boilers, and sea valves and cocks; three chapters that would be more appropriate in a professional pamphlet than in one that professes to treat solely of the war ships of Europe.

A short chapter is also devoted to offensive torpedo warfare, whilst the organization of our Royal Dockyards and the Naval College at Greenwich is fully gone into. The book is profusely illustrated with plans and diagrams of the ships, their ordnance and machinery, and is produced in a manner to reflect credit on its publishers. Altogether we must congratulate Mr. King for the very comprehensive work, compiled with great labour by a painstaking and observant officer, which has been presented to the public at a very appropriate time; and although, as we have said before, we doubt the wisdom of the policy that enables foreigners to collect such a mass of important information regarding our naval organization, still the production of the *War Ships of Europe*, which will no doubt be carefully studied by any nation desirous of trying conclusions with us, will, by proclaiming our strength, materially assist in promoting peace.

A CATALOGUE OF MANUSCRIPT AND PRINTED REPORTS, FIELD BOOKS, MEMOIRS, MAPS, &c., OF THE INDIAN SURVEYS, DEPOSITED IN THE MAP-ROOM OF THE INDIA OFFICE. (Trübner & Co., Allen & Co., King & Co., and Stanford.)

A CATALOGUE of Maps of the British Possessions in India and other parts of Asia, published by order of Her Majesty's Secretary of State for India in Council, was issued in 1870; and a continuation of it, including maps subsequently published, appeared in 1872. In 1874 a tabulated Catalogue of all published Maps on sale was also printed, with an Index Map to the Indian Atlas; and in 1876 a second edition appeared, with a key Index.

The present Catalogue includes the whole of the permanent collection deposited in the Map-room of the India Office. It begins with Mr. Markham's Memoir on the Indian Surveys, and similar introductory papers; the Triangulation of India, including the famous measurement of the Indian arc of meridian. Begun by Col. Lambton, this trigonometrical survey of the highest order of exactitude, has been continued by his successors, Sir George Everest, Sir Andrew Waugh, and the present Surveyor-General of India, Col. J. T. Walker. In succession appear the reports of the Topographical and Revenue Surveys; the publications of the Geological Survey of India; the Schlagintweit Surveys; the Archæological and Marine Surveys.

The Indian Atlas, which combines the Trigonometrical, Topographical, and Revenue Surveys, on a scale of 4 miles to an inch, forms the second division of the Catalogue, and is followed by general maps, whether of the whole peninsula or of more than one administrative division of it. Under this head occur various specialties—copies of old Portuguese and Dutch drawings, commemorating their Indian tenure, together with maps of rivers, canals, and railways. The foregoing occupies about a fourth of the present Catalogue, which extends to 638 pages; the volume altogether, with its classified contents and index, being about 700 pages. More than half of the Catalogue consists of maps of varying age, arranged according to the actual civil divisions of India, and thus bringing whatever information is contained in them under the notice of the officials engaged in local government. In the case of maps of old and bygone divisions, those too are classified under the present political system, regard being had rather to the territory itself, than to any difference of name which the same locality may have borne at different times. The contents is besides intended to be a complete index to all the political divisions of the country that are actually in operation, whether under Native or British rulers, and whether separate maps exist of them or not.

The completeness of the collection or the contrary,

from that point of view, is thus laid open, and a key is provided to the political geography of India, its Presidencies, subordinate Governments, divisions, and districts, together with each separate native State or jurisdiction, and the principal divisions of those of large extent.

The materials are thus brought into view from which the actual delineation of India is derived. Here are many of the route surveys made by the first English pioneers into the interior, together with the marches of armies like Lord Lake's, and plans of battles like Plassy. Among many other interesting monuments of the labours which have become consolidated into an Empire are the original surveys of Rennell in Bengal, especially the delta of the Ganges, in 1764; the upper course of the great river, by Capt. R. H. Colebrooke, in 1796, and by Lieut. T. Wood in 1800; and Lieut. Webb's discovery of the sources of the Ganges and Jumna in 1810. In the south are Col. Colin Mackenzie's surveys in Madras and Mysore, and those of Ward and Conner, Turnbull, Garling, and others, in Malabar, Travancore, &c. No less interesting are the original drawings of Wood, Bedford, and Wilcox on the Brahmaputra, and of Lieut. John Wood on the Indus, besides the original map of his discovery of a source of the Oxus, and his surveys in Afghanistan, under Sir Alexander Burnes.

It is almost invidious to mention a few only from among the famous explorers and surveyors whose works are included in this Catalogue, and the brevity of such a notice is the only excuse. Before, however, turning to another branch, attention should be invited to such beautiful maps as those of Jhelum and Rawul Pindi, by Capt. D. G. Robinson.

The second part of the Catalogue is made up of Maps of Asia and its divisions beyond India; Maps in Oriental Languages; General Atlases and Maps; Indian Marine Surveys; and Indian Observatory Reports, astronomical, meteorological, and magnetical. Among the maps of Asia and its divisions beyond India are many of much interest and value; but the collection is not nearly so complete as the importance of the subject in connection with India would lead one to expect. The list of old charts is a wonderful testimony to the enterprise of past times, and in tracing the succession of Indian Marine Surveys, it is gratifying to observe that the revival of the Marine Surveying Service by the Indian Government is already bearing good fruit.

The alphabetical index which completes the volume appears to be exhaustive, and it can have no better commendation.

CAPTAIN GILL'S RECENT JOURNEY IN WESTERN CHINA supplies an interesting confirmation of the apparent existence of a belt of exceedingly moist region between the Tibetan plateau and the lands encompassing it on its north-eastern and eastern sides. Prejevalsky, in his *Mongolia and Tangut Country*, notices this feature while ascending the mountains south-west of Taging; the Père Armand David noticed it during his residence at Mupin, north of Ching-tu-fu; Mr. Cooper, while making his way from the last-named place into Eastern Tibet; and Captain Gill's testimony now supplies us with a link between the observations of Prejevalsky and David, as he speaks of the wonderfully moist and semi-tropical character of the vegetation on the eastern side of the plateau, between the valleys of Sung-pan ting and Ling-ngan, on the extreme northern border of the province of Se-chuen.

## Log Book.

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**The Royal Awards of the Geographical Society for 1878.**—The Council has awarded the Founders' Gold Medal to Baron F. von Richthofen, for his extensive travels and scientific explorations in China, and for his great work, now in course of publication, in which the materials accumulated during his long journeys are elaborated with remarkable lucidity and completeness. The Patron's Gold Medal has been awarded to Captain Henry Trotter, R.E., for his services to Geography, in having conducted the survey operations of the late Mission to Eastern Turkistan, under Sir Douglas Forsyth, which resulted in the connection of the Trigonometrical Survey of India with Russian surveys from Siberia; and for having further greatly improved the Map of Central Asia by uniting his own work on the Upper Oxus with the explorations of the Mullah and Havildar further to the west, so as to give, for the first time, a nearly continuous delineation of the course of the river, from its sources in the Pamir lakes to the frontiers of Balkh.

The Annual Prize Medals offered by the Society to the Public Schools have also been awarded as follows:—

PHYSICAL GEOGRAPHY.—*Gold Medal*, W. J. Newton, of Liverpool College. *Silver Medal*, C. M. Wilson, of Clifton College.

POLITICAL GEOGRAPHY.—*Gold Medal*, W. W. Ord, of Dulwich College. *Silver Medal*, G. A. Tomkinson, of Haileybury College.

The examiners were Col. J. A. Grant, C.B., and Mr. Clements R. Markham, C.B., F.R.S.

**The late Captain F. Elton on the Nyassa Country.**—Some private letters of the late Captain Elton, which have just reached England, give us very interesting information regarding the country passed through by him on his journey to Lake Nyassa. Speaking of Ramakukan's country (about 16° S. lat.), on the Shire, he says—"Cotton grows luxuriantly: I should like to see some one settle here, and manage cotton cultivation for Ramakukan. There would be any amount of labour available, excellent land, and a good reception from the chief; whilst Blantyre, on the hills, is within 1½ days as a sanatorium, and there is a medical man stationed here by the Established Church of Scotland."

Lake Nyassa he describes as follows:—"Lake Nyassa was at its best as we steamed up from Mponda's, at the beginning of the Shire river, yesterday forenoon—eight hours' voyage—just a ripple upon its glassy surface, and the distant range of 'Kirk's mountains,' purpling through the grey smoke of the numerous grass fires lighted at this season of the year, softened down the grand rugged foreground of precipitous cliffs, bold headlands, and isolated rocky islands, clothed to the water's edge with trees, the boulders at the feet of which are washed by its miniature waves. This morning the wind had raised a sea on the lake, which enjoys the reputation of being occasionally treacherous."

Captain Elton remarks of the Mission, that he is surprised at what it has really effected, looking at the difficulties it has had to contend with. He fears,

however, that they will have to seek another station, as the position is too isolated to enable them to do good to the lake people. The dreaded *tsetse* fly infests the place, and the poorness of the soil prevents natives from settling in numbers. The slave-trade is still carried on, and Captain Elton states it as his opinion that the best way of putting it down would be by means of the appointment of a Commissioner, whose aim should be to detach the chiefs from the Arab slave-trade influences, and attach them to a policy of legitimate commerce and progress. Of the probable good effects of such a step, Elton speaks strongly and confidently. The difficulty in the way of trade is *carriage*, and to meet it he suggests the use of elephants, which are so plentiful as to be an absolute nuisance to the villagers. A few decoy elephants and a staff of elephant-catchers from Ceylon would enable a regular line of elephants to be utilised between Zanzibar or Kilwa and the lake. This would do away with the necessity of using the Portuguese Zambesi. One of the last remarks of the Captain is to warn "small men"—*i.e.* without capital—from "trying their luck" about Nyassa. This, he says, would infallibly lead to complications with the natives and Arabs.

**Cook's Log Book during his Voyage of 1772.**—Dr. A. Kirchhoff, President of the Halle Geographical Society, has discovered in the library of the University a copy (apparently) of part of the original log book of Captain Cook during his voyage of 1772. The book—a MS. folio, in brown leather—was bequeathed to the library referred to by John Reinhold Forster, Cook's companion, who died in Halle. It is headed, "Log Book kept on board His Majesty's Sloop 'Resolution,' Captain James Cook, Esquire, Commander." It begins with the departure of the vessels 'Resolution' and 'Adventure,' on the 13th of July 1772, and contains the usual entries of a log book up to the 11th January 1773, where it breaks off. Dr. Kirchhoff suggests that an extract given by him, and printed in the *Mittheilungen* of the Halle Geographical Society for 1877, p. 105, should be compared with the original log book, if in existence.

**Colonel Prejevalsky** writes under date 29th December, from Zaissan:—"The impossibility of penetrating into Tibet by way of Lob-Nor has compelled me to choose my route *viâ* Guchen and Hami, with the view of reaching Tsaidam, and eventually Lhasa, by way of the upper course of the Yang-tse. Having organised the caravan, and prepared ourselves for a long journey, we left Kuldja the 28th August for Guchen. As the principal road was watched by Chinese pickets, and part of it by squads of *champans* (convicts enlisted in the army), I took, in order to avoid any possible collision, an alternative way along the Ebi-Nor lake as far as the Saur mountains—the same route as that followed by Colonel Sosnofsky in 1875. It is true that this occasioned a *détour* of 250 versts, but we were sure of reaching Guchen without difficulty. We arrived there at the beginning of November, and ascertained that the route to Hami was unobstructed; but an unfortunate accident prevented our further march. The difficulties of the journey and the badness of the drinking water had made me very ill, and on arriving at Guchen I was utterly exhausted. It was thus impossible to continue

the journey. There were no means of remaining there, far from all medical assistance, nor of dwelling in a miserable *yurt*, with the Centigrade thermometer showing 40 degrees of frost. I resolved to retrace my steps as far as Zaissan, and to recruit my strength before starting for Tibet. We arrived at Zaissan on the 20th December, where I am now under treatment, and the doctors give me hopes that I shall be well in a month or six weeks. The Chinese authorities at Guchen received us very surlily, and even refused us lodging, which obliged us to occupy a *yurt* outside the town: it was enough for one of us to be seen by soldiers to be subjected to every kind of insult. Generally speaking, the Chinese troops, as far as we could judge during our stay at Guchen, are completely demoralised, and their chief occupation consists in pillage. They told us that at Manas a soldier killed a shopkeeper in a quarrel, and that, as a punishment, the General sent him to the army fighting against the Dungsans, with orders to place him in the front rank in the first engagement. . . . I calculate on leaving Zaissan about the middle of February, and, journeying by way of Bulontokhoi to Guchen and Hami, I hope to arrive at Tsaidam in the summer, and to push on during the autumn to Lhasa, across the deserts of Northern Tibet. I believe that this delay will not affect the results of the expedition, provided always that I recover my health."

**Austrian Expedition to the East.**—An expedition has started from Austria for the East. Count Bela Szechenyi and two young *savans*, Messrs. G. Balinth and L. Loczy, propose to visit Bombay and Calcutta, Indo-China, Ceylon, the Sunda Island, Japan, and China. On arrival at Peking, they purpose to procure attendants, camels, and horses, and to journey into the interior of Central Asia, principally with the object of studying the Kuen-Lun range. The expedition expects to be away two or three years. We have since heard from India that Herr L. Loczy, the geologist, has slightly modified this programme by a journey to Darjiling, whither he arrived on the 9th February, and whence he has started for Independent Sikkim, with the object of studying some of the glacial formations of the Himalayas.

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## Correspondence.

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### THE KARAKORAM.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—Although loth to trespass on your valuable columns, yet I venture to solicit space for a few last words on my part, a summing up of the friendly controversy between Mr. Trelawney Saunders and myself on the above-named subject.

Mr. Saunders has now put the whole question in a nut-shell. It is a question of fact not of principle. He pleads for "a distinctive name" (but does not suggest one) "for the mass which unites the two watersheds" (*versants*) "of Lake Lob and the Indus." He adds: "the *culminating summits of the south-western slopes of this mass form a lofty range, to the whole extent of which (as defined by the coincidence of the Lob and Indus basins) I have given the well-known name of*



Karakoram Mountains. This name was originally confined to the most frequented pass across these mountains."

If the facts were as Mr. Saunders conceives them, his nomenclature would be correct. But (1) the chain of culminating summits of the south-western slopes is *not* "defined by the coincidence of the basins," or, in other words, by the water-parting, for this occurs on the plateau often many miles to the north of the chain: and (2) the frequented pass called Karakoram does *not* lead across these mountains (which the alternative roads penetrate through the deep gorges of Murghu and of Kumdān respectively) but across the water-parting some 25 miles further north.

With regard to the first point, the Indus-feeders have worked their way back through the bounding range into the high plateau behind.\* It is an anachronism (measurable by geologic ages) to identify the water-parting with the bounding range at the present time. With regard to the second point, the Karakoram is separated from the mountains on the edge or slope of the plateau by the whole width of the Depsang plain, *i.e.* by a distance of some 25 miles (witness Mr. Saunders' own map, *Geographical Magazine*, July 1877). That is why I object to the name Karakoram for this bounding range. If Mr. Saunders will not accept my name of Eastern Muztāk for the chain of culminating summits of the south-western slope, he must find some new name, for it is evident that the Karakoram cannot possibly form at the same time both the water-parting of the streams which rise in the middle of the plateau and *also* the south-western boundary of that plateau.

As for my Eastern Muztāk, Mr. Saunders asserts that I would carry the "main range . . . along the formidable spur which divides the Nubra from the Shayok" rivers. But he also points out that my diagram does not represent the true direction of the Nubra-Shayok range or spur, or, in other words, that the range set down by me is *not* the Nubra-Shayok spur. In this he is quite correct. I have never asserted that this is the "main range" (or even the bounding range of the plateau, which is the question in hand). The range which I represented in my diagram, and described in the text of my article (*Geographical Magazine*, for December, 1877), was one "continuing in a straight line across the heads of the Shayok river and of some of its feeders," not between and parallel to them. This mighty range formed by "the culminating summits of the south-western slope" or edge of Mr. Saunders's Tibetan plateau, has been sufficiently described by Dr. Thomson, Dr. Scully, and myself. It is quite distinct from the remarkable spur running between the Nubra and Shayok rivers, and equally distinct from the Karakoram water-parting.

Whether the Karakoram may also be considered a range or not is another question. Mr. Saunders now points "to observations of 20,673 feet and 21,638 feet at the head of the Karakash river where his Karakoram range terminates" as contradicting my statement that the Karakoram is devoid of bold eminences. But this remark goes no further than to show that where the Karakoram terminates, the bold eminences begin. That is also my contention.

Mr. Saunders invites me to connect my Muztāk range with the Gangri in a symmetrical manner. This I have never undertaken to do, partly because it may be that there is no symmetry. That the water-parting must be continuous, is certain; and that the plateau has an

edge, so far as it is a plateau, is probable (though it might sink gradually). But Nature has never undertaken to supply a range to correspond everywhere. I merely come forward as an eye-witness to testify that on certain portions of the water-parting in the plateau, which are known to me, she has not placed a range of mountains, while she has done so at the edge of the plateau. She may have done differently further east.

If Mr. Saunders desires a systematic nomenclature for the actual facts of that region, I offer him the Karakoram plateau (a subdivision of the Tibetan plateau), bounded by the Kuen-lun range on the north-east, and by the Eastern Muztāk on the south-west, both of which are penetrated by the streams rising on the plateau on either side of the Karakoram water-parting, which is in places marked by a ridge and in places unmarked and almost imperceptible on the open plains of the table-land. How and where the south-western bounding range and the water-parting coalesce further east in the Gangri range, which seems to be both bounding range and water-parting, is a question which I have not investigated. But I do not know that this fact invalidates my observations of the Karakoram region.

Lastly, Mr. Saunders defends his exclusion of the table-land of Zanskar, Ladāk &c., from his Tibetan plateau, by the remark that I am confounding physical with political geography in asking for their inclusion; and that I am forgetting that *Western Tibet* is an exploded term as applied to Ladāk &c., since its acquisition by Kashmir (Mr. Saunders probably refers to the acquisition first of Ladāk and later of Kashmir, by the Chief of Jammu). As for that, I think it might as well be said that the name of Western Turkistan cannot be applied to Khokand, Samarkand &c., since these provinces have been acquired by Russia. Bengal, the Punjab, Hindustān, have not become exploded terms by these regions passing into English hands. But that is not the point. Physical characteristics and position at least do not change with a changing rule. Mr. Saunders cannot intend to say that Ladāk and Zanskar might be included in his geographical definition of the Tibetan plateau, but for their conquest by the Sikhs. Politics do not interfere to that extent with geography. I do not reckon Alsace to be still a part of France, but I do reckon it still a part of the Rhine basin.

Mr. Markham tells us: "Tibet or Bodul is divided into four great provinces, called Kam, U, Tsang, and Ari (or Ngari). . . . Ari is the mountainous region west of the Mariam-la (pass) including Ladāk."\* Mr. Markham also remarks that "Tibet, the name now adopted by Europeans, came from the Turks and Persians, and is unknown in the country,"\* and it so happens that it is precisely the province and town of Ladāk to which the Turks apply the name of Tibet, and from which consequently the rest of the country derives its European name. Great or Chinese Tibet is known to the Turks as *Ursang* (for *U-tsang*, the names of its two component provinces). But in situation, climate, natural features, race, religion, language, almost everything but political status, Tibet is all one, from Ngari to Kam. I therefore hope that Mr. Saunders will not exclude from the "Tibetan plateau as distinguished from the Himalayan," the table-lands of the original and typical Tibet.

I have been led into this discussion by the wish to assist (by contributing to make it more exact in detail) Mr. Saunders's excellent attempt at systemising our knowledge of the Himalayo-Tibetan upland. I now leave these points in the hands of Mr. Saunders and of your readers.

Yours, &c.,

ROBERT B. SHAW.

CALCUTTA, February 25th, 1878.

\* See my map presented to the Royal Geographical Society in 1872. Capt. Trotter also, after crossing the Chang-lung pass northwards, descended into the deep ravines of a stream which ultimately joins the Shayok river and then ascended on to the *Lingai-thang plain*, "in traversing which the traveller crosses, almost without knowing it, the water-shed (-parting) between India and Central Asia." (*Report of Sir T. D. Forsyth's Mission to Yarkand*, pp. 245-6).

\* *Tibet* (Bogle and Manning), page xxvi of Introduction.



## Proceedings of Geographical Societies.

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### ROYAL GEOGRAPHICAL SOCIETY.

*Meeting of 25th March, 1878.*

SIR RUTHERFORD ALCOCK, President, in the chair.

The first paper of the evening was by Mr. H. B. COTTERILL, who had recently returned from an eventful exploration of the region between the north end of Lake Nyassa and the east coast, *viâ* Ugogo,

#### ON THE NYASSA AND A JOURNEY FROM THE NORTH END TO ZANZIBAR.

Mr. Cotterill first explained his reasons for visiting Nyassa. He had read with horror the descriptions given by Dr. Livingstone of that terrible scourge of Africa, the slave trade, and had determined to try to plant in Central Africa a germ of legitimate trade, which might in time serve as an antidote to the illegal traffic in men. The great expenses connected with a first attempt precluded all idea of a mercantile success, so that the liberality with which his venture was encouraged was all the more conspicuous. In addition to goods which he obtained from some friends, he received a present of a steel boat from friends at Harrow School. This craft, cutter-rigged and manned with ten oars, was built in compartments, and was 30 feet long. Mr. Cotterill then briefly described his adventures from the time he left England, in May 1876, with a party of Scotch missionaries, bound for Livingstonia, until he was floating on the waters of Nyassa, in his little vessel the 'Herga,' out-distancing Mr. Young's steam launch, the 'Ilala.' At first he tried to trade with a wily old chief, Mponda, but soon found that the Arab slave-dealing influence was too strong, and it was decided to visit other parts, where the probabilities of success seemed greater. After spending a few days with a friendly chief, named Tambala, who was anxious to welcome the white man to his country and would have nothing to do with Arabs, the party wished to return, but found it impossible to get bearers to carry the food. The people were afraid to go far from the village lest they should be enslaved, and even told the chief that they were afraid Mr. Cotterill would make slaves of them. Though eager to get cloth the poor creatures could not be persuaded to leave their homes. Pushing on with his own party, in the evening they passed a dead body with its slave stick by its side. They found another dead slave next day lying across the path.

After describing some excursions made up the lake, and not without great danger from storms which frequently sweep across it, and in one of which he lost medicine chest, notes, observations, cloth, beads, and other things, Mr. Cotterill related the events which preceded his meeting with Captain Elton and three friends in August last at the lower falls on the lake. As Captain Elton was anxious to return by a land route, they agreed to travel together from some point on the north or west coast of the lake of Dar-es-Salam, if that should be practicable. The mission authorities having kindly given them the use of the 'Ilala' they ran up the east coast, visiting several towns, and then crossed to the western shore. Here Mr. Cotterill ascended Mount Chombi, which he found to be about 4000 feet above the level of the lake. As they neared the north end of the lake, the weather became stormy, and it was decided to run into a deep inlet, about latitude 9° 40', named Ruambadzi. The high land on the west of the lake trends off a little below this in a north-westerly direction, and as far as they could see left a flat marshy country extending towards the south of Tanganyika, which was said to be about ten or twelve days distant. They landed at Malisaka, a village of the Wachunga.

The people were very shy, and not very friendly at first. They were totally naked, though they sometimes hung a banana leaf or bunch of grass from their waists. The chief, Mbungu, visited them and obtained a good present, in return for which he promised to supply men to the party. But the men professed to be warriors, and would not carry—that was a woman's duty. They could not be bribed with cloth, for they did not know any use for it, and did not want it. At length, many things being left behind, a start was made with fifty men. Mr. Cotterill, who through sickness was obliged to follow a day later, found, when he came up with the party, that every one of the carriers had disappeared, though they had been engaged for a five days' journey to Merere's. The whole country was here covered with groves of banana, some of them five miles in extent. They procured other carriers and crossed the river in the Chombaka valley several times, and passing two very beautiful little lakes. Kisewa was very much like the Alban lake, and looked almost like the crater of an extinct volcano. To prevent the desertion of carriers, they had to mount guard over them at night and keep the head-man in close confinement. On the whole, however, the party seemed to have gained, to a certain extent, their confidence, though the appearance of white men in the country produced considerable excitement and a good deal of terror in some cases. Cattle abounded and were easily procured, as well as sour milk and bananas, which form the principal food of the Wachunga. Their huts are circular, and beautifully built with bamboo or wood and oval bricks of sun-baked clay. The party now struck more to the north. A magnificent waterfall was discovered where the Luisi pours its stream down a steep cliff into the Chombaka valley. Crossing the range of hills, they found stretching away to the east and south-east a great plain bounded in the far distance by a towering range of mountains that evidently ran up from the eastern side of the Nyassa towards the north-west, and were the continuation of what Mr. Young had named the Livingstone range. The native name for these mountains and the surrounding country was Kondi. Several rivers intersected the plain running in the direction of Nyassa. The slopes of the hills in Kondi were extensively cultivated, the beauty and fertility of the country far surpassing anything Mr. Cotterill had seen elsewhere in Africa. They had been gradually ascending since leaving Nyassa, and when they reached Mazotes' they were at an elevation of 6000 feet above the sea. The cool mountain air was most refreshing; the grassy slopes, rushing streams, the herds of cattle with their tinkling bells, the wild flowers, forget-me-nots, buttercups, heaths, and many old familiar friends, made it like a dream of Switzerland. All the upper ridges of the hills were infested by robbers, who collected in considerable numbers on the heights, armed with great bundles of spears, to gaze at them. On one occasion about 200 of the brigands (called the Makauka) came down upon one of the party who was wandering from the camp, but a bold demcanour and a display of guns kept them from attacking him. The people of the valleys call themselves Wabena, though it is believed they are Wasanga, who have turned the Wabena out of this part of the country. All their carriers having deserted, Captain Elton, Mr. Cotterill, and another, with five of their men and a guide, started for the town of Merere's whose empire was said to extend from the Rufigi to Nyassa. Passing through forests of gigantic bamboos they crossed the Kondi range at a height of 8800 feet above the sea, and found themselves on a great plateau 7000 feet high, called Uwanji, a splendid cattle country, watered by many streams. They were stopped by the people and compelled to wait for three days until men had been sent to inform Merere of their arrival, and messengers, followed by a young Arab sent by one Suleiman bin Abed, who had lived at Merere's for many

years, came out to meet them and escort them to the town. Through a gap in the hills to the north a great plain could be seen, and from the edge of the plateau they saw across a vast plain, Usango, intersected by many rivers, among which were the Ruaha, rising in a gorge at their feet, and the Ranga. A lakelet into which the Ruaha and its affluents flowed was visible, and they caught the gleam of a larger lake on the far horizon, into which the Ruaha poured its waters, and in which there were said to be two islands. To the north-west the high plateau extends towards Usafa and Lake Hikwa, about four days distant. From the banks of the lake the natives informed them that a kind of salt was procured, with which they cured tobacco.

They were now stopped by a war between two tribes, the Machinga being engaged in ravaging Merere's country. Trying to maintain the character of neutrals they moved forward by night with a guard of sixty warriors whose faces were smeared with pipe-clay, and were escorted to a stockade and admitted into Merere's "boma." The smell from the filth in the stockade and the corpses lying outside was almost unbearable. The besiegers numbered about 3000, the garrison about 600, besides women and children, and the enemy having failed to take the place by assault and siege operations were trying to starve Merere's men. In their rage at a repulse on the previous day they had butchered in sight of the garrison about eighty women and children among their prisoners. The siege lasted several days, when the Machinga retired and the party pursued their journey. They suffered much for want of food during part of the journey, and Captain Elton began to break down. He was carried for two days, and on reaching the Kasigo became worse, but it was thought best to push on, for the rain was violent and the food was used up. At South Usekhe, after remaining unconscious for fifty hours, Captain Elton breathed his last and was buried—though not without difficulty, owing to the superstition of the natives—under a large baobab tree about 3 miles to the south-east of the village. A numerous caravan was found at North Usekhe, and having got fresh supplies from the chief Arab, they traversed the remaining 350 miles of the Ujiji caravan route, arrived at Bagamoyo, where they found Her Majesty's ship 'Vulture' awaiting them, and on the last day of February reached Zanzibar. They were four months and a half in making the journey from Livingstonia.

An interesting discussion followed the reading of the paper, several of the members bearing testimony to the admirable care and precision with which Captain Elton had kept his journal; and one and all regretting the loss the public service and the cause of exploration in Africa had sustained by his death.

The second paper was by **Mr. J. L. HADDAN**, M.I.C.E.,

#### ON OVERCOMING GEOGRAPHICAL OBSTACLES TO AFRICAN TRADE BY ECONOMICAL, ANIMAL, AND MECHANICAL EXPEDIENTS.

The author dwelt upon the advantages of the "Pioneer Railway" in a country like Africa. The principal features of this newly-invented system consisted in the employment of one rail instead of two, and the non-requirement of cuttings, sleepers, system of signals, &c. The "Pioneer," he said, was readily transportable; it followed the natural undulations of the ground, without disturbing the soil; it required neither tanks nor cuttings, and did not interfere with the water-partings, a most important element in the tropics. The rolling stock was handy, and could be shipped in running order, the engine weighing only four tons. The horizontal grip system of driving, adopted in the "Pioneer" locomotives, destroyed impetus, so that such a train might with safety run fast down inclines which ordinary railway trains could not face. In conclusion, Mr. Haddan hoped that, in order to prevent the loss of more valuable lives by exploration, the base of operations might, by

means of this cheap railway, be so far advanced into the interior, that explorers might not be worn out before they could reach new ground.

In the discussion which followed Mr. STANLEY said that he would be very sorry indeed if the *Daily Telegraph* or the *New York Herald* had sent him single handed to build a railroad across Africa. What Mr. Haddan should do was to get a number of English capitalists to form an East African Company similar to the old East Indian Company. The British Empire had not yet begun to demonstrate what it was capable of. If they once reached Karagwe by the "Pioneer," or any other railroad, they would soon annex 6,000,000 square miles of territory. There were plenty of opportunities for trade on Lake Victoria, with its coast line of about 1100 miles. Usongora produced cotton; Uganda, ivory, furs and skins; Uvuma, hides; Usoga, magnificent timber; and a great number of other countries would bring their produce for the benefit of commerce when once steamers were launched upon the lake, and some such plan as the "Pioneer" connected it with Zanzibar. But it was useless for a small capitalist to think of doing anything for the good of Africa.

Captain CAMERON thought that Mr. Haddan's scheme for opening up Africa by a railroad was hopeless; but it had been fairly worked out in some instances. As no earthworks were required, the railroad could be transported from one place to another, according to the necessities of trade. Mr. Haddan's scheme illustrated the axiom of the unit of weight being equal to the unit of traction. The train would go up an incline of 1 in 7, and would thus be fitted to cross mountain-passes. It was originally intended to lay down such a line in Turkey and Asia Minor, but the political difficulties which had arisen had prevented the execution of the design. He had no doubt that if such lines had been laid down the "Pioneer" Railway would by this time have occupied a very high position in the quotation of shares. Mr. Fowler was constructing a railway across the Sudan similar to the railways in England; but Mr. Haddan's railway would have fully answered the requirements of such an undeveloped country, and would have entailed only one-sixth of the cost. Sir Fowell Buxton and others were now constructing a road from Dar-es-Salaam towards the interior. It was already open for a certain distance; and although it did not pay a dividend to those who had constructed it, having been made in the purest spirit of philanthropy, it did pay a dividend to the people in the surrounding district. A great deal of the work to be done in Africa must not be expected to return satisfaction to English pockets, but to English hearts and minds. The Map-Curator of the Society had shown him a model of a steamer that he had seen on the upper waters of the Fraser, and with such steamers, and the "Pioneer Railroad," communication might be opened up through the Nile, the Congo, and the Zambesi, into the very heart of Africa. He hoped that the "Pioneer" would be tried in the Transvaal, to connect the Diamond and Gold Fields with Cape Colony.

#### Meeting of 8th April, 1878.

On taking the chair, the PRESIDENT (Sir Rutherford Alcock) informed the meeting that the Council had awarded the Gold Medals of the year to Baron F. von Richthofen and Capt. Henry Trotter, R.E.

Captain W. J. GILL, R.E., then proceeded to read his paper

#### ON TRAVELS IN WESTERN CHINA AND ON THE EASTERN BORDERS OF TIBET.

Whilst at Shanghai in January last, Captain Gill received an invitation from Mr. Consul Baker, well known in connection with the Grosvenor Expedition, to accompany him to Chung-king, which he readily accepted.

Thence he travelled alone for a couple of months through Tzi-lu-king, Ching-tu, Lifan-fu, Sung-pan ting, Lung-ngan-fu, and back to Ching-tu, where he was joined by Mr. Mesny, to whom he was greatly indebted for the admirable and friendly relations they always maintained with the officials and the people, and with whom he travelled to Ta-sien-lu, Lithang, Bathang, Atentze, Tali-fu, Yung-chang, Tang Yuen ting, and Bhamo, whence an English steamer took them to Rangoon.

From Shanghai a journey by steamer of four days brings the traveller to Hankow, a distance of 680 miles. Following the course of the Yang-tze, through a long reach of uninteresting and monotonous country, the new port of Ichang was reached, and a month after they arrived at Chung-king, one of the most important towns of Sechuen.

Captain Gill described Sechuen as one of the most beautiful, perhaps the richest, and for foreigners certainly the most pleasant provinces in the empire; endowed by Nature with every charm of variegated scenery; giant mountains in the north, of whose peaks of perpetual snow little more has been known than the wild statements of ancient geographers that one of them attained a height of 36,000 feet; fertile plains, where in the driest season the rice-crop never fails; undulating hills, where streams have cut deep channels in the soft sandstone. The hand of man has not been slow to utilise these advantages; everywhere the hills are laid out in terraces for cultivation, irrigation is carried on to an almost inconceivable degree, and, although the inhabitants have not learnt the art of making water run up hill by itself, one of the most remarkable features in Sechuen landscape is the sight of the countless contrivances and water-wheels by which water is raised.

Nor is art neglected by the gentle people of this happy province, and the traveller, as in the evening he nears his journey's end, long before he arrives at the city where he is to sleep, is made aware of its vicinity by the numerous triumphal arches built across the road. These—ornamented with rich carvings, most artistically finished, of household scenes or official duties—have generally been raised by some widow to the memory of her deceased husband; and in these the design is as elegant as the workmanship is finished. The careful way in which everything is roofed here must strike the eye of any traveller.

Houses, gateways, bridges, triumphal arches, and, indeed, almost wherever it is practicable to put a roof, there one is sure to be; even the walls are often coped with glazed tiles, so that the timber-work, being built in the most solid manner and carefully protected from the weather by an efficient covering, lasts an incredible time, even in a country where rains and snow are regular in their occurrence.

Besides the officials, the people of this province are mostly either merchants or agriculturists, the *litterati*—that generally highly-favoured class in China—being held in light esteem by the men of Sechuen; and to this is probably owing the fact that foreigners are always treated with great politeness, as wherever opposition to foreigners is carried to any great extent, it will generally be found to be owing to the influence of the *litterati* class.

Captain Gill next gave a very interesting description of the manners and customs and mode of living of the Chinese, contrasting them with the Tibetans, in order more forcibly to demonstrate the habits of the Chinese. Sechuen, he proceeded to say, may generally be described as an exceedingly mountainous country; indeed, the only plain of any importance in the province is that in which the capital Ching-tu is situated. It is bounded on the north and north-west by mountains forming the buttresses of the great Himalayan plateau, which extends to the north-east across the whole frontier of this province.

Captain Gill's observations for height have enabled him to lay down two extensive contour lines of 8000

and 12,000 feet on the map. There are some, he continued, who still deny that the mountains of China are connected with the great Himalayan system; but when it is remembered that there is a high plateau commencing westwards of Lhasa, and extending with a sweep to the north right up to the Chinese province of Kansu, and that in all this there is no single point at a less elevation than 12,000 feet above the sea (the Kinsha is 13,000, in long. 94°, *vide* Prejevalsky's map), it seems to me that if there is to be any meaning attached to the word "*connection*," the Chinese mountains must be considered as belonging to the Himalayan system; and whilst on this subject I will, as briefly as possible, give the data on which I have, with what will perhaps be considered considerable rashness, drawn the contour of 12,000 feet. Commencing at the north-eastern extremity, the ridge that divides the Lung-ngan from the Sung-pan valley is crossed at about the snow-line (June) at an elevation of 12,500 feet, with peaks to the south somewhat higher; whilst still further south there are other peaks which, from their considerable elevation above the snow-line, cannot be less than 5000 feet, and where glaciers were reported to me as existing.

To the north of Sung-pan ting the road that leads to Koko Nor was described to me as very dreadful; my informant assured me that the wind cut great gashes in his face and arms, and was much disappointed because I could give him no medicine to protect him.

Sung-pan itself is upwards of 10,000 feet: behind it can be seen a very considerably elevated chain of mountains: and I have no doubt whatever that the water-parting between the two great rivers, the Hwang Ho and the Yang-tze, is in an upland considerably more than 12,000 feet above the sea.

Coming south-west to Lifan-fu, this place, though itself only 5000 feet high, is on a stream that, below this city, falls 1500 feet in 30 miles, and evidently descends with great rapidity from high lands above. Another sure indication of an elevated plateau is found in the fine, good-looking ponies that the natives bring down to Sung-pan ting and Ta-sien-lu. It is also surrounded by snowy peaks. Snow-fields were reported to me as within 20 miles, and glaciers at no great distance.

The region to the south-west of this is a little-known mass of mountains, and the contour cannot be laid down till about 8 miles distant from Ta-sien-lu. Thence to Bathang the road lies nearly always at an elevation of above 12,000 feet. A little beyond Bathang the Kinsha is crossed at an elevation of 7500 feet (Bathang is 8000), the road immediately rising to the water-parting between the Lan-tsang and the Kinsha at an altitude of 14,500. A little further to the south on the western face of the mountain lies Atentze, at an altitude of 10,000; and still more to the south the road again crosses back to the Kinsha basin over a pass, of which the altitude is about 14,000 feet.

From Ching-tu to Sung-pan ting the road is full of interest, both from the natural beauty and magnificence of the scenery as well as from the numerous historical associations of the place. Here is to be observed the civilised Chinaman in close contact with the mountaineer, who, now driven from the valleys, takes refuge on the steep hill-side or the wild fastnesses of the mountain gorges. Most picturesque there are the Mantzu villages perched on the summit of a crag, their gloomy stone walls with tiny holes for windows, and one high tower standing sentinel over the country.

The road is now at the level of the stream—now scooped out of the solid rock or propped up for a yard or two by rickety-looking stakes from underneath—now winding up the side of a valley where a cascade leaps down to join the foaming torrent below, or rising over a spur from the mountains that bound it. The ground is carpeted with beautiful and variegated wild flowers.

Leaving Ching-tu by the north-west gate, the road for eight miles is across the beautiful and fertile plain. Here the whole country is a perfect network of canals and water-courses, and, as the plain begins rising at the rate of 10 feet per mile, the streams are all rapid. The number of trees everywhere is very great all along the sides of the road, and between the fields are long rows of willows and a kind of beech; round all the houses are clusters. Now, there is a line of fruit-trees, oranges or apricots; here, a temple is enclosed by a wall with a number of fine yews inside; and, looking back from Chuen hien, the plain has all the appearance of being densely wooded.

Chuen hien is a busy place, situated at the embouchure of the river that here escapes from the mountains, and by a number of ingenious irrigation works is directed into the artificial channels by which the place is watered. The dams for this purpose are, like all Chinese contrivances, remarkable for their simplicity; large boulders, about the size of a man's head, are collected and put into long cylindrical baskets of very open bamboo network; these cylindrical baskets are laid nearly horizontal, and thus the bund is formed.

The road ascends the left bank of the river between mountains that here rise about 3000 feet above the stream, their sides so steep as to become in places almost precipitous, and now and then there will be on either hand vertical cliffs 400 to 500 feet high; these are of bare rock, and in them the road is often regularly scooped out, sometimes without a parapet, and only just wide enough for laden mules; at others, 6 or 7 feet broad, with a stone wall at the outer side.

Beyond Wan-Chuen hien is seen the first village of the Mantzu, or Barbarians, as the Chinese call them. The word Mantzu seems to be a sort of generic term applied by the Chinese generally to all the aborigines of this country, and many will include in it even the pure Tibetans, though the better-informed know how to distinguish between the different tribes.

Perched like an eagle's eyrie right on the top of an almost inaccessible hill, or like wild birds' nests in the face of some perpendicular cliff, these curious villages are very remarkable features in the landscape. The houses are of stone—the lower part with narrow slits for windows like the loop-holes of a fort. The roofs are flat, and on part of these is generally erected a kind of shed.

There are altogether eighteen of these tribes spreading over the country from Yun-nan to the extreme north of Sechuen. Each tribe has its king—one of them a queen, and they live almost entirely by agriculture and cattle-keeping.

It is not more than eighteen or twenty years since the Mantzu were driven from these valleys by the Chinese. Every town and village has some tale to tell of the fight with the Mantzu, and the numerous ruins, which from their appearance cannot be very old, prove how recent were the conflicts in which they were destroyed.

Sometimes a Chinese village is to be seen built close to the ruins of an aboriginal one, and the advance of the Chinese is thus presented to the traveller's eye in a very striking manner.

Two other tribes—the Su-Mu and the Ru-kan (or, as the people here call them, the White Mantzu and the Black Mantzu)—live up a river that debouches a little higher up. The Su-Mu are always ruled over by a queen. When the Tartars were conquering the land, this tribe happened at that time to have a queen for sovereign, who gave the Tartars great assistance, and, as an honorary distinction, it was decreed by the conquerors that in the future the Su-Mu should always be governed by a queen.

Leaving the main river the road to Lifan-fu strikes up a tributary, and the scenery changes. Instead of the magnificent verdure we had left, the mountains rose up almost precipitously, and, with the exception of a

few blades of grass, are almost bare, standing like a long wall, almost unbroken even by a gully: at the bottom, if there should be a little flat ground, it is converted into fields of barley, divided by walls of loose stone, where a village with its flat roof only wanted a few tall, straight poplar trees to be a model of many a Persian hamlet lying in the valleys of the great Elburz: at a little distance the resemblance was remarkable, and at times I almost imagined myself nearer to the Atrék than the Yang-tze.

Leaving the Mantzu villages behind the country of Sifan was entered, the people being much more like Chinese, and very wild-looking.

The plateau between Sung-pan and Lung-ngan is scarcely inhabited. Great droves of yaks feed on the rounded hills, that here are covered with grass and brushwood, and where hardly a tree is seen. The summit presents a bare and dreary appearance, especially when viewed in mist and rain. A few patches of snow were lying within 50 feet of the highest point of the western face, and the ridge was crossed at an altitude of 12,500 feet. The characteristics of the eastern slopes are very unlike those of the west. Its climate appears much more damp. The growth of trees, flowers, ferns, and grass is so luxuriant as to become in appearance almost tropical. Great pine-forests clothe the northern faces of the mountain-sides, while the southern slopes are covered with rich green grass. The descent is very rapid, and lower down the hills on both sides are densely wooded with trees of the richest green.

About 30 miles from Lung-ngan-fu, a road leads to the east into the province of Shensi. Below this the silk manufacture commences; mulberry trees spoiled of their leaves surround the houses.

About 50 miles above Mien-chow the river is large enough for navigation, and descending to the city with a rapidity quite unknown in land travel, we were again in the plain country. The quiet mountain villages were left behind, and here, instead, the towns were big and full of people: numbers of labourers in the fields, coolies on the roads, and traffic on the river. There was an appearance of wealth and prosperity, of life and activity, about the country that contrasted remarkably with the miserable poverty we had left only a few hours before.

The city of Mien-chow is a large, well-built, and important place, protected from floods by very extensive, well-built river-walls; the streets nice and clean, and free from smells. In the market great quantities of beautiful vegetables were displayed, cabbages as round as cannon-balls, very fine cucumbers, and splendid turnips. Leaving Mien-chow everything showed that we had now struck a great high road. Quantities of coolies going both ways, chairs, ponies, and numbers of tea-houses by the roadside, enlivened the scene.

The crops are chiefly Indian corn, beans, and ground-nuts. Of the last the Chinese make oil, and they are almost as fond of eating them as they are of water-melon seeds, and at the stalls by the roadside are little piles of some twenty or thirty, which can be bought for a cash or two. There is also a good deal of rice, a great number of melons are grown in the gardens, and quantities of vegetables. The want of rain had been very severely felt here; some of the rice-fields were quite dry, and the Indian corn looked burnt up. The people were fasting, beating gongs, and burning incense-sticks, and the south gates of the cities were shut, in the hopes of propitiating the skies.

As Ching-tu is approached, the country is again entirely given over to rice cultivation, the Indian corn disappearing; and as we march westwards there is more and more water, until we again come to the streams running by the road-sides. At Ching-tu itself there was no want of water, though the drought when I was there was becoming very serious; but I have never heard that it eventuated in a serious famine in this province, though, as we know, the neighbouring one of

Shansi has been the scene of one of the most appalling calamities that were ever inflicted on a nation.

The road from Ching-tu to Ta-sien-lu traverses, roughly speaking, two sides of an equilateral triangle. There is, or used to be, a direct road, but it passes through a country much disturbed by fighting amongst or with the aborigines, and for centuries almost the circuitous route has been considered the great high-road to Tibet. The plain country is soon left, and 50 miles from Ching-tu the mountains that stretch from here to the Himalayas are first seen.

The main body of the Min river—only known here as the Southern river—is crossed just beyond Chiung-chow by a bridge, which is 240 yards long and  $9\frac{1}{2}$  wide, and has fifteen arches, and is really a very fine work.

Ya-chow is a place of great importance, as it is the starting-point of all the commerce to Tibet, to which place tea and cotton are the chief exports. The most remarkable trade of this place is its commerce in tea, vast quantities of which are sent from here through Tibet, and up to the very gates of our own tea-gardens in India. The tea for the Tibetans is merely the sweepings that would elsewhere be thrown away, the poor Chinese in Ya-chow paying seven or eight times the cost of this for what they drink themselves. The average load for a coolie is about ten or eleven of these packets. I have seen some carrying eighteen—that is, 432 lbs. Little boys are constantly seen with five or six pau (120 lbs.) These men wear a sort of framework on their backs, which, if the load is bulky, often comes right over the head, and forms in rainy weather a protection from the wet.

A little further on in one of the valleys there are a considerable number of the celebrated insect trees of Sechuen. This is a tree on which is bred the insect that produces the white wax of Sechuen. These trees are in appearance like an orange, with a smaller leaf. They have a very small white flower that grows in large sprays, now (20th July) covered with masses of blossom, and the strong smell, which was not very sweet, filled the air. This tree is chiefly grown in the Ning-yuan-fu neighbourhood, and the eggs are thence transported towards the end of April to Kia-ting-fu, where they are placed on the wax tree, which is something like a willow. Here the insects emerge from their eggs, and the branch of the tree on which they are placed is soon covered with a kind of white wax, secreted. It is this white wax that is so celebrated, and is one of the most valuable products of Sechuen.

Ta-sien-lu may now be considered as the boundary of China, for up to this point the people are governed directly by the Chinese; but beyond this there are native chiefs who, subject to China, rule over the people.

Ta-sien-lu is situated in a small open valley at the foot of mountains, enclosing it on all sides except to the east. The brawling stream that divides the city into two parts is crossed by a wooden bridge, and a good many trees grow about the banks. The streets of the place are narrow and dirty, the shops inferior, and in them are all sorts of strange wild figures, some with matted hair, and others with long locks falling down their shoulders; they dress in a coarse kind of serge or cotton stuff, and wear high leathern boots. The women wear a good many ornaments, some are good looking and all utterly unlike the Chinese in every way.

Both the women and the men wear great quantities of gold and silver ornaments, heavy earrings and brooches, in which are great lumps of very rubbishy turquoise and coral. They wear round their necks charm-boxes; some of gold, others with very delicate filagree work in silver. These are to contain prayers.

Here and all through Tibet the Indian rupee is the current coin; and only those who have gone through the weary process of cutting up and weighing out lumps of silver, and disputing over the scale and asserting the quality of the metal, can appreciate the feelings of

satisfaction at again being able to make purchases in coin.

These rupees come in thousands all through Tibet, Lhasa, and on to the frontiers of China, where merchants eagerly buy them up, and by melting them down are able to gain a slight per-centage. Curious it is, too, to see the wild-looking fellows, as well as Chinamen, fastening their coats with buttons on which is the image and superscription of Her Most Gracious Majesty. There is scarcely a regiment in our service whose buttons do not find their way into Tibet. The old clothing in India is, I suppose, sold, the buttons bought by Indian traders and carried across the Himalayas, whence they gradually work their way eastwards. Lower down, imitation 4-anna pieces are used. These must be made somewhere in England.

From Ta-sien-lu the road at once ascends to the great plateau. The ascent is not a severe one—a gradual rise up a valley amongst granite rocks, capped at the summit with bare crags of limestone.

On the road are great droves of yaks, with enormous horns and heads like bisons, huge bushy tails, and hair under their stomachs reaching to the ground.

On passing the crest of Cheh-toh-shan the great upland country is at once entered. Standing on the summit of the pass, stretched below us was a fine valley, closed in on both sides by gently-sloping, round-topped hills, all covered with splendid grass. The richness of the pasture was something astonishing. The ground was yellow with buttercups, and the air laden with the perfume of wild flowers of every description. White currants and gooseberries, barberries, a sort of yew, and many other shrubs, grew in profusion. By the side of a little tent some Tibetans were lying about, their fierce dogs tied up to pegs in the ground, and great herds of sheep and cattle grazing round them.

The road to Lithang is a succession of mountainous valleys, huge pine-forests, and open glades. Just before reaching this city the mountain Shiehla is crossed at an altitude of 13,700 feet. From here gentle slopes lead down about 700 feet to the plain. This is 8 to 10 miles wide, and stretches out for many miles east and west. Opposite, a range of hills bounds the plains; behind it rises a magnificent range of mountains, stretching as far as eye can see to the east and west; snowy peak rising behind snowy peak—where, even at that great distance, vast fields of snow almost dazzle the eye as the sun shines on them.

A river winds through the centre of the valley, and numerous streams run down from the mountains on each side; and at this season of the year, when covered with luxuriant grass and wild flowers, one can hardly regret that the excessive cold prevents anything else from growing. No cereals of any kind nor potatoes can be raised. Just round the houses at Lithang a few half-starved cabbages and miserable turnips appear to be the only things that can be produced.

Lithang is a cheerless place, situated at an altitude of 12,500 feet. The people said that it rained here every afternoon in the summer, but that the mornings were generally fine. Though there are only 1000 families in the place, there is in the city a Lamassery containing 3000 Lamas, and within 5 miles another not much smaller. This Lamassery is adorned with a gilded roof, which has cost a large sum of money, notwithstanding the miserable poverty of the place. Its chief productions are gold, sheep, horses, and cattle. There are 300 Tibetan soldiers and 98 Chinese soldiers scattered about the neighbourhood.

The natives said that Ta-So, the last mountain-pass between us and Bathang, was a very bad medicine-mountain. The inconvenience caused by the rarefaction of the air at these great altitudes is attributed by them to subtle exhalations, and they always speak of a high mountain as a medicine-mountain. Before reaching this, the magnificent mountain of Neu-da, 22,000 feet high, is passed.



Just over the crest of the pass (15,600 feet) is a great basin 2 miles in diameter, and such a wild and savage scene I never before looked on—a very abomination of desolation. Great masses of bare rock rising all round; their tops perpendicular, torn and rent into every conceivable shape by the rigour of the climate. Long slopes of *débris* that had fallen from these were at the bottom, and scattered over the flat of the basin. Great blocks of rock lay tumbled about in most awful confusion amongst the masses that cropped out from below the surface. Three or four small ponds formed in the hollows were the sources of the stream that, descending from the basin, plunged into another valley, and, falling rapidly, soon became a roaring torrent, dashing through mile after mile of dense pine-forest.

The stillness of this place was very remarkable. The air was so rarefied that I could hardly hear the horse's feet only a few yards off, and when quite out of hearing of these, as I walked on alone, the silence was most impressive.

The town of Bathang is quite new, having been destroyed a few years ago in a frightful series of earthquakes that, lasting over many weeks, devastated the whole neighbourhood. The plain of Bathang only covers an area of a few square miles, producing barley, wheat, and Indian corn.

The climate is remarkably warm, as it is at an altitude of 8000 feet. It is on a small river of about 25 yards wide, that five miles lower joins the Kinsha, there 170 to 200 yards wide. Bathang contains 300 families, residing in about 200 houses. It is chiefly remarkable for its immorality and its Lamassery, containing 1300 Lamas, whose golden roof cost upwards of 1000*l.*

To insure our safety on the road to Atentze, the chief magistrate of Bathang came with us to that town, accompanied by the native chief and a large retinue, which day by day increased in number, until on the 3rd of March we had 300 men with us.

Then, when we had reached the place where the great Lhasa road branches off, on a high plateau in a storm of wind and sleet the somewhat exciting spectacle lay before us of an encampment of 300 Tibetans turned out by the Lamas to bar the road to the centre of Tibet.

The boundary between Yun-nan and Bathang is crossed at the Tsa-leh mountains 14,500 feet above the sea. This is also the water-parting between the two rivers, the Lan-tsang and the Kinsha. The country gradually descends from this point, the scenery changes and the climate becomes warmer. Atentze (10,000 feet), on the western slope of the mountains, is a Chinese town, but the people are thoroughly Tibetan, even the Chinese talking Tibetan better than their own language. The prevalence of goitre in these districts is something appalling; some attribute it to the water, others to the salt, but, whatever the cause, two-thirds of the population have swellings on their throats, some of enormous size. All the country between the two rivers is covered with forests, in which there are many wild beasts—amongst others, wild oxen and monkeys were reported.

From Atentze the road again crosses to the Kinsha river and follows it for two or three days, when it, for a third time, crosses the ridge and descends to the town of Tali-fu.

The country for many miles round this city still bears the traces of the Muhammadan rebellion: ruined villages and terraced hill-sides, where now no crops are raised, attest the sparseness of the population. Sechuen is over populated, and a very little Government assistance would enable the people to emigrate to this province. This, however, they cannot obtain, and it must be a long time before this beautiful and naturally-wealthy country can again become a flourishing one.

For many days before reaching this city we had been almost always marching in heavy rain, and the valleys were now all flooded, so much so that the rice crop was lost, and in Tali-fu I saw myself the young rice, on

which the ear had hardly formed, being sold in the streets as green fodder for animals.

From here we followed in the footsteps of Mr. Margary, and the expedition that was sent to inquire into the circumstances of his death. Wherever we went, and whoever it might be that spoke of Mr. Margary, he was always referred to in terms of almost affectionate regard, and, standing at the scene of his cruel murder, I could not but feel what a loss the country had sustained in that brilliant young officer, who, through sickness and the difficulties surrounding a pioneer in new and untravelled districts, had not only carried out with singular tact the delicate duties entrusted to him, but had also known how to portray in striking and vivid colours the many new scenes presented to his view, and to leave a faithful and lasting record of the strange peoples and countries through which he passed as a legacy to regretful countrymen.

The direct road from Yung-chang was pronounced impracticable, owing to the fact that it passes over a plain entirely depopulated by the plague that appears every year in June or July.

The symptoms described appeared to coincide with those described by Broccaccio in the plague at Florence in 1348, and by Defoe in the plague of London.

Near Yung-chang, my informant said that during July, August, and September, more than 1000 people died of this complaint. A traveller who had passed the stricken districts in July said there were scarcely any inhabitants left, and that the dead bodies were lying about unburied: he added that the disease had moved southwards, and was raging in another district.

Beyond Yung-chang is the valley of the Lu-chiang, so unhealthy that no stranger can at any time sleep here (so they say) without getting fever. In the summer months it is quite impassable. Even the inhabitants leave it, and ascend to the mountains.

The miasma that rises is said to be a reddish mist; the ordinary white mist that I often saw hanging over the valleys in this neighbourhood is said to be harmless.

We were fortunate in the time of our passage, and the sun shone brightly as we crossed the curious suspension bridge that spans the river. It is in two spans of 73 and 52 yards; but for greater ease in tightening up the chains, the two are not in the same straight line. In construction each span is identical with that I have already described.

In rainy variable weather at no season of the year will any one attempt the passage of this valley; and Marco's words, "So unhealthy that no stranger can pass in the summer time," were brought strongly to my mind.

At Bhamo, coolies, mules, and ponies were left behind, and coal and iron swiftly bore us down the broad bosom of the Irrawaddy to home and civilization.

The PRESIDENT said Capt. Gill had determined by an elaborate series of observations, which would appear in the "Proceedings," but which time had not permitted to be read, the altitudes of the various mountainous regions he had traversed. No previous traveller had done this; and their perfect scientific accuracy might be relied on, as his hypsometrical instruments had, since his return, been tested at the Kew Observatory. His work had been done from a pure love of Geography and Science, and entirely at his own expense.

A second paper was read by MR. T. W. GOAD: ON LIEUT. WHEELER'S (U. S. ENGINEERS) EXPLORATIONS IN NEW MEXICO.

The object of the survey was the collection of data for a series of topographical atlas maps, upon a scale of 1 inch to 8 miles of the territory of the United States west of the one-hundredth meridian, each sheet representing an area of from 17,000 to 18,000 square miles, and so projected that the several sheets might be joined to comprise entire political or other divisions. During the years between 1867 and 1873 an area of 228,150 square miles had been surveyed in California, Arizona,



Utah, Colorado, and New Mexico; but since that time the area had been probably doubled. Mr. Goad, who was one of Lieut. Wheeler's party, could not give a complete history of the survey, but confined himself to the exploration of New Mexico, during the season of 1877. The section surveyed lay between the 105th and 108th meridians, and between the 33rd and 35th parallels, comprising an area of about 15,600 square miles. One half of this country was mountainous, the rest being mesas and plains. Their route was from Fort Lyon across the Costilla mountains into New Mexico, and down the Rio Grande to Fort Craig. The ranges occupied by the division were the Magdalena mountains, San Mateo, Fra Cristobal, Oscura, San Soledad, Sierra Blanca, del Sacramento, Capitan, Carrizo, Jicarilla, and Gallinas. The mesas were those situated between the Oscura and Mazana mountains, and the Gallinas and Rio Grande. The plains of Jornada del Muerto, those between San Soledad and Sierra Blanca mountains, and between the Gallinas and Oscura mountains. The principal rivers are the Rio Grande del Norte and Pecos, which drain a considerable extent of country; and creeks and springs were found in the mountains, but in the plains water was very scarce. Numerous tribes of Indians were met with, but during the whole time of their sojourn in the territory they were never interfered with, and never lost an animal. Sante Fé was the most important town through which the exploring party passed, and second to it was Albuquerque, on the left bank of the Rio Grande del Norte. The surrounding country yields a considerable amount of grain and the vineyards and orchards are most productive, doubtless owing to white colonization. The maximum heat was 102° Fahr. in the shade, and between 120° and 130° in the sun. In November the minimum recorded was 29° below freezing, although in the previous year it was 16° below Zero. The rainy season is in July and August, when thunderstorms are frequent; and during a heavy rainfall in what is termed the monsoon the fall is estimated at from 2 to 4 inches an hour. The climate of New Mexico is delightful, for at no season is one deprived of sleep by excessive heat, nor does the dry cold affect the body; and if the Mexicans were a little more cleanly, Mr. Goad had little doubt but that their curse, the small-pox, would disappear.

The PRESIDENT complimented the author of the paper for the interesting account he had given of the topographical survey which the Government of the United States had caused to be made.

Sir HENRY RAWLINSON said he had no information to give with regard to the country traversed by Capt. Gill, but he thought it would be a great pity if such an interesting paper did not elicit some discussion. In many respects Capt. Gill's paper was one of the most remarkable that had ever been read before the Society. This was not the first occasion that Capt. Gill had done good service to Geography. A few years ago he accompanied Col. Baker to the frontier debatable land between Persia and Russia, a region which very possibly, in a not remote future, would become of the greatest political interest. He assisted Col. Baker in mapping all that region, and brought back most valuable scientific information. He had never received the credit which was due to him for that journey, and therefore, *en passant*, he (Sir Henry Rawlinson), on behalf of the Royal Geographical Society, tendered him their best thanks for what he had done on that occasion. Subsequently Capt. Gill proceeded to China, and was enabled, by his possession of ample means, to set out from Shanghai and travel clean through China into Burmah. The Royal Geographical Society had always declared that they did not pursue Geography as a mere abstract or dilettante science, but looked at practical effects. They considered Geography in its relation to the progress and advancement of civilization and the spread of commerce. The great practical point in Capt. Gill's journey was that he proceeded along one

of the great trade routes of the world, which had always attracted much attention, and probably in the future would attract still more—the trade route from Sechuen to Lhasa, and through Tibet to India. One of the most interesting points alluded to in the paper was the route from Bathang across the frontier to Lhasa, and he wished to know what Capt. Gill's opinion was as to the possibility of opening out that route. The Che-fu Convention provided for such a possibility, and over and over again it had been in contemplation to send an expedition along it, either from India to China, or from China to India. That was really one of the most important geographical problems still remaining unsolved in Central Asia, and one to which great interest was attached, not only by geographers, but by politicians and merchants. Many parts of Captain Gill's route were entirely new, such as the detour he made to the mountains from Cheng-tu northward, and any details he could give with regard to the tribes in those mountains would be of exceeding interest. He also thought the route from Bathang to Tali-fu was new. Capt. Gill must have had excellent opportunities of making himself acquainted with the capabilities of Sechuen, and any information he could give on that subject would be of great interest.

Captain LOCKHART and Sir WALTER MEDHURST also congratulated Capt. Gill on the result of his journey.

The PRESIDENT was pleased to hear the testimony which Capt. Gill had borne to the good qualities of the Chinese. Englishmen were too apt to regard them as a degraded and immoral people.

CAPT. GILL thanked Sir Henry Rawlinson and Dr. Lockhart for the kind way in which they had spoken of his travels, and in answer to the former said, there were two roads to Lhasa, one from Ta-sien-lu northward, to a place called Cheng-tu, and then straight to Lhasa. It was reported to him as being a very fair road, and no doubt it was, as it kept on the high plateau. Traders used it to a great extent, but there were no Chinese officials there. The other road struck off to the west. He could not conceive of any country more rich in agricultural products than Sechuen. Wherever the slope was not more than 30°, the land was cultivated. Where it was steeper than that, a man could not stand to cultivate it. Rice was grown in the low valleys; higher up, Indian corn, which was probably the greatest crop in the country; and still higher up, wheat and barley. The people were very pleasant to travel amongst, and he never had an uncivil word from them during the whole time he was in China. There were four gold washings, but the river there ran through narrow gorges, so that it was almost impossible to do anything with it.

In conclusion, the PRESIDENT moved a cordial vote of thanks to Capt. Gill and Mr. Goad for their interesting papers.

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#### FRENCH GEOGRAPHICAL SOCIETY.

February 6th, 1878.—M. DE QUATREFAGES presiding, Lieutenant Wyse wrote from Chepo, under date the 20th December, to the effect that his party had arrived at Panama the 29th November, and had set about examining the Isthmus of San Blas, which is the narrowest between the Atlantic and Pacific Oceans, and which had been already explored more or less perfectly by Kelley (1864), by Wyse himself (1868), and Selfridge (1870-71). Lieutenant Wyse gave a detailed account of the examination of the Isthmus by himself and M. Reclus up to date.

M. le Comte MOUCHEZ brought to the notice of the Society a new instrument, of his own invention, for observing meridian altitudes: and M. B. PASQUIER gave a brief sketch of Afghanistan and its inhabitants. M. DE UJFALVY gave a very interesting recital of his last year's travels in Ferghanah and Kuldja, in which he dwelt on the devastation which the latter province has

sustained, in the massacre of the Chinese inhabitants by the Mussulmans.

*February 20th, 1878.*—M. DE QUATREFAGES presiding. M. W. Martin, Consul at Havre, communicated to the Society the latitude and longitude of Honolulu, as determined by the English expedition sent to observe there the transit of Venus. The co-ordinates were latitude  $21^{\circ} 17' 56.8''$  N., and longitude  $157^{\circ} 51' 55''$  E. of Greenwich.

Announcement was made of the sad death, at Zanzibar, of Messrs. Crespel and Maes, the Belgian explorers, who were starting for the interior, from the east coast of Africa. A discussion then took place with reference to a discovery of a *mapa mundi* of 1701, in the Lyons Library, on which the course of the Congo is shown very similarly to the course as drawn by Stanley. The award of the annual medals was then made known. The principal Gold Medal to Mr. Stanley for his journeys across Africa. A large Gold Medal to M. Vivien de Saint Martin, for his life-long labours in the cause of geography; and lastly, the Logerot Gold Medal (its first award), to Dr. Harmand, for the geographical results derived from his five journeys to the valley of the Mekong, and about the coast of Annam.

M. LEVASSEUR read the first part of a paper prepared by him, on the distribution of population over the globe, and began by tracing the history of territorial changes in France, ending with the losses sustained during the late war. The second part of the paper was reserved.

*March 6th, 1878.*—M. DE QUATREFAGES presiding. Dr. G. BARRION announced his departure for Cochin-China, and his intention of exploring various parts of Indo-China. General Morin despatched to the Society a collection of maps and atlases, sent by H. I. M. the Emperor of Brazil, for exhibition at the Philadelphia Exhibition. Mr. J. Jackson sent a hypsometrical map of the United States, drawn by M. H. Gannett, under the direction of Dr. Hayden. The contour lines are 1,000 feet apart, and the map is the most complete one of its kind in existence. Mr. Stanley acknowledged the receipt of the letter informing him of the award to him of the principal Gold Medal, and expressed his intention of visiting Paris in June. M. Deloncle, of Lyons, wrote to the effect that from documents in his hands, he had arrived at the conclusion that (1) Lake Tanganyika was not in existence at the time of the missionary journeys of the 14th, 15th, and 16th centuries; (2) that Unyamuezi, Ugogo, Uganda and other districts were known in the 14th century; (3) that Lakes Victoria and Albert Nyanza, Banguelo and Moero had been explored at the same time; (4) that the wide northern affluent of the Lualaba, discovered by Mr. Stanley, issues from the Albert Nyanza; (5) that Lake Nyanza was a basin, not perhaps as important as Mr. Cooley has made out, but much larger than now, and other minor points. The Geographical Society of Montpellier wrote to announce its foundation, Messrs. Germain and Paul de Ronville being President and Vice-President respectively. A letter was read from the French Consul at Zanzibar giving full particulars of the death of Messrs. Maes and Crespel, the Belgian travellers. A communication was read from M. A. Pinart, giving an account of Easter Island.

#### LYONS GEOGRAPHICAL SOCIETY.

*January 31st, 1878.*—Lieut.-Colonel DEBIZE, Vice-President, in the chair. In announcing Mr. Stanley's election as honorary member, the President recommended, and the Society approved of, the institution of Annual Medals in recognition of great geographical exploits. M. CH. ANDRE, Professor of Astronomy at the Faculté des Sciences, who had already, together with

various naval officers, observed the transit of Venus, at Numea, gave an account of his arrangements for observing the transit of Mercury across the sun's disc, at Ogden in America. A letter was read from M. Largeau, promising to send a hydrographic and archæological map of the Sahara.

*March 10th, 1878.*—M. FRANÇOIS DELONCLE read a very complete paper on the sources of information used in the construction of the Lyons globe. Although the Capuchin friars laid down the basins of the Nile, the Congo, and the Zambesi, they erred in copying Ptolemy's theory of the interior lakes. Eduardo Lopez, in the narrative of his journey to the Congo (given by Pigafetta), describes the course of the Nile, its sources, tributaries, and lakes in the most circumstantial manner. The lecturer stated, however, that he had ascertained from unpublished documents that eight Dominicans left Montpellier in 1317 and ascended the Nile as far as Ugomba (?), that they then made for the Zambesi and discovered the town of Mani-Motapa, which they imagined to be the capital of "the great empire of Monomotapa." He was of opinion that the information derived from this journey had been embodied in the Lyons globe. The same authority represented two lakes within the basin of Lake Chad, between the parallels of  $3^{\circ}$  and  $5^{\circ}$  and  $8^{\circ}$  and  $9^{\circ}$  respectively, and the researches of Barth, Vogel, Overweg, and Fleuriot de Langre, he contended, favoured the correctness of this view.

The PRESIDENT announced, in conclusion, that M. Deloncle's valuable paper would be printed for general distribution.

*March 17th, 1878.*—Lieut.-Colonel DENIZE presiding. M. LANÇON read a paper on the subject of Chinese immigration, and the prospect of China usurping the labour markets of the world.

#### BERLIN GEOGRAPHICAL SOCIETY.

*January 5th, 1878.*—Herr VON RICHTHOFEN in the chair. The PRESIDENT congratulated the Society on the fiftieth year of its existence. He referred to the establishment of a Geographical Society in Metz, under the presidency of Captain Yancke. The President also made mention of Lieutenant Gill's journey in Western China, remarking that the portion of his route between Atentze and Tali-fu is quite new.\*

Dr. KARL SACHS, of Berlin, read a paper on his journey in Venezuela during the autumn of 1876. Herr BREHM spoke on the subject of settlers and exiles in Siberia, with particular reference to cultivation.

*February 2nd, 1878.*—Herr VON RICHTHOFEN in the chair. Announcement was made that Herr Schutt, an engineer, sent by the German African Society, had arrived at Loanda on the 10th December, and that he purposed to make his way to Kimbundo, with the object of making that a fixed point for further exploration. Freiherr Von Thielmann sent an account of a part of his journey in South America, from Paturia, on the River Magdalena to Bogota, and thence to Cartago, on the Cauca river. A number of height measurements were taken in the course of the journey, which will be published in Petermann's *Mittheilungen*. Herr ERMAN read a paper on the schemes for the construction of a ship-canal across Central America. Herr KERSTEN spoke on the subject of the scientific equipment and preparations necessary for explorers.

\* Cooper succeeded in reaching Tung-lan, which is about half-way between Atentze and Tali-fu; and the Abbé Desgodins has given a detailed itinerary of a portion of the same route—i.e. as far as Tseko—in the *Bulletin de la Société de Géographie*, October 1875, p. 339.—(Ed. G. M.)

## VIENNA GEOGRAPHICAL SOCIETY.

THE Annual Address of the President (Dr. Ferdinand von Hochstetter) is to be found in the January number of the *Mittheilungen* of the above Society. Mention was made of the Vienna branch of the International Association for the exploration of Central Africa, and of Herr Marno's appointment as explorer in connection with it. Reference was also made to Dr. Oscar Lenz's travels in the region of the Ogowai, and to the prospect of the early appearance of the account of Lieutenant Lux's journey from San Paolo de Loanda to Kimbundu. Dr. Emil Holub, whose travels in Southern Africa during the years 1873-77, formed the subject of an article in the September number of the *Mittheilungen* last year, was announced to be on his way homeward. Count Bela-Szechenyi, Messrs. G. Balinth and L. Loczy, and Lieutenant Kreuter intend after visiting India, Indo-China, Ceylon, the Sunda islands and Japan to repair to China, and to journey into Central Asia by way of Peking, principally with the object of studying the Kuen-Lun-range.

Among important publications published during the year mention was made of the second volume of Herr Kanitz's work on Danubian Bulgaria and the Balkans, the fine work entitled *The Island of Réunion*, by Dr. Richard Ritter von Drasche, and the Wall Map of Africa, by Dr. Chavanne.

Dr. VON HOCHSTETTER gave a careful *résumé* of the labours of the Imperial Military Geographical Institute in its astronomical work, its triangulation, and levelling. With reference to the topographical work, he announced the completion of the drawing of thirty-six sheets of the map of Central Europe, on the scale of 1:300,000, including preliminary editions of Servia, Bosnia, Herzegovina, Montenegro, and six sheets of southern Turkey. Considerable progress had also been made with other cartographic productions. The labours of the Geological Survey were described at some length, and those of the Central Institute for Meteorology and Terrestrial Magnetism, the Austrian Meteorological Society, the Imperial Central Commission for Statistics, the Statistical Branch of the Department for Commerce, the Oriental Museum of Vienna, and other institutions were briefly adverted to.

During the year referred to forty-four new ordinary members and seven corresponding members were elected, raising the number of members to 641, corresponding members 132, and honorary members 70, after making allowance for deaths.

*February 26th, 1878.*—H. E. FREIHERR VON HOFMANN presiding. Herr Baron Greindl writes from Brussels, conveying the intelligence of the death of Messrs. Maes and Crespel at Zanzibar, and stating that Messrs. Marno and Cambier had set out on a journey into the interior. Herr Bela Gerster, engineer, read a paper on "The Project for Cutting a Canal through the Isthmus of Darien."

## ITALIAN GEOGRAPHICAL SOCIETY.

*February 10th, 1878.*—The Senator AMARI presiding. Signor GIACOMO BOVE, an officer of the Italian navy selected to accompany the Swedish Arctic Expedition of Professor Nordenskiöld, read an able review of Arctic exploration in past times, with special reference to Professor Nordenskiöld's approaching expedition into the Siberian Polar Sea. Signor Pigorini exhibited an ethnological collection from the Republic of Ecuador.

*February 17th, 1878.*—II Commendatore GIORDANO, Vice-President, presiding. Signor CRISTOFORO NEGRI delivered a brief address, in continuation of Signor Bove's paper of the preceding meeting, on the subject of the prospects of Professor Nordenskiöld's Arctic Expedition

## HALLE GEOGRAPHICAL SOCIETY.

*December 12th, 1877.*—Dr. KIRCHHOFF presiding. Herr FUHST gave an account of the development and present state of the German Society for the Saving of Life from Shipwreck, an institution which has already rescued 1000 lives. Professor FREIHERR VON FRITSCH gave an account of his travels since 1866 in Santorin, through the Dardanelles, the Sea of Marmora, and the Bosphorus, to Mudania, Brussa, Isnik, and Ismid.

*January 10th, 1878.*—Dr. KIRCHHOFF presiding. Dr. GUSTAV NACHTIGAL read an interesting paper on the difficulties of African exploration, in which he explained the physical structure of the continent, and the various obstacles with which a traveller has to contend, according as he starts from the north, the east or west coast, in deserts, want of navigable rivers, the attacks of insects, the extraordinary force of the rains, and the hostility of natives. He expressed his doubt as to the expediency of the course of exploration followed by Stanley, and advocated the founding of stations, as favoured by the associations started under the auspices of the King of the Belgians.

*February 13th, 1878.*—Dr. KIRCHHOFF presiding. Dr. TRAUMULLER, of Leipsic, read a paper on "Java: its Topographical and Geological Features." The author had resided at Batavia between 1867-1870, and made many excursions into the interior. He ascended the volcanoes Gede and Panggerango, and visited the famous "Valley of Death." The carbonic acid gas which here accumulates to a height of 2 or 3 feet above the ground is noxious to small animals, but harmless to human beings. A former connection between Asia and Java appeared to the author to have once indubitably existed.

Dr. KIRCHHOFF took the opportunity to make a few observations on the ethnology and highly-flourishing condition of the island, which yields a net return of 200 millions of marks, and whose population has risen from 3½ millions at the beginning of the century to 18 millions in 1874.

*March 13th, 1878.*—Dr. KIRCHHOFF presiding. The PRESIDENT made mention of the newly-discovered petroleum springs in Rumania, and then delivered a brief address on the state of the Society and its progress during the past year. The total number of members amounted to 146. Dr. FRITSCH read a paper on the formation of the pelvis among different races. Dr. BRAUNS read a paper on the past condition of the Notte depression south of Berlin, as deduced from geological researches made there last summer.

## NOTICE.

*The Office of THE GEOGRAPHICAL MAGAZINE is at 57 & 59, Ludgate Hill, E.C.*

*Manuscripts sent to the Editor cannot be returned, nor can the Editor be responsible for them.*

*Letters and Articles intended for insertion should be written on one side of the paper only, and must be accompanied by the name and address of the writer; not for publication, but as a mark of good faith.*

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BRITISH MAP

CONSTRUCTED TO ILLUSTRATE

EXPLORATIONS

MADE IN CONNECTION WITH THE OPERATIONS OF

THE GREAT TRIGONOMETRICAL SURVEY OF INDIA

by Mullah

IN 1876.

Scale 1 Inch = 24 Miles.



EXPLORATIONS.

- (1). The course of the River Indus, from Amb to Banji.
- (2). The route from Yassin to Mastoj, via Sar Lâpur.
- (3). The route from Mastoj, via the Tui or Moohabar Pass to Barku.
- (4). The route from Sar Lâpur to the Tal Pass and down the Panjil River, to its junction with the Dir River.
- (5). The route from Mînkhalî, via Nawâgi to Peshat or New Kunar.
- (6). The route from Nawâgi to the Fort of Abasai.

REFERENCES.

Hill peaks fixed by the G. T. S. are shown by triangles, thus  $\Delta$ ; their heights determined are given opposite them in feet.

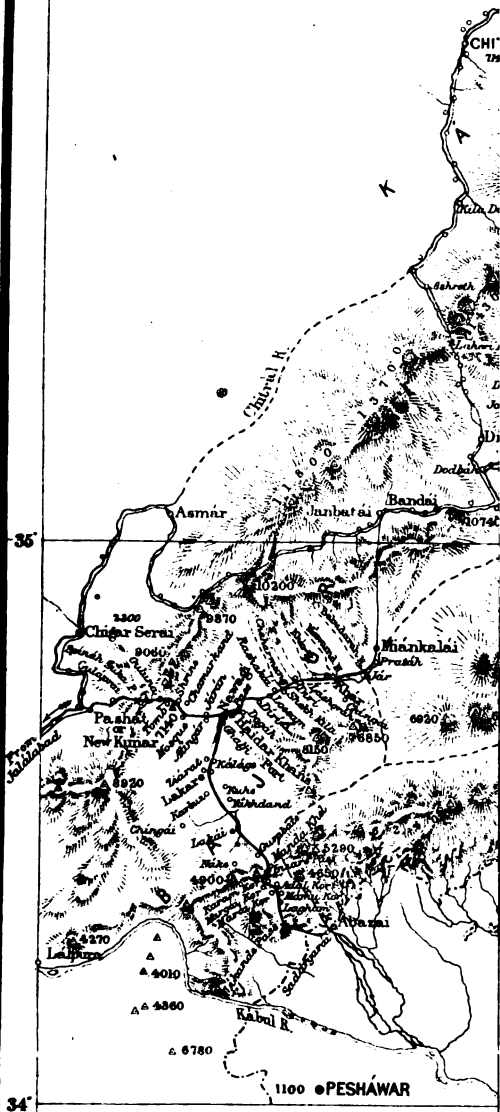
Hill peaks fixed by Lieutenant Hayward are shown by small circles, thus  $\odot$ ; determinations of heights are distinguished by the letter (H) after them, thus 17864 (H).

Lieutenant Hayward's Surveys between and beyond Gilgit and Yassin, he largely availed of in the compilation of this map.

Captain Biddulph's Surveys in the Karambar and Nagar valleys have also been used of; his heights are distinguished by the letter (B) after them.

The route from Dir to Mastoj via Chitral and from Dir to Kunar via Asmar, is from the map which was compiled to illustrate the explorations Havidar and the Mullah in 1873-74.

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Geographical Magazine

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THE  
GEOGRAPHICAL MAGAZINE.

JUNE, 1878.

RESULTS OF THE ARCTIC EXPEDITION,  
1875-76.\*

THE publication of the work of Sir George Nares, containing a record of the results of the Arctic Expedition, is the most important geographical event of this year. It will effect two great objects. It will show the practical value of the Arctic work that has been done, and it will at the same time establish the fact that future exploration within the Arctic Circle is desirable. Those who have advocated a renewal of Arctic exploration by the Government of this country during the last twelve years have always had in view the attainment of scientific results, and that alone. In former days the discovery of a commercial route was the main object of Arctic voyages of discovery, but this notion has long since been abandoned. Another object has been to reach the North Pole, which in itself is a childish and useless quest, and quite unworthy of serious consideration, although it was unfortunately foisted into the Admiralty Instructions. They might as well have inserted orders to go to the moon. But to add to the sum of human knowledge, to learn respecting unknown regions all that we already know of Greenland or the Parry Islands, is a great and important object well worthy of attainment, and of all the dangers, hardships, and expense which must be entailed in securing it. It was to obtain this object that the late Admiral Sherard Osborn worked so perseveringly and successfully, and for which the late Arctic Expedition was despatched. The great aim of those who advocated further polar exploration, and whose representations led to the expedition being sent out, was to secure the discovery and exhaustive exploration of the largest area of unknown region that could be reached by the explorers with the means at their disposal.

The first point to decide was the route by which this object could best be secured; and the only sure guide for arriving at a right conclusion was the accumulated experience of three centuries of previous Arctic exploration. The first great lesson taught by those three centuries of experience is that no extensive and useful exploring work can be done by merely entering the drifting pack ice in a ship, and

that effective progress can only be made by following a coast-line. The second Arctic canon is, that to secure useful scientific results, observations must extend at least over a complete year, and that consequently one winter must be faced in a position beyond any point hitherto reached. The third canon is, that mere navigation in a ship cannot secure the results derived from Arctic exploration, and that navigation must be supplemented by sledge travelling. The exploration of 50 miles of coast by a sledge party is worth more to science than the discovery of 500 miles of sea or coast by a ship. In the former case, the land is accurately mapped, and its fauna, flora, geology, and physical features are ascertained. In the latter, a coast is seen, and its outline shown by a dotted line on a chart, and that is all. The two methods will not bear comparison.

The experience of centuries of Arctic research has thus resulted in the establishment of three canons, which form unerring guides to us who inherit that experience. The first is to navigate along a coast line and avoid the drifting pack. The second is to winter at a point beyond any hitherto reached. The third is that a ship must only be looked upon as a base of operations, and that sledges are the main instruments for discovery and exploration.

With these rules as a sure guide, the best route for an Arctic Expedition had to be decided. The question was—by which route leading to the unknown polar region, could these essential conditions best be found. In the first place there must be coast lines leading into the unknown space, both for navigation and for sledge travelling. In the second place there must be a fair prospect of securing winter quarters beyond the threshold of the hitherto discovered region. In the third place there must be unknown coast lines extending beyond the winter quarters.

In 1875 Smith Sound, at the north end of Baffin's Bay, and the east coast of Greenland alone met such conditions. Of these two routes, Smith Sound offered two coast lines for examination instead of one, and its navigation was reported to be less precarious up to the furthest point hitherto reached. The Smith Sound route was consequently the best by which to recommence the discovery of the vast unknown area.

This was the train of reasoning, very briefly stated, by which we arrived at the conclusion that to secure the true objects of Arctic discovery, and to make a successful commencement of the examination of the unknown area, the first expedition should proceed by the route of Smith Sound.

\* *Narrative of a Voyage to the Polar Sea during 1875-76, in H.M. Ships 'Alert' and 'Discovery.'* By Captain Sir G. Nares, R.N., K.C.B., F.R.S., Commander of the Expedition. With Notes on the Natural History, edited by H. W. Feilden, F.R.G.S., Naturalist of the Expedition. Two Vols. (Sampson Low; 1878.)



The true object of the late Arctic Expedition was then to penetrate up the channels leading north of Smith Sound, to cross the threshold of the unknown region, and to winter at a point beyond any that had previously been reached, and by sledge travelling in various directions to secure those rich scientific results which the examination of an unknown region invariably yields; to the utmost possible extent, with the means at their disposal.

This was a most difficult task. The late explorers have performed it, and they have thus achieved a great and memorable success. And this leads us to the consideration of the true test of the success of an Arctic Expedition. It must be borne in mind that unless a new expedition excels all that have gone before in the same direction it cannot succeed. The first and only condition of success is that an expedition should cross the threshold of the unknown region; and, when it is remembered that this cannot be done unless the furthest points attained in the course of former efforts are not only reached but passed, it will be seen that this in itself is no slight achievement.

A successful Arctic Expedition is, then, one which has crossed the threshold of the unknown region and entered upon new ground. The extent and amount of that success must be measured first by the nature of the difficulties and dangers which were encountered and overcome, and secondly by the variety and importance of the results that have been secured.

The expedition, commanded by Sir George Nares, and consisting of the two ships 'Alert' and 'Discovery,' answers to the first essential test. The leading ship crossed the threshold of the unknown region, and the British flag was hoisted in a latitude where no flag of any nation had ever been hoisted before. It also wintered at a point beyond any hitherto reached. The expedition was therefore successful. We would now invite the attention of our readers to the difficulties that were encountered and overcome, and to the scientific results that were secured, in order that a correct judgment may be formed of the amount of success achieved, and of the value of the results. Upon these considerations depends the cogency of the arguments by which the continuance and completion of Arctic research can be advocated.

The first point for our consideration is the preliminary work of the expedition by which it reached the remote point in the previously unknown region which secured success; in other words—the ice navigation. In passing through Baffin's Bay the same difficulties were overcome, neither more nor less, as are encountered every year by the hardy and intrepid whalers from Dundee, and as were met with by previous Arctic Expeditions which have proceeded up Barrow's Strait, Wellington Channel, or Regent's Inlet. But after entering Smith Sound a far different and far more formidable navigation commenced. The navigation of the channels leading north from Smith Sound is the most difficult of any that has been experienced in Arctic coast waters.

During the whole of August, 1875, the 'Alert' and 'Discovery' were engaged in one long incessant struggle with the ice. Every opening was taken advantage of, and, thanks to combined judgment, skilful seamanship, prudence, and daring, they slowly but surely made progress northwards.

The ice in Robeson Channel and the Polar Sea beyond is entirely different from any ice that has ever been seen before, except along the west shores of Banks and Prince Patrick Islands. Scoresby and other Arctic voyagers have mentioned having encountered ice of great thickness, but it has been formed by one floe sliding underneath another; and lines of ice hummocks have also been met with of great height, formed by broken pieces piled one upon another. There is nothing of this kind in the sea of ancient ice. The floes, from 80 to 100 feet thick, are formed by the accumulated frosts of ages, and are solid masses. They are, in fact, floating glaciers rather than ice floes; and the pieces broken off from them and forced on the shore, were very appropriately named "*floe-bergs*." Some of these huge masses were 60 feet above the water, yet they were aground in 10 or 12 fathoms.

On the 1st of September 1875, a S.W. gale blew with such fury that the pack was driven off the land, leaving a narrow channel of water, of which advantage was instantly taken. This was a red letter day in the annals of naval enterprise. On it a British man-of-war reached a higher northern latitude than had ever been attained by any ship of any nation; and the colours were hoisted at noon to celebrate the event. But one short hour after the British ensign had fluttered gaily before the breeze, the ship was again stopped by a barrier of great thickness, through which it was impossible to penetrate. The coast was without any bay or harbour, and the 'Alert' was secured inside a fringe of grounded *floe-bergs* which lined the coast, and afforded protection from the pressure of the outside pack.

Success was thus made certain. The threshold of the unknown region was crossed. To have brought a ship through all these dangers, and to have found winter quarters on the open and exposed coast of the Polar Sea, protected only by grounded *floe-bergs*, which might at any time be driven higher up or swept away, was in itself a great success. No other Arctic navigator ever forced his ships through such obstacles, and brought them safely back again. This establishment of a base of operations within the unknown region called forth all the highest qualities of a commander—incessant watchfulness, great presence of mind, rapid yet cautious decision, and consummate seamanship.

The next service to be performed was the laying out of depôts of provisions by autumn sledging parties. Autumn travelling, in the Arctic Regions, is most severe and miserable work, entailing the greatest amount of hardship and danger. It was first attempted in the expedition in which we had the honour to serve in 1850, and it was further developed in 1852, at Melville Island, when McClintock and others were away for 22 days in October, with the temperature generally above zero. The parties from the 'Alert' were away during September and October in blinding snow-storms, on treacherously thin ice, exposed to sudden changes of temperature, with increasing darkness. But they pressed onwards, and established a depôt 50 miles from the ship, for use during the spring. The temperature fell far below zero, and the sun had entirely disappeared four days before they returned to the ship. In comparing the autumn travelling of the 'Alert' with that of former ex-

peditions, the difference of latitude must be taken into consideration. The sun did not leave the points where most former expeditions have wintered until the 3rd of November; while it was last seen from the 'Alert' on the 11th of October. This makes a vast difference. The cold and darkness experienced by the 'Alert's' parties in October are equivalent to what a party from any former expedition would have had in November, and no party ever travelled in that month. Hence the autumn travelling of the 'Alert' has eclipsed all that had ever been done previously, whether we consider the work accomplished, the hardships endured, or the cold and misery experienced. Unfortunately, this brilliant piece of work had to be heavily paid for. Half the men returned badly frost-bitten, and three suffered amputation, including one of the most valuable officers in the ship.

An Arctic winter is a period of preparation for spring travelling. The great point is to preserve the health of the men under the most disadvantageous circumstances. The precedents of former expeditions were carefully followed. The officers were fully employed with scientific work, and the men were kept constantly amused and interested by schools, lectures, theatricals, and other entertainments. Special care was taken that the men took daily exercise, and lime-juice was not only regularly issued, but all the men were obliged to drink the daily allowance in presence of an officer. In this respect the expedition of 1875-76 made a considerable addition to the usual precautions against scurvy. For instance, in the expedition in which we served, and in most others, the lime-juice was merely served out to the messes and the men drank it or not, in their own messes, as they pleased. But in the 'Alert' and 'Discovery' special and unusual care was taken that every soul on board actually drank his daily allowance of lime-juice, and that the full amount of daily exercise was taken. We dwell particularly upon these facts because, with reference to the terrible outbreak of disease in the spring, there has been much very disgraceful misrepresentation. The true cause of scurvy is the absence of fresh food with such predisposing causes added as long darkness, foul air, intense cold, and damp. All expeditions have been exposed to these influences. The sole difference is that the men of the late expedition were exposed to them for a much longer time than any other. The sun was absent for 142 days, instead of 94 days. In the case of former expeditions which sent out sledging parties for long periods there was never total darkness at noon. In the 'Alert' there was greater darkness during the whole time from November 6th to February 5th than there was on the darkest day with former expeditions. It was this difference which caused the outbreak of scurvy. But it could not be foreseen. Apparently the long darkness was passed through without deterioration, and when the sun returned every soul seemed to be full of life and energy; and all undoubtedly were influenced by the determination to do all that resolute men could do, and to achieve the most complete measure of success that was possible with the means at their disposal.

The crowning work of an Arctic Expedition must always be achieved by means of sledge travelling in the spring. By this method alone can an unknown Arctic coast line be satisfactorily and exhaustively

explored. The system of Arctic sledge travelling was adopted in the searches for Sir John Franklin, and was elaborated and perfected by Sir Leopold McClintock. All the details of equipment, and the scale of diet for the travelling parties of the late expedition were in exact accordance with the results of McClintock's long experience; based on the numerous extended journeys over the ice, which were made by that highest of all Arctic authorities and his comrades who served with him in the search expeditions.

The details were studied and elaborated with great care by the officers of the 'Alert' and 'Discovery,' and the following slight alterations were made. There was a reduction in the weights to be dragged on first leaving the ship, as compared with those adopted by McClintock in 1853, and a very considerable reduction when compared with Sir Edward Parry's weights in 1827. A reduction was also made in the allowance of rum, and an increase in the allowance of tea; and tea was substituted for rum for the midnight meal. Lime-juice had never been given as a daily ration to sledge travellers in any previous expedition, except in the case of Sir James Ross, in 1849, whose party suffered from scurvy. But special care was taken in this respect by Sir George Nares, and all sledges which were sent away after the thaw, when it became possible to use it, were supplied with regular rations of lime-juice. In all other respects the equipment and scale of diet of the late expedition's travelling parties were identical with those adopted by McClintock and other old Arctic officers, and which long experience had proved to be best.

Lime-juice was not sent with the sledges during March, April, and May, for the very sufficient reason that it could not have been used in those months, in the form in which it was supplied to the expedition, namely liquid, in bottles and jars. During the intense cold of those months, a bottle or jar placed near a fire would at once be cracked into pieces. Sir George Nares would, therefore, have acted wrongly if he had added largely to the weights by loading the sledges with lime-juice jars or bottles, knowing perfectly well, as all Arctic travellers know, that, in that form, it could not be used during intense cold. He, however, placed lime-juice in the depôts, to be picked up during the return marches after the thaw had set in.

If lime-juice would have prevented the outbreak of scurvy in the travelling parties, as has since been alleged, there was gross neglect among those who were responsible in this country, for not having supplied the anti-scorbutic in a form in which it would have been possible to have used it during intense cold. It has since been found that it might have been supplied in lozenges or in the pemmican. But there was no neglect of any kind on the part of Sir George Nares, who did all that close study of the subject, careful forethought, and former Arctic experience could suggest to secure the health and comfort of the men while employed on this hazardous and most severe service. It is now certain that the long winter was the real cause of the outbreak of scurvy, and that the subsequent use of lime-juice would not have averted it. The moment lime-juice could be used, it was supplied to the sledge parties; yet, in nine instances, men were attacked with scurvy

in those later parties, as well as on board, who were taking daily allowances of the anti-scorbutic. This fact is quite conclusive on that point.

So much misrepresentation has been published on this subject, that we have considered it necessary to re-state the above facts. It is a very disgraceful and discreditable thing to reflect upon, that our greatest explorers and travellers, by sea and land, from the time of James Bruce of Kinnaird, have been attacked on their return by a swarm of ignorant detractors. Certainly none have deserved such treatment less than Sir George Nares, and the officers and men who had the honour of serving under him; for none ever worked harder, and with more single-minded zeal, to deserve well of their country.

Having placed his ships in admirable positions, Captain Nares organised his spring travelling parties with a view to making as thorough an exploration as the means at his disposal allowed in every direction. He decided upon despatching four extended parties provisioned, including depôts, for periods of from sixty to eighty days, to advance as far as possible north, south, east and west. The most hazardous attempt was to be made due north over the frozen sea under the command of Captain Markham, and, as there was danger that the ice near the coast might break up, this party was obliged to drag boats with it. Aldrich led the extending party along the coast to the westward, Beaumont of the 'Discovery' was to push along the north side of Greenland to the eastward, while Archer advanced southwards down the deep fiord at the entrance of which the 'Discovery' wintered, which was then supposed to be a strait.

Before the extending parties started it was necessary to open communication between the two ships, and Lieutenants Egerton and Rawson, with Petersen, the Danish dog driver, were despatched from the 'Alert' on the 12th of March, with the temperature at -35 to -50 below zero. The poor Dane was badly frost-bitten, and afterwards nothing could keep him warm. The two officers made a hole in the snow, covering the opening with the tent and sledge. They then deprived themselves of their own warm clothing, and at the expense of the heat from their own bodies, they succeeded, after great persistence and often reiterated efforts, in restoring circulation to Petersen. During the journey back to the ship they behaved most heroically and, though frequently badly frost-bitten themselves, they succeeded in keeping life in their comrade until they arrived on board. They saved his life at the imminent risk of their own. On March 20th they again started and reached the 'Discovery.'

These remarkable journeys of Egerton and Rawson take rank with anything of the kind that has ever been done by their predecessors in Arctic travelling, and the gallant young officers nobly upheld the credit of the expedition by their conduct on this occasion. We look upon the performance of such deeds, which will be handed down to our children, as examples for their imitation, as not the least valuable among the results obtained from Arctic exploration. The record of acts of self-denial in the face of danger done by our countrymen are certainly not less precious than scientific discoveries.

But the great work, for which the autumn and very early spring journeys were only preparatory, was that of the extended parties which started from the 'Alert'

on the 3rd of April with the thermometer at -33. In former expeditions the temperature has been equally low for a week or so during the April travelling, but the same amount of continuous cold in April and May has never before been faced.

In all, 53 officers and men left the ship to face the hardships of this intense cold out of a complement of 66. The temperature fell to -45 a few days after leaving the ship, and until the 28th of April it never was up as high as zero. The work before the northern party, owing to the necessity for taking boats, was tremendous. Their only mode of advancing was by a system of double banking, which, with three sledges, meant one mile made good for every five miles marched. Yet there was no alternative, for the impossibility of depending upon depôts laid out on a frozen sea which might break up, and the necessity for taking boats, made any reduction impossible.

The character of the ice to be travelled over was without precedent as regards the difficulties it presented. For no one ever before attempted to traverse the sea of ancient ice. It consisted of very small and rugged floes, separated by ranges of ice hummocks from 30 to 50 ft. high, and sometimes a quarter of a mile wide. The hummock ridges were composed of a vast collection of *débris* of the previous summer's broken-up pack ice, which had been refrozen during the winter into one chaotic rugged mass of angular blocks of every possible shape. The intermediate floes of ancient ice were very rugged and heavy for travelling, and never as much as a mile wide. Their surfaces were thickly studded over with rounded, blue-topped ice humps 10 to 20 ft. high, the depressions between them being filled with snow deeply scored into ridges by the wind. The whole formed the roughest line of way imaginable. At first there was a faint hope that such broken masses were confined to the vicinity of the coast, and that further out to sea the ice would be smoother. But this proved not to be the case, and the whole polar ocean in this part is of the same character.

Over such ice the northern division had to fight its desperate way, going five times over the same ground, and while working 10 and 12 hours a day, and walking over at least a dozen miles, only making at most 2 miles good. It is impossible to conceive more disheartening work, nor work that could more fully try the highest qualities of the men. No excitement, no rest, no change; but continuous and intensely hard work, with scarcely any progress, accompanied by hardships and privations of no ordinary kind. Supported by a sense of duty, by that devoted courage and confidence in their officers which makes seamen of the British navy follow withersoever they are led, these gallant fellows struggled on until they dropped. Not a single murmur or complaint was heard throughout the journey, which, for the difficulties encountered and overcome, is without a parallel in the whole annals of Arctic sledge travelling.

On the 16th of April the fatal disease made its appearance, which so enhanced the difficulties of this memorable journey. One of the men broke down, and had to be put on the sledge. This was equivalent to losing two men, for while his dragging power was lost, his weight was added to what the others had to drag. Still they zealously and cheerfully pushed on, resolved to march northwards to the utmost limits of

their endurance. Two days afterwards a second man broke down with scurvy; and all were becoming much weaker. Yet they lost no particle of their pluck and determination to work onwards until they dropped. By the 6th of May there were three men helpless on the sledges, the rest suffering from great stiffness and pains in the legs.

At length, on the 10th of May, the most northerly camp was pitched, and on the 12th Captain Markham hoisted the British flag in  $83^{\circ} 20' 26''$ , the most northern point ever reached by man. Next day they were homeward bound. Never, in the whole annals of Arctic prowess, full as they are of deeds of gallantry and devotion, had men persevered so long, and with such desperate tenacity, actuated solely by duty and by the desire to uphold the honour of their country.

The return march showed how fearfully close they had gone to the limit of safety. Very soon, two more men were attacked, and on the 27th of May, Captain Markham resolved to abandon the boat. It was a hazardous alternative. If they continued to drag this additional weight while becoming weaker every day, they might never reach the land; while there was a probability of finding a lane of water, between the ice and the shore, which would be impassable without a boat. Several of the men, who still tried to drag, were in great pain, but they held out most pluckily, sticking to the drag-ropes until they could stand no longer. Day by day they got worse. On the 30th Captain Markham's sledge was dragged by three men and himself, entailing labour which would soon have overpowered them. At length they reached the land, and Lieutenant Parr was despatched to the ship for succour. They were saved, but help came too late for one poor fellow, who sank to his last rest the day before assistance arrived. Of all that zealous company of strong and brave men who left the ship on April 3rd, only four could do work when they returned on June 14th, after an absence of 72 days. The sledge was dragged alongside the ship by Captain Markham himself and three men.

Aldrich's party to the westward also suffered, but not so severely, and they returned after having discovered three hundred miles of new coast-line.

It must have been a heart-rending sight to see those gallant fellows returning prostrate with disease. Yet, at the same time, it was a soul-stirring and glorious sight. For those men had performed an act of heroism which has seldom had a parallel. In spite of a wasting disease, they had remained resolute and undaunted, and had struggled on to complete the duty on which they were employed, in the face of dangers and hardships at which men in full health might well quail. Warm and hearty was the reception from their comrades in the 'Alert'—a reception which thus found expression in words:—

"Welcome home to the wished-for rest,  
Travellers to north and travellers to west;  
Welcome back from bristling floe,  
Frowning cliff, and quaking snow;  
Nobly, bravely the work was done;  
Inch by inch was the hard fight won.  
Now the toilsome march is o'er,  
Welcome home to our tranquil shore.  
Rough and rude is the feast we bring;  
Rougher and ruder the verse we sing.  
Not rough, not rude, are the thoughts that rise  
To choke our voices and dim our eyes,

As we call to mind that joyous sight  
On an April morning cold and bright,  
When a chosen band stepped boldly forth  
To the unknown west and the unknown north:  
And we from our Haven could only pray—  
'God send them strength for each weary day.'

The parties from the 'Discovery,' especially that which made important discoveries on the north shores of Greenland, also suffered terribly from scurvy. This outbreak was the one single calamity in an otherwise successful expedition. Every precaution was taken to check its progress, and as soon as fresh meat was obtained in the summer, the men rapidly recovered, and there was not a soul on the sick list when the ships arrived at Portsmouth. The outbreak of scurvy was not an unmixed evil. It has taught lessons which will be of great use hereafter, when the next expedition is fitted out. Nor should the examples of devotion to duty called forth by the terrible sufferings of the sledge-travellers be overlooked. They have added to the prestige of our navy, and will have an enduring value.

The work was not confined to the extended parties. From March to August 1876 every soul in the expedition was actively engaged in furthering its objects—some in laying out depôts and bringing succour to those engaged on the long journeys, others completing the examination of inlets, glaciers, and of other points of interest nearer the ships. The naturalists were away incessantly making collections, and other officers zealously assisted them, especially in the examination of the post-tertiary beds. All did their work admirably, and extended their explorations to the utmost limit—in three sad cases beyond the utmost limit—of human endurance. They fully, completely, and with heroic self-devotion, fulfilled the objects sought by geographers, by exploring that portion of the unknown region accessible by the Smith Sound route, to the farthest extent possible with the means at their disposal.

At the conclusion of the sledging season, in August 1876, Captain Nares was able to review the work that had been accomplished. The outbreak of scurvy had made it imperative to return to England, in order to avoid a certain and serious loss of life. But even if perfect health had been happily maintained, it would have been his duty to return. For the work was done, and done thoroughly. A point had been reached to the westward beyond which exploration would be better conducted by another route. To the eastward a point was attained beyond which further discovery must be achieved by the route on the east coast of Greenland. This part of the Polar Sea was found to be covered with ancient ice, and is not navigable. The work was finished, and it was the duty of Captain Nares to obey the order contained in the 18th paragraph of his Instructions—"to use his best endeavours to rejoin his consort in 1876, and to return to England, provided that the spring exploration had been reasonably successful."

After overcoming even greater difficulties and dangers in the return voyage than had been encountered on the way out, the expedition returned to England in October 1876, and received that cordial and hearty reception which its great success, its valuable scientific results, and the admirable conduct of officers and men had so fully earned for it.

We would now invite our readers to consider the results of the late Arctic Expedition. It will be seen that the wildest and most remote and unknown parts of our earth teem with matters of great interest in every branch of science; and that all the expense, danger and suffering entailed in their discovery and examination are well and abundantly repaid a hundred-fold.

Let us first glance at the geographical results. Four hundred miles of previously unknown coast line was discovered; and this, be it remembered, is no barren result. Geography is the base of all other sciences. It supplies the essential element of locality. The accurate delineation of an unknown region is essential for correct description, and to correct deductions in other branches of science, especially in meteorology, geology and biology. So that the new discovery and survey of unknown land was in itself an important result. But still more valuable were the discoveries of the late expedition with reference to the sea of ancient ice.

It was found that the coast lines beyond Robeson Channel trended away to west and north-east, forming the shores of a frozen polar sea, and that along the whole of this distance the ice was of the same character. Its existence was an unexpected and important discovery. The ice is from 80 to 100 ft. in thickness, formed by continual additions from above, due to the annual snowfalls. By the ever-increasing superincumbent weight this is gradually converted into snow-ice. Complete sections of the huge masses forced upon the shore were carefully taken, and they show the way in which the whole is formed as well as its great age. The process of formation of the ancient floes resembles that of glaciers, and the grounded *floe-bergs* had been chipped off from them. The examination of 400 miles of coast line, Captain Markham's journey over the polar sea away from the land, and the minute examination of the sections of *floe-bergs* at the winter quarters have given us a thorough knowledge of this remarkable ice formation; while observations during two summer seasons have thrown light on the amount and direction of the drift which annually takes place. Several considerations point to the conclusion that this sea of ancient ice is of considerable extent. There are no flights of birds to the north, which certainly would be the case if there was land in that direction. Animal vertebrate life ceases to exist on the ice-covered polar sea. The cold currents destroy whales' food, and there are no cetaceans. Except two or three stragglers close in shore no seals were seen, consequently there are no bears. The falcons, which prey on marine life, also entirely cease.

The shore to the westward, after culminating at Cape Columbia, trends away south of west; and it was deduced, from similarity of tides, direction of prevailing winds, and movements of the ice, that this trend continues south-westwards towards Prince Patrick Island. Similar evidence, as regards the drift of the ice and the comparison of winds with those experienced by the German Expedition on the east coast of Greenland, lead to the belief that the north coast, from the furthest point discovered by Commander Beaumont, also trends south to Cape Bismarck. A study of the tides by Professor Houghton confirms this view.

It usually happens that when a new geographical

fact is revealed through the labour of scientific explorers, it is found that it harmonizes with other isolated pieces of knowledge which previously stood alone, and were not intelligible without it. Thus the value of discoveries is scarcely ever confined to the work itself; but they throw light upon the true bearings of former work, and help towards the elucidation of far larger questions. As regards the sea of ancient ice discovered by the late Arctic Expedition, this is eminently the case.

Referring to the information gathered by former expeditions, we find that Sir Richard Collinson, in coasting along the Arctic shore of North America, discovered that similar ancient ice composed the pack bounding the narrow lane of water along which he was able to pass in the 'Enterprise' in 1851. He made an attempt to examine this ancient ice from Camden Bay by sledging; but he was stopped on the second day by gigantic uneven floes and lines of hummocks—in short, by obstacles similar to those which were encountered by the northern division of sledges under Captain Markham in 1876. Captain M'Clure found that the same ancient ice extends along the whole western side of Baring Island; and the 'Investigator,' in daily and hourly peril of destruction, passed along between it and the cliffs in 1851. M'Clure describes the surfaces of the floes as resembling rolling hills, some of them a hundred feet from base to summit—aged sea ice, which may be centuries old from the accumulated action of alternate thaws and falls of snow, giving it a peculiar hill and dale appearance. M'Clure emphatically warned those who might meet such ice, that if a vessel got into it she would never be heard of again, and ought not to be followed. Meham and McClintock found the same ice along the west coast of Prince Patrick Island, and Sir Edward Parry had a glimpse of it in 1819, from the western end of Melville Island.

Standing by itself, as an isolated geographical fact, the heavy ice seen by Collinson, M'Clure, Meham, and McClintock failed to reveal the whole truth. But the discoveries of the Arctic Expedition of 1875-6 have thrown light upon and explained this interesting question. We now know that the polar sea of ancient ice extends from the shores of North America to the north coast of Greenland, a distance of 1200 miles; for the gap of 400 miles from Prince Patrick Island to the most western point reached by Aldrich in 1876, is a continuation of coast line or islands, as is deduced from coincidences of winds, tide, and drift.

This polar sea is also, in all probability, a comparatively shallow sea. Captain Markham, at a distance of 40 miles from the land, found bottom in only 72 fathoms, and another indication of the present shallowness of this sea is supplied by proofs of the general recent upheaval of the adjacent land. The discoveries of the late expedition enable us to comprehend, with a nearer approach to accuracy, the general relations of the polar area to the rest of the world as regards the circulation of water and the distribution of land and sea. The drift eastward of the ice north of Grant Land seems to be due to the great flow of warmer water into the polar area, which afterwards, as a cold current, seeks an outlet southward at every opening, owing to the polar area itself being surcharged. The warmer water, flowing up between Greenland and Spitzbergen as a submarine

current, appears to come to the surface along the Siberian coast, and, aided by the discharged volume from the rivers, it causes a current round the area from left to right, and also across from the eastern to the western hemisphere. Hence, probably, the tremendous pressure on Grant Land and the north coast of Greenland, which prevents the sea from ever being navigable. It is possible too that the enormous growth of the ice may be due to shoal water or land, which prevents it from floating south with the currents.

The geographical results of the Arctic Expedition are exceedingly valuable, because they have a practical bearing on the general system of oceanic currents and of meteorology, and consequently form an essential part of a vast whole. Without a knowledge of the hydrography of the polar region all the general theories of oceanic currents must be incomplete; and Arctic research is, therefore, essential to a science which is of great practical utility.

But these only form a small fraction of the results of an expedition, from the labours of which every branch of physical science has benefited. We have complete series of elaborate meteorological observations, extending over a whole year, and taken at two different stations. Meteorological observations are taken at the colonies in Danish Greenland, and the distance from the most southerly of these at Ivigtut to the 'Alert's' winter quarters is 1200 miles. Thus, in the memorable years 1875-76, a simultaneous series of observations was taken at both extremities of this widely-extended meridional arc. The results, as might be supposed, were very important. In a former number (Sept. 1877, p. 225) we explained the nature of the Greenland *Föhn*, and the very remarkable example of one which occurred in Greenland from the 20th of November to the 11th of December, 1875. At the same period the weather was similarly disturbed both in 'Discovery' Bay, and at the winter quarters of the 'Alert.' The average temperature at those far northern stations, due to the season, should have been  $-20$  to  $-27$ . From November 26th to December 13th the weather remained above the average; and on the 12th the barometer attained the highest level recorded during the year. On the 1st of December the temperature at the 'Alert' rose as high as  $+35$ , but not at the 'Discovery,' the very warm blast passing the more southern station without affecting the temperature there. Again on the 4th a southerly squall raised the temperature to  $+23$ , and similar phenomena continued until the 14th. It would appear that the disturbance which caused the rise in temperature producing a heat excess of  $46^{\circ}$  at Upernivik on the 25th of November, arrived at the 'Alert's' winter quarters about twenty-four hours afterwards, causing a heat excess at that extreme northern station of  $40^{\circ}$ . Captain Nares, at the time, remarked that the gale must have travelled to the northward from the Atlantic, because the warm air was at a higher temperature than any water within many hundred miles of the 'Alert.' This coincidence of the observation of the same remarkable meteorological phenomenon in Greenland and in the extreme north serves to show the great value of Arctic research in this branch of scientific inquiry. As regards magnetic observations, two complete and elaborate series were taken by Captain Markham and Lieutenant

Giffard in the 'Alert,' and by Lieutenants Archer and Fulford in the 'Discovery.' The tidal observations also yielded important results, which have been worked out by Professor Haughton.

The examination of the geological formation of the whole coast line on the west side of the Smith Sound channels from Cape Isabella to Cape Union, as well as of the shores of the polar sea for 400 miles, and the collection of rocks and fossils at every point, are also results of great importance. Some broad geological facts have thus been established, which dovetail with those derived from an examination of the Parry Islands. Thus the carboniferous limestones of Cape Joseph Henry will, in all probability, prove to be a prolongation of similar beds discovered on Eglinton Island, west of Melville Island, by Mechem and Nares in 1853.

But by far the most important geological discovery was that relating to the existence of tertiary coal in  $82^{\circ}$  N. latitude, and the former extension of a miocene *flora* to that parallel. A bed of lignite, from 25 to 30 ft. thick was found, resting unconformably on azoic schists. The lignite is overlain by black shales containing many impressions of fossil plants which have been examined by Professor Heer. He reports that remains of 25 species of plants of the miocene period were collected, including two species of *Equisetum*, as many as ten conifers, a *Carex*, and eight dicotyledons—namely, a poplar, two species of birch, an elm, a *Viburnum*, two *Coryli*, and a water lily. *Pinus abies*, which occurs here and in Spitzbergen, did not exist in Europe in miocene times, but had its original home in the extreme north, and thence extended southwards. One tree, *Betula Brongniarti*, had not previously been found within the Arctic zone.

Professor Heer says that this thick lignite bed in  $82^{\circ}$  N. indicates the former existence of a large peat moss, probably containing a lake in which water lilies grew. On its muddy shores stood the large reeds and sedges, the birches and poplars, and some fir trees. The drier spots and neighbouring chains of hills were probably occupied by pines and firs, associated with elms and hazel bushes. A single clytron of a beetle is at present the sole evidence of the existence of animals in this forest region.

The astonishing discovery of a rich fossil *flora* so near the pole has given rise to much speculation among geologists. Professor Ramsay cannot believe that these trees could live through the long night of an Arctic winter, and flourish again the following summer: and he has suggested that there must have been a change in the direction of the axis of the earth with respect to the sun's light. Dr. Murie, on the other hand, thinks that too much stress has been laid upon the influence of the sun's light, and suggests that changes in electrical conditions might have some influence on the possibility of the existence of life at the poles. Other authorities believe that it is not the geographical position of the poles, but the climatic conditions of the polar regions which have undergone a change. Be this how it may, the discovery of a fossil *flora* so near the pole is a most important result of the late expedition, and one which, like all others, points to the desirability of continuing and completing north polar researches.

Scarcely less important are the zoological and botanical results of the expedition.



To begin with ethnology, the interesting inquiries with reference to the migrations of Eskimo tribes and their history, have had fresh light thrown upon them. Traces of Eskimo encampments were found at intervals on the western shores of the channels leading from Smith Sound; and under Cape Beechey, about 6 miles south of the 82nd parallel, Captain Feilden, the indefatigable naturalist of the 'Alert,' came across the most northern traces of man that have ever yet been found. They consisted of the frame-work of a large wooden sledge, a stone lamp, and a very perfect snow scraper made of a walrus tusk. The point where these relics were found is at the narrowest part of Robeson Channel, where it is only 13 miles across. This then was, probably, the point selected for crossing, and the heavy sledge may have been left behind, owing to the difficult and dangerous nature of the ice to be encountered. Captain Feilden conjectures that this spot marks the *Ultima Thule* of human advance. The tremendous ice of the polar sea to the north, and the absence of animal life, formed an impassable barrier. Northwards from this point no trace of men was ever found. In connection with previous researches, the ethnological results of the late expedition are of great interest and value.

As regards the mammals, a large extent of country was carefully worked by the naturalists, zealously assisted by other officers, and no species can have escaped their united observations. Through their diligent research much new information was obtained respecting the habits of the Arctic mammals. Close examination of the haunts of white foxes brought to light numerous *caches*, or stores of provisions. In one alone there was a heap of over fifty dead lemmings, concealed under a pile of stones; in another, half of a hare and wings of brent geese. It is also very striking that the increased vegetation induced by the presence of the foxes should be the means of attracting and sustaining the lemmings in the immediate vicinity of the foxes' dens. Captain Feilden also observed the habits of the lemmings with very close attention, and of the Arctic hare; and he has added considerably to previous knowledge respecting the musk oxen, their habits and migrations. He was also able to place in the hands of Dr. James Murie specimens of the stomach and other organs, which will give a further insight into the anatomy of this interesting animal. With, if possible, even closer attention, the birds of the far north were studied, for ornithology is the branch of natural history to which Captain Feilden, the accomplished naturalist of the 'Alert,' has long devoted himself. The place of breeding for knots and sanderlings was reached, and several young birds were obtained. Twelve species of mammals and twenty-four species of birds fully described, and their habits and migrations closely and most carefully investigated, are the results of the expedition in this branch of science. The fishes collected by the expedition have been reported upon by Dr. Gunther, of the British Museum. The most northern salt-water fish was obtained by Lieutenant Egerton, in 82° 30' N. It was a *Cottus quadricornis*, a fish which is not included in Dr. Lutken's list of Greenland fishes. The most northern fresh-water fish is a charr (*Salmo Arcticus*), several specimens of which were found in small lakes as far north as 82° 34' N.

The collection of *mollusca* made by the late expe-

dition embraces thirty-five species between 79° and 82° 30' N., and represents very fully the molluscan life within those parallels. For the researches in this department were not confined to dredging. Recent sea-beds, extending from the present sea margin to a height of not less than a thousand feet, are being deposited, at the present day, under precisely the same physical conditions as those now being elevated above the sea level, which give satisfactory evidence that the molluscan fauna of the past, represented by these post-tertiary deposits, is precisely that now existing in the adjacent sea. Upwards of fifty spots, where these post-tertiary beds occur, were carefully examined by Captain Feilden and the officers who zealously assisted him. Thus large deposits of recently-emerged sea-bed were laid open to investigation, and this circumstance rendered the researches in this branch of natural history especially exhaustive and satisfactory.

The *crustacea* brought home by the expedition, although not including many novelties, are of great interest, on account of the high and hitherto unexplored latitudes in which they were collected. The most northerly species obtained, and, indeed, the most northerly known animal in the world, is the *Anonyx nugax*, several examples of which were dredged up by Captain Markham in 72 fathoms, in latitude 83° 19' N. The next most northerly species is the *Hippolyte aculeata*, found in 82° 30' N. The number of species collected north of Smith Sound was thirty-one.

The collections of *insecta* and *arachnida*, 45 species of the former and 16 of the latter, are very important. They have been examined and discussed by Mr. McLachlan.

The *echinodermata* of the expedition have been reported upon by Professor Martin Duncan and Mr. Percy Sladen. The collection is so interesting, and the specimens are so valuable, that these eminent men of science have described it in a separate monograph. Similar reports have been made on the collections of *polyzoa*, *spongida*, *hydrozoa*, *foraminifera*, and *polycystina*.

The plants were examined and named by Professor Oliver, and Sir Joseph Hooker has written a most interesting memoir on the botanical results of the expedition. They prove that the vegetation of the newly-discovered area is entirely Greenlandic. The collection consists of no fewer than 69 flowering plants and ferns that can be identified, and 6 more in an imperfect condition; being 10 more than were collected at Melville Island in a much milder climate, and only 23 less than have been found in Spitzbergen. Mr. Mitten has reported on the mosses, and Mr. Berkeley on the fungi.

Such then, very briefly and inadequately stated, are the results of the late Arctic Expedition. They are the work of one year and a half of arduous toil; and they undoubtedly repay—fully and completely—the expense, and the dangers, hardships, and, alas! the losses which it was necessary to encounter and to suffer, in securing them. But there is yet one other result to record, which, though mentioned last, is not the least to be considered. In advocating the renewal of Arctic exploration, Admiral Sherard Osborn specially dwelt upon the importance of encouraging a spirit of maritime enterprise, and of giving worthy





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employment to our navy in time of peace—a truly national object, and one which should have as much influence in forming a decision to despatch an expedition, as the anticipated scientific results. That great object has also been secured. The interest in Arctic service, always popular in former days, has been revived. We now once more have a supply of young but experienced ice-navigators and sledge travellers, trained in the best school, where they have done their work right well, and who are willing and ready to face new dangers, and to win new laurels in the polar seas.

We have endeavoured to explain the nature of the difficulties and dangers which were encountered and overcome; and we have enumerated the results that have been secured. Our readers are now in a position to form their own judgments as to the degree of success which may be claimed for the late Arctic expedition. Our deliberate conclusion is that the scientific expedition commanded by Sir George Nares was, all things considered, the most successful that ever crossed the Arctic Circle.

But whether its success was great or small there is at least concurrence among scientific men that its rich and varied results are valuable. Thus the first great step has been accomplished by the advocates of Arctic discovery. The work has been revived. An expedition has been despatched, has manfully done its work, and has returned with a valuable increase to the sum of human knowledge. It remains to consider the next step, and to take care that this one success shall not be a spasmodic effort, but that it shall be the commencement of continuous work in the same direction, to be persevered in until it is complete.

The arguments for the continuance and completion of polar discovery are the same as those for its renewal. If the encouragement of maritime enterprise and the exploration of the polar region were objects of sufficient importance to justify the despatch of an expedition to commence the work in 1875, those objects still exist, and the arguments for continuing and completing the work are quite as strong in 1878 as they were in 1875. Indeed the success of the late expedition, and the experience gained by it, gives new strength to those arguments; while the recent discoveries add fresh interest to Arctic research, and give additional scientific importance to its completion.

There is a vast area, teeming with interest in every branch of inquiry, which is still unknown. There is the gap of 400 miles between Aldrich's furthest and Prince Patrick Island, to be approached by the Jones Sound route. There is the discovery of the northern side of Greenland, from Beaumont's furthest to Cape Bismarck, on the east coast. There is the exploration of the northern shores of the Franz Josef Land. There is the mysterious Wrangell Land. There is the North-east Passage. Abundance of glorious work in many directions; but, on the whole, the East Greenland route is the best that can be selected for the next Arctic Expedition. Britain ought not to relax her efforts after one success. There should be continuity in her measures, and there should be steady perseverance in the good work, until the exploration of the unknown region round the North Pole is finished.

### HENRY M. STANLEY IN THE AFRICAN LAKE REGION.

THROUGH the courtesy of the publishers, we have been supplied with a portion of the proof-sheets of Mr. Stanley's book, which will enable us to give our readers a general idea of the contents of his first volume. This part of the work embraces the period from the departure of Stanley's expedition to its arrival at Ujiji, including the exploration of the Victoria Nyanza. The second volume, of which we shall give a complete and extended review in our July number, contains the narrative of Stanley's discovery of the course of the Congo, from Nyangwé to the furthest point reached by Captain Tuckey above the falls.

Mr. Stanley, as is well known, was employed by the *Daily Telegraph* and the *New York Herald* to achieve geographical discoveries in Central Africa. But the plan of completing the researches of Speke in the lake region, and then of exploring the course of the Congo, originated with himself. The principal feature in Mr. Stanley's equipment was the boat constructed in sections, which was built by Mr. James Messenger, of Teddington. It was 40 feet long, 6 feet beam, and 30 inches deep, of Spanish cedar  $\frac{3}{8}$ -inch thick, and was built in five sections each 8 feet long. Mr. Stanley took with him a young man named Frederick Barker, who had been a clerk at the Langham Hotel, and the two sons of Mr. Henry Pocock, a fisherman of Lower Upnor, in Kent. Francis and Edward Pocock were the nephews of a gallant seaman who served and perished in Sir John Franklin's expedition. They were fine stalwart young men, full of courage and enthusiasm. On the 15th of August 1874 the party left England for Zanzibar, where they arrived on the 21st of September. The preparations were then expeditiously proceeded with and completed, the total weight of goods to be carried being 18,000 lbs., divided into loads weighing 60 lbs. each, and requiring, therefore, the carrying capacity of 300 men: 1300*l.* were also paid for advances of pay and rations to the men who had been engaged—230 Wanyamwezi, Wangwana, and coast people, and a supernumerary force of forty men, recruited at Bagamoyo and the Rufiji delta. On the 12th of November six Arab vessels conveyed the expedition from Zanzibar to the mainland.

The first part of Stanley's march, as far as Mpwapwa, was across the country which has frequently been traversed from Bagamoyo to Unyanyembé, but a little to the northward of former tracks. But on the 1st of January 1875, he struck north, leaving for the first time the path to Unyanyembé, the common highway of East Central Africa. Extraordinary difficulties accompanied him in this first entrance into an undiscovered region. He had to make his way over a country consisting of dense bush where provisions ran short, and sickness broke out among the people, which culminated in the illness and death of poor young Edward Pocock, on the 17th of January.

These painful marches brought the explorers to the most southern of the Nile sources. Stanley says:—

"Since leaving Mpwapwa, we have not crossed one perennial stream. All our drinking water has been obtained from pools, or shallow depressions lately filled by rain. Between Suna and Chiwyu was crossed



one small rill flowing north-easterly, which soon afterwards joins another and still another, and gathering volume, swerves north, then north-west. These are the furthest springs and head-waters of a river that will presently become known as the Leewumbu, then as the Monangah, and lastly as the Shimeeyu, under which name it enters Lake Victoria on the south-east coast of Speke Gulf. The length of its course, from the sources to the lake is 300 miles, which gives the course of the Nile a length of 4200 miles."

On the evening of the 21st of January the party arrived at Vinyata, in Ituru, where, consistent with custom, the camp was constructed on the summit of a slightly-swelling ground. Here one of the men was found murdered close to the camp, and soon afterwards war cries were heard, and a large mob approached, evidently with hostile intentions.

"In the midst of this, Soudi, a youth of Zanzibar, came hastily upon the scene. He had a javelin gash near the right elbow joint, and a slight cut as though from a flying spear was visible on his left side, while a ghastly wound from a whirling knobstick had laid open his temples. He reported his brother Suliman as lying dead near the forest, to the west of the camp.

"We decided, nevertheless, to do nothing. We were strong disciples of the doctrine of forbearance, for it seemed to me then as if Livingstone had taught it to me only the day before. 'Keep silence,' I said; 'even for this last murder I shall not fight; when they attack the camp, it will be time enough then.' To Frank I simply said that he might distribute twenty rounds of ammunition without noise to each man, and dispose our party on either side of the gate, ready for a charge should the natives determine upon attacking us."

Next day the camp was again attacked by a body of men of the Wanyaturu tribe.

"On the morning of the 25th we waited until 9 A.M., again hoping that the Wanyaturu would see the impolicy of renewing the fight; but we were disappointed, for they appeared again, and apparently as numerous as ever. After some severe volleys we drove them off again on the third day, but upon the return of the Wangwana, instead of dividing them into detachments, I instructed them to proceed in a compact body. Some of the porters volunteered to take the place of the soldiers who perished the previous day, and we were therefore able to show still a formidable front. All the villages in our neighbourhood being first consumed, they continued their march, and finally attacked the rocky hill, which the Wanyaturu had adopted as a stronghold, and drove them flying precipitately into the neighbouring country, where they did not follow them.

"We knew now that we should not be disturbed. Some of the guns, lost the day before, we re-captured. On reckoning up our loss on the evening of the third day, we ascertained it to be twenty-two men killed, three men wounded, twelve guns lost, and four cases of ammunition expended. Including Kaif Halleck and Suliman murdered, our losses in Ituru were therefore twenty-four men killed and four wounded, and as we had twenty-five on the sick list, it may be imagined that to replace these fifty-three men great sacrifices were necessary on the part of the survivors, and much ingenuity had to be exercised. Twelve loads were

accordingly placed on the asses, and ten chiefs were detailed to carry baggage until we should arrive in Usukuma. Much miscellaneous property was burned, and on the morning of the 26th, just before daybreak, we resumed our interrupted journey.

"The expedition on this day consisted of three Europeans, 206 Wangwana and Wanyamwezi, twenty-five women, and six boys. At 9.30 A.M. we camped at a place which might be called a natural fortress. To our right and left rose two little hills 100 feet high and almost perpendicular. Behind us dropped a steep slope 400 feet down to the Leewumbu river, so that the only way of access was the narrow gap through which we had entered. We soon closed the gateway with a dense wall of brushwood, and in perfect security lay down to rest.

"This camp was at an altitude of 5650 feet above the ocean, and due west of Vinyata about 10 miles. On one side of us was the deep-wooded valley through which the rapid Leewumbu rushes. Its banks on each side slope steeply upwards, and at the top become detached hills clothed with forest. On the 27th we crossed the Leewumbu, and the whole of that day and the next our route was through a forest intersected by singular narrow plains."

We have quoted Mr. Stanley's account of the above encounter with the natives, and we believe that our readers will concur in the opinion that nothing was done, on this occasion, which had not become absolutely necessary for self defence.

On the 17th of February, having surmounted a ridge which bounds the valleys of the Leewumbu, or Monangah, on the north, the explorers reached "Usiha, at the commencement of a most beautiful pastoral country, which terminates only in the Victoria Nyanza. From the summit of one of the weird grey rock piles which characterize it, one may enjoy that unspeakable fascination of an apparently boundless horizon. On all sides there stretches toward it the face of a vast circle replete with peculiar features, of detached hills, great crag-masses of riven and sharply-angled rock, and outcropping mounds, between which heaves and rolls in low, broad waves a green grassy plain, whereon feed thousands of cattle scattered about in small herds.

"As fondly as the Wangwana with their suffering vitals lingered over their meals in the days of plenty at Mombiti, so fondly did I gloat over this expanding extent, rich in contrasts and pleasing surprises. Fresh from the tawny plains of Monangah, with its thirsty and sere aspect, I was as gratified as though I possessed the wand of an enchanter, and had raised around me the verdant downs of Sussex. I seated myself apart, on the topmost grey rock. Only my gunbearer was near me, and he always seemed intuitively to know my moods. I revelled therefore undisturbed in the bland and gracious prospect. The voices of the Wangwana came to me now and again faint by distance, and but for this I might, as I sat there, have lost myself in the delusion that all the hideous past and beautiful present was a dream.

"After the traveller has performed his 600 miles from the ocean to Usiha, however phlegmatic he may be, he will surely glow with pleasure when he views this fair scene of promise. The delicious smell of cattle and young grass comes up from the plain quick, and reminds one of home-farm memories, of milk

and cheese, and secret dippings into cream-pots, and from the staked bomas and the hedge-encircled villages there rise to my hearing the bleating of young calves, and the lowing of the cows as they looked interested towards the village, and I could see flocks of kids and goats, and sheep with jealously-watchful shepherd-boys close by—the whole prospect so peaceful and idyllic that it made a strangely affecting impression on me.”

Proceeding through this country, they reached the village of Kagehyi on the 27th. “We dipped into the basins and troughs of the land, surmounted ridge after ridge, crossed water-courses and ravines, passed by cultivated fields, until, ascending a long, gradual slope, we heard on a sudden hurraing in front, and then we too knew that those in the van were in view of the Great Lake.” Stanley and his party, from November 17th, 1874, to February 27th, 1875, had walked over 720 miles in 103 days, being 70 marching and 33 halting days.

The explorer was now on the southern shore of that famous Victoria Nyanza, which he had determined to circumnavigate; and the news of his arrival spread far and wide:—

“The village of Kagehyi, in the Uchambi district and country of Usukuma, became after our arrival a place of great local importance. It attracted an unusual number of native traders from all sides within a radius of twenty or thirty miles. Fishermen from Ukerewé, whose purple hills we saw across the arm of the lake, came in their canoes, with stores of dried fish; those of Igusa, Sima, and Magu, east of us in Usukuma, brought their cassava, or manioc, and ripe bananas; the herdsmen of Usmau, thirty miles south of Kagehyi, sent their oxen; and the tribes of Muanza—famous historically as being the point whence Speke first saw this broad gulf of Lake Victoria—brought their hoes, iron wire, and salt, besides great plenty of sweet potatoes and yams.”

In a few days the boat, named by Stanley the ‘Lady Alice,’ was ready and strengthened for rough sea life, a crew of ten men and a steersman were selected; and the leader of the expedition prepared to embark with the object of circumnavigating the lake; while Frank Pocock and Barker remained in charge of the camp at Kagehyi. Stanley set sail on the 8th of March, 1875, eastward along the shores of the broad arm of the lake, which he called ‘Speke’s Gulf.’

His account of his voyage round the eastern and northern shores of the lake is most interesting, and during April 1875, he was with M’tesa, the Emperor of Uganda, where he met M. Linant de Bellefonds, who had been sent on an embassy to Uganda, by Colonel Gordon. Stanley thus describes the Uganda potentate:—

“In person M’tesa is tall, probably 6 feet 1 inch, and slender. He has very intelligent and agreeable features, reminding me of some of the faces of the great stone images at Thebes, and of the statues in the museum at Cairo. He has the same fulness of lips, but their grossness is relieved by the general expression of amiability blended with dignity that pervades his face, and the large, lustrous, lambent eyes that lend it a strange beauty, and are typical of the race from which I believe him to have sprung. His colour is of a dark red brown, of a wonderfully

smooth surface. When not engaged in council, he throws off unreservedly the bearing that characterizes him when on the throne, and gives rein to his humour, indulging in hearty peals of laughter. He seems to be interested in the discussion of the manners and customs of European courts, and to be enamoured of hearing of the wonders of civilization. He is ambitious to imitate as much as lies in his power the ways of the white man. When any piece of information is given him, he takes upon himself the task of translating it to his wives and chiefs, though many of the latter understand the Swahili language as well as he does himself.”

The strangers were witnesses of a naval review in Murchison Bay. The Uganda fleet consisted of forty canoes containing about 1200 men. M’tesa promised that he would furnish Stanley with transport sufficient to convey his expedition by water from Kagehyi to Uganda; and a chief named Magussa was ordered to escort him with thirty canoes, which were, however, not ready when Stanley departed.

During the return voyage nothing of importance occurred until the explorers approached the Bumbireh group of islands in order to obtain provisions. Bumbireh Island is about 11 miles long by 2 broad, and presents the appearance of a hilly range with a tolerably even and softly-rolling summit line clothed with soft grass. Its slopes are generally steep, yet grassy or cultivated. It contains probably fifty small villages, averaging about twenty huts each, and a population of 4000 souls. Herds of cattle were grazing on the summit and slopes, and extensive banana groves marked most of the village sites. “There was a kindly and prosperous aspect about the island.”

But the people raised war cries and made hostile demonstrations as the canoes approached. The provisions were exhausted, and, forced by hunger, Stanley and his crew continued to approach, when suddenly the savages rushed into the water and dragged the boat high and dry for about 20 yards. “Then ensued a scene which beggars description. Pandemonium—all its devils armed—raged around us. A forest of spears was levelled; thirty or forty bows were drawn taut; as many barbed arrows seemed already on the wing; thick, knotty clubs waved above our heads; two hundred screaming black demons jostled with each other and struggled for room to vent their fury, or for an opportunity to deliver one crushing blow or thrust at us.”

Then the King of Bumbireh, named Shekka, retired to consult with his chiefs, and several men made a rush at the boat and seized the oars, an act which was greeted with a loud cheer; and, as they were assured that their victims could not escape, the savages withdrew to the nearest village to refresh themselves. In a short time they again appeared, armed and prepared for battle, to the number of 300, while Shekka refused to give any pledge of peace. Then, with great presence of mind, Stanley faced the enemy, while his people suddenly launched the boat, and they all sprang in. The savages rushed furiously down to the water’s edge, but too late. Stanley kept up a steady fire upon them, while his crew tore the bottom boards out of the boat to use as oars.

They were saved. They heard a voice cry out, “Go and die in the Nyanza!” They were twelve hungry men, and they only had four bananas in the



boat. In the morning there was no land in sight: all was a boundless circle of grey water. At length they reached an uninhabited island, which they called "Refuge Island," where they found rest and food, and on the 6th of May, after having achieved the great geographical feat of circumnavigating the Victoria Nyanza, Stanley arrived at Kagehyi and rejoined his camp. Frank Pocock was well, but poor Frederick Barker had died twelve days previously. Stanley had thus set at rest for ever the question whether the Victoria Nyanza is one or several lakes. Speke was right. He had merely over-estimated the extent of the lake. His sketch gave it an area of 29,000 square miles. Stanley's survey has reduced it to 21,500 square miles. (For a map showing Stanley's track round the Victoria Nyanza, see our number for September 1876, facing page 245.)

Preparations were then made for the departure of the whole expedition to Uganda by water. By the 19th of June 1874, grain, sesamum, millet, and Indian corn had been purchased to the amount of 12,000 lbs., and stowed in sacks. On the 20th the embarkation was commenced of 150 men, women, and children, with 100 loads of cloth beads and wire, 88 sacks of grain, and 30 cases of ammunition; but there was a disastrous start necessitating repairs for the canoes, and it was not until the 6th of July that they were fairly off. During the long voyage round the lake it was necessary to pass the hostile Island of Bumbireh; and Stanley was obliged to halt on a neighbouring island called Mahyiga. Antari, the King of the main land called Ihangiro, and Suzerain over Bumbireh, declared that he would not allow strangers to travel by sea, and that they must go back, adding that, if Stanley did not obey, he should be killed and all his party. Meanwhile Antari sent large re-inforcements to Bumbireh. Stanley's reply was that he intended to go to Uganda, whether Antari would let him or not. Soon afterwards he was joined by six canoes from Uganda, and heard that M'tesa had believed him to have been murdered at Bumbireh, and had sent an expedition in search of news. The leader of these canoes was named Sabadu. A search expedition consisting of eight more canoes arrived next day; but it was evident that the departure of the expedition to Uganda would be hotly contested by Antari and the people of Bumbireh. A small party of Waganda had obtained leave to land and cut bananas on Bumbireh, when they were treacherously attacked, and six lost their lives.

This being the position of affairs, Stanley had to decide what course to adopt, and we will give his explanation of the events which followed in his own words:—

"Alone with myself, I began to discuss seriously the strict line of duty. If it were a military expedition that I commanded, duty would have pointed out the obvious course to follow; but though the expedition was governed for its own well-being after military principles, it was an expedition organized solely for the purposes of exploration, with a view to search out new avenues of commerce to the mutual advantage of civilization and such strange lands as we found suitable for commercial and missionary enterprise. But whatever its character, its members possessed the privilege of self-defence, and might justly adopt any measures, after due deliberation, for self-protection.

The principles of right and justice every educated Christian professes to understand, and may be credited with a desire to observe, but in addition to these, it was desirable in a person in my position—knowing how frequently it is necessary to exercise them in barbarous lands—to remember charity and forbearance, in order to ensure the objects in view, and to create good impressions for the benefit of those who might succeed the pioneer.

"Thirteen days had elapsed since our arrival at Mahyiga, and the thirteenth day was signalized by this bloody attack upon people entrapped to their death maliciously, and evidently by a preconcerted arrangement between Antari's elders and the chiefs at Bumbireh. Sabadu said also that the last words he had heard as the Waganda paddled away from Bumbireh were, 'Look out for mischief to-morrow,' which no doubt meant that the war 'shauri' was nearly terminated, and that all were by this time worked up into proper fighting spirit.

"The expedition was now ready to move towards Uganda, but the waterway had first to be opened; whatever plot was on hand must be frustrated, and treachery punished; otherwise impunity would inspire an audacity which might be dangerous to our safety.

"Apart, therefore, from a duty owing to the wounded Waganda and the dead chief of Kytawa, as well as to our respect for and gratitude to M'tesa and Kytawa—apart from the justice which, according to all laws human and divine, savage and civilized, demands that blood shall atone for blood, especially when committed with malice prepense, and the memory of our narrow escape from their almost fatal wiles, and the days of agony we had suffered—there lay the vital, absolute, and imperative necessity of meeting the savages lest they should meet us. For they were by this time reinforced by about 2000 auxiliaries from the mainland; they were flushed with triumph at their success in the snare they had set for the unsuspecting Waganda, and the sight of their dead victim would only inspire them with a desire for more blood.

"As I could not see any way to avoid the conflict, I resolved to meet them on their own island, and by one decisive stroke break this overweening savage spirit. I should, however, wait the result of my last message, for it might be that the capture of one of Antari's sons might induce them to embrace peaceful proposals.

"Accordingly next morning a couple of ammunition boxes were opened, and twenty rounds distributed to each man who bore a rifle or musket; 230 spearmen and fifty musketeers were detailed for a fighting party, and eighteen canoes were prepared to convey them to Bumbireh.

"I waited until noon, having gazed through a field-glass many times in the direction of Bumbireh, but nothing was observed approaching Mahyiga."

The distance from Mahyiga to Bumbireh was about 8 miles, and Stanley did not arrive before the latter island until 2 P.M., finding the heights crowded with large masses of men, and every point manned with watchmen. The savages hurried from their coverts between 2000 and 3000 in number; and Stanley, anchoring his boats in line, after a fruitless parley, opened fire. After a few rounds the savages were cowed, and the safety of the passage was secured. The passage of the channel with the women and

children and the property of the expedition was now safe, and they started for Uganda on the 5th of August, with a fleet consisting of the boat and 37 canoes containing 685 souls.

After carefully reconsidering Mr. Stanley's detailed explanation of this affair at Bumbireh, we are glad to repeat what we said in the article in our number for March 1878 (page 53) that self-defence and the imperative duty of securing the safety of the hundreds of men, women, and children under his charge, fully and completely justified him in the course he adopted.

Stanley remained at Uganda, the guest of M'tesa, during the months of September and October 1875, and his work contains several very interesting chapters on M'tesa's wars, on his conversion to Christianity, and on life and manners in Uganda in the different classes of society—the *kopi* or peasant, the *mkungu* or chief, and the *kabaka* or emperor. He describes the form of the Empire governed by M'tesa as a crescent, its length 300 and its breadth about 60 miles, covering, with the lake islands, an area of 30,000 square miles; and 70,000 including the tributary States of Unyoro, Ukedi, and Ankori. He estimates the population at 2,775,000. The productions are ivory, coffee, gums, resins, myrrh, lion, leopard, otter and goat skins, ox hides; cattle and sheep. The vegetable products are the papaw, banana, yams, sweet potatoes, peas, beans, melons, cucumbers, and tomatoes, rice, wheat, maize, sesamum, millets, and vetches. There are also fine forests of great extent.

From Uganda Mr. Stanley made an expedition westward from Victoria Nyanza to Beatrice gulf or lake, which he believed to be a portion of the Albert Nyanza. He thus describes the intervening country:—

"Starting from the sea-like expanse of the Victoria lake, the traveller would be ushered into the depths of a tall forest, whose meeting tops create eternal night, into leafy abysses, where the gigantic sycamore, towering mvulé, and branchy gum strive with one another for room, under whose shade wrestle with equal ardour for mastery the less ambitious trees, bushes, plants, lianas, creepers, and palms. Out of this he would emerge into broad day, with its dazzling sunshine, and view an open rolling country, smooth rounded hills, truncated cones, and bits of square browed plateaus, intersected by broad grassy meads and valleys thickly dotted with ant-hills overgrown with brushwood. Few trees are visible, and these, most likely, the candelabra or the tamarisk, with a sprinkling of acacia. As some obstructing cone would be passed, he would obtain glimpses of wide prospects of hill, valley, mead, and plain, easy swells and hollows, grassy basins and grassy eminences, the whole suffused with fervid vapour.

"These scenes passed, he would find himself surrounded by savage hills, where he would view the primitive rock in huge, bare, round-backed masses of a greyish-blue colour, imparted to them by moss and lichens, or large fragments flung together as in some Cyclopean cairn, sundered and riven by warring elements. At their base lie, thickly strewn, the *dibris* of quartz-veined gneiss and granite and iron-coloured rock, half choking the passage of some petty stream, which vents its petulance, as it struggles through it to gain the clear, disencumbered valley and the placid river, guarded by banks of slender cane and papyrus.

"And then the traveller would observe that the valleys are gradually deepening, and the hills increasing in height, until suddenly he would be ushered into the presence of that king of mountains, Mount Gordon Bennett, which towers sheer up to the azure with a white veil about his crown. Escaping from the vicinity of this mountain monarch, he would be swept over a brown parched plateau, and then, all suddenly, come to a pause at the edge of an awful precipice, some 1500 feet in depth. At the bottom of this, slumbering serenely, and reflecting the plateau walls on its placid surface, lies the blue Luta Nzigé."

In February 1876, Mr. Stanley took leave of M'tesa, and crossing the river Kitangule, which was discovered and named by Speke, entered the territory of Rumanika, King of Karagwe. In this country Mr. Stanley collected much valuable geographical information, and personally explored the little lake Windermere of Speke, the Thema island, the hot springs of Mtagata, and part of the Kitangule valley.

From Karagwe Stanley made his way to the shores of the lake Tanganyika at Ujiji, where he arrived on the 27th of May 1876.

Great as the value of Mr. Stanley's geographical researches are, and absorbing as is the interest excited by his narrative, we are inclined to attribute equal importance to the ethnological portions of his first volume. He has been most assiduous in collecting and arranging information respecting the habits and modes of life of the people, their arts and manufactures, and his account of the kingdom and people of Uganda especially is most valuable.

#### THE PRODUCTIVE ZONES OF RUSSIA IN EUROPE.\*

THE Russian dominions embrace within their enormous extent most varied economic products, which offer a striking contrast one with the other. The different regions or zones admit of convenient division into five, which, in European Russia, are especially marked. These are, starting from the north, the *tundras*, then the forest and agricultural regions (forming three zones), and the steppes.

The tundras, those bare, damp Arctic wastes, are, as a rule, to be found between the Arctic Circle and the Polar Ocean. They are frozen in winter, and generally thaw to the depth of a foot or so in summer. Turf moss (*sphagnum*) and reindeer moss (*cladonia rangiferina*) are both to be found, and the latter is a product of economic importance, though in eight or ten days a herd of reindeer will generally exhaust a pasture of it. These animals yield so little milk that, according to Charles Vogt, it takes at least 100 of them to support one family. It is reckoned that there are 340,300 reindeer in the Government of Archangel alone, but this government includes forest and other land besides tundras. The entire area of the tundras in Europe amounts to about 144,820 square miles (English).

\* This article is based on an interesting and fuller one by Dr. O. Krummel in the *Geographische Blätter* of the Bremen Society. The author expresses his acknowledgments to the "Map showing the areas of production in Europe," published by the Ilyin Institute in 1873; to E. Réclus's work (*La terre*, i. p. 99); to Oscar Peschel's lectures; and to various independent sources.

The Forest Zone extends southward of the isothermal line of 8° R. in July (which is coincident with the limit of trees), as far as the 60th parallel of latitude, and embraces the greater part of Finland, the Governments of Olonetz, Vologda, Archangel (*minus* the tundras), and the northern districts of Novgorod, Vyatka, and Perm. All here that is not moor, lake or river, is covered with a perfect ocean of forest, in which cultivated oases are rare. It forms fully two-thirds of the entire forest area of Russia and covers 815,790 square miles. The density of population amounts to between 13 and 14 souls to the square mile.

In Novgorod and Vyatka the wealth of timber has been diminished by cultivation, or to speak more properly, by firing the forests; in Finland the forest area is limited through the space monopolized by its enormous lakes and its rocky soil. The four northern Governments of Archangel, Vologda, Olonetz, and Uleaborg, cannot expect ever to attain a much higher degree of cultivation than at present. The inhabitants prefer the chase to agriculture, and devote only three months to the latter instead of seven or eight as in other countries.

This forest region is important from an economic point of view, as it produces fur, timber, tar, and potash, but it is only during three months of the year that the condition of the rivers admit of these products being conveyed down by boat to the South or to the White Sea. The tar and pitch annually prepared in Northern Russia amounts to 330 millions of Russian pounds. Perm, Novgorod, and Vyatka are rather better circumstanced as regards fertility and productiveness of soil, and the last province exports cereals in a slight degree to the neighbouring province.

The third division, the cultivated zone, leads from the 60th parallel southward to the steppes. The geological features of this zone are noticeable. The northern and central portions are a diluvial deposit, which forms a thin sandy soil for cultivation, requiring plentiful manuring and careful handling, owing to the frequency of stones. In the western and eastern portions cultivation has existed for a much longer period, a more scientific system prevails, and the fertility is on the whole greater. On the other hand, the southern zone, consisting of the "black earth" (Chornosyom), yields rich harvests without manuring or labour. The entire zone may thus be subdivided into northern and southern, or belts of weak and strong cultivation, to the latter of which may be added the Baltic and Polish provinces.

The region of weak or slight cultivation includes fifteen entire governments and parts of others, with a total area of about 371,900 square miles. The average density of population is 54 to the square mile. The following table shows the relative proportions of forest and cultivated land:—

	Per-cent. of total area.		Per-cent. of total area.	
	Cultivated.	Forest.	Cultivated.	Forest.
St. Petersburg	16·3	44·0	Tver . . . . .	31·7 31·6
Pskov . . . . .	32·3	48·9	Yaroslav . . . .	35·0 34·0
Vitebsk . . . . .	45·2	41·8	Vladimir . . . .	43·8 46·8
Minsk . . . . .	24·0	45·0		
Mohilev . . . . .	45·7	27·0	Nishegorod . . .	38·7 49·6
Smolensk . . . . .	38·1	34·8	Kostroma . . . .	20·6 67·1
			Kazan . . . . .	44·0 40·4
Kaluga . . . . .	53·7	25·1	Simbirsk . . . .	47·9 35·0
Moscow . . . . .	39·0	38·1	Ufa . . . . .	10·3 52·5

This region yields too little wheat for the support of its inhabitants; the produce is only 1·7 *chetverts* per head, whereas the lowest quantity reckoned as essential for health is 2·3 *chetverts* per head. The yield is thus sufficient for only 270 days in the year, and for the remaining 95 days the inhabitants must rely on imported grain, for which they pay by their manufacturing industries. In the governments of Moscow, St. Petersburg, Vladimir, Southern Perm, Iver, Riazan, Yaroslav, and Kaluga, about half the entire industrial wealth of Russia is concentrated, in the order of precedence in which they are placed; the Government of Moscow alone turns out 18 per cent. : here the manufacturing industry has its centre and flourishing cotton flax and silk spinning mills and yarn manufactories are to be found. The materials are handed over to the peasants, who spend all their time in weaving, spinning, and preparing flax and hemp. The cotton industry is particularly flourishing and almost wholly supplies the clothing wants of the inland population, the finest textures alone being imported. Large consignments of plush, calico, and nankin were exported to the Asiatic markets 1,070,000 roubles' worth in 1873, and 1,120,000 in the following year. This activity contrasts strongly with the low condition of the cloth-manufacturing industry, which would scarcely exist were it not for the heavy protective duty (which, according to Matthaei, amounted in 1873 to 23 per cent. *ad valorem*), although the raw material is at hand in the country itself. The cotton industry, it must be remarked, is also protected against foreign competition by a duty even higher in 1873 (according to the same authority) = 25 per cent. The iron and metal industries (copper and nickel) have their chief seat on the western slope of the Ural, in the Government of Perm, and there are also special manufactures (such as that of arms at Tula) elsewhere. The manufacture of Russia leather is carried on in the Governments of Yaroslav and Tver, while an enormous trade is done in wooden spoons and bast shoes (made from young linden trees). Flax is worked up in the western governments.

The forests, once so rich, are gradually being diminished through supplying the heating material for these manufactures. The frequent conflagrations which overtake houses, stables, &c., and the artificial heating of dwellings, contribute in no small degree to reduce the stock; while in innumerable cases vast quantities of timber are felled without any thought for the renewal of the supply. The yearly export of timber has increased threefold—from about eleven millions of roubles' worth in 1866 to over thirty-three millions' worth in 1874. It is not to be wondered at, in these circumstances, that the forests in the vicinity of towns are gradually being diminished, and wood steadily rising in price.

This has given an impetus to the coal industry, and the yield of the Moscow district rose from a yearly average of a million and a half puds in 1860-1866 to about nine million puds in 1872. The Moscow coal is used for heating, for smelting, and especially for gas-works, for which it is better fitted than even the Scottish bog-head coal. The chief mines are south of Moscow, on both sides of the Oka, between Kaluga, Tula, and Bielev. The yearly yield of the Polish district in 1872 was much greater than that of Central Russia, being seventeen and a half million

puds. It is a continuation of the deposit of Upper Silesia, but has not attained the same economic importance. The coal district in the Donetz district is an important one to a portion of Russia so destitute of forests as that. It has been known since 1724, and was turned to use by Katharina II. for the purposes of a factory at Lugansk. It was also used extensively during the Crimean war, when the English supply was cut off. The coal is the best in Russia, and though the out-turn has varied considerably, owing to the awkward situation of the deposits and want of communications, it nevertheless amounted to close on thirty-seven million puds in 1872. The deposits on both sides of the Ural, though rich and easy to work, are only used for the neighbouring iron and copper works, and (to a very small extent) for the Volga and Kama steamers.

Taken as a whole, the coal industry of Russia is very small in its yield, being in 1872 only 0.43 per cent. of the whole out-turn of the globe (England's share being 49 per cent., and Germany and the United States about 16 per cent. each). It has, however, increased a good deal more than 300 per cent. since 1866, so that there are good grounds for hope as regards the future.

The zone of rich cultivation bases its chief claim to that title on the black earth above referred to, which Ruprecht of the St. Petersburg Academy considers to be due to the process of turf formation which is always going on, and not to be of marine origin and still less to be the produce of former forests. The first of these last theories (Murchison's) is set at rest by the facts that there are no marine fossils to be found, and that the deposit occurs uniformly on high and low elevations, and there are no forest-tree remains to support the second theory. The black earth is found to extend into Siberia, and it also occurs in the prairies of North America, and in some parts of India. The black earth in Russia has extraordinary fertility, and enables wheat, rye, and maize, to be grown without manuring. Clover, lucerne, and esparcet have been seen to grow there to the height of 15 feet. Forests occur sparsely only in the north, and the zone of black soil is so remarkably destitute of timber that the only fuel besides the droppings of cattle consists in dry, half-wooded grain stalks. Lately, however, the produce of the Donetz coal-beds have found their way here. The total area of the black soil is estimated by Ruprecht "from official statistics" at 250,760 square miles, and by Wilson more than 425,000 sq. miles (?). The soil is found spread over 22 governments, 8 of which belong to the steppe region. The remaining 14 exhibit the following proportions:—

	Per-cent. of total area.		Per-cent. of total area.		
	Cultivated.	Forest.	Cultivated.	Forest.	
Volhynia . . . .	33.7	41.9	Kursk . . . . .	67.0	9.5
Podolia . . . . .	52.0	15.1	Tula . . . . .	70.0	8.6
Bessarabia . . .	37.8	9.0	Orel . . . . .	55.0	23.1
Kiyev . . . . .	57.0	24.7	Voronesh . . . .	60.0	9.1
Chernigov . . .	55.0	19.4	Riazan . . . . .	56.0	22.0
Poltava . . . . .	44.0	6.8	Tambor . . . . .	60.0	17.6
Charkov . . . .	46.0	12.8	Penza . . . . .	44.0	6.8

In addition to these, 6 of the West Russian Governments and Poland are noted for their fertility, and exhibit about equal signs of prosperity:—

	Per-cent. of area.		Per-cent. of area.		
	Cultivated.	Forest.	Cultivated.	Forest.	
Poland . . . . .	50.1	25.2	Kovno . . . . .	55.3	20.6
Grodno . . . . .	41.3	27.5	Kurland . . . . .	22.2	34.2
Vilna . . . . .	42.9	30.0	Livland . . . . .	22.0	45.1
			Estland . . . . .	15.5	24.9

The produce of wheat in the black-soil country amounts to more than two-thirds of Russia's total produce, while potatoes are chiefly grown in the Polish and Baltic provinces. The high importance of the black soil is further exemplified by the fact that its population forms 53 per cent. of the entire population of the country, and that its crops form 68 per cent. of the total yield of the country. According to Wilson, four-sevenths of the surplus goes to feed the manufacturing zone, while the remainder is conveyed by rail and water to the Black Sea and the Baltic for shipment to the United Kingdom. The value of the grain exported across the European Customs' line in 1874 was 212 millions of roubles. A fraction of surplus grain is converted into spirit, which is also made in Poland and Finland.

In the black soil zone (Kiyev Government) the sugar-boiling factories are to be found. No soil is better suited for the beet than the black earth; but owing to the want of fuel and of facile communications, the sugar is dear and its consumption small. The number of sugar factories in European Russia varies between 200 and 300. The protective duty on foreign sugar is stated by Matthaei to have been as high as 36 per cent. in 1873. This zone suffers very much from the want of proper communications, the few railways requiring to be supplemented by proper inland roads, the present ones being also impassable in wet weather.

The "Scythian deserts" have not changed their character as regards their lack of vegetation since the time of Herodotus, 2000 years ago, so that there is no prospect of a *re-boisement*, which Russians are sometimes sanguine enough to hope for. The vegetation belonging to the forest and cultivated regions of Central and Northern Europe cannot flourish here, owing to the excessive summer heat; and the severity of the winter and spring frosts prevents the growth of the evergreens of Southern Europe. The limit between the steppe and forest zones runs from Kishenau, in Bessarabia, across the Chornosyom to Syzran, on the Volga (53° N. latitude). The chief vegetation found on the steppes is grasses, spiniferous and leafless plants, bulbous plants, &c. In some places, where the soil is salt, the only growth in the steppe is halophytes, cultivation being an impossibility. Forest growth and cultivation is only found in the vicinity of rivers. Fuel is very scarce, Orenburg and Ufa alone drawing a sufficient supply from the Ural forests.

The population of the steppes zone is very sparse, the greatest density being along the rivers banks. On the western and northern confines only of the zone is there any considerable cultivation, the chief dependence of the inhabitants in the typical Cis-Caucasian districts being on their cattle. From the south and south-east portions of the empire are obtained the excellent horses which serve to make the Russian cavalry so excellent and Russia the richest European country for horses. In Russia there are about 10 horses to every 35 human beings, whereas in no other country is the proportion greater than 10 to 100. Between 1871 and 1876 the average number of horses

exported was 25,000 per annum, the value being over 1,500,000 roubles. The steppe zone is also rich in oxen and sheep, which were exported largely, the merino sheep and the fat-tailed sheep being both of great importance, the tail of the latter yielding from 20 to 30 Russian pounds of tallow. It is worthy of remark that the South Russian flocks remain out in the open all the year round, while those in the central part of the empire pass 150 days of the year, and those in the north 200, under cover.

The wine cultivation is not unimportant in the steppe zone, though on the whole the French and German wines are preferred to the home produce. Silk has languished owing to an epidemic among the worms, but previously it had attained a yearly value of four million roubles. Southern Russia is also the chief source of the salt supply to the remaining governments, more than half the total yield being obtained from the salt lakes of Southern Russia and Southern Siberia. The southern side of the Caucasus is characterised by a semi-tropical vegetation, including citrons, pomegranates, &c., which are well described by Gustav Radde in his recent work.

From the above will be seen what varied products Russia can boast, and what scope there would be for the development of the resources of the country under a different policy from that which now prevails.

## DOUBLE DELTA OF THE WHANG HO, OR YELLOW RIVER IN CHINA.

### PART II.

SHORTLY after the Rev. Mr. Williamson's paper was read at the Shanghai meeting of the North-China branch of the Royal Asiatic Society, a lecture was given on the same subject by W. A. P. Martin, LL.D., President of the Foreign College of Peking, on the 29th March, 1866. A special meeting had been called in order to enable Dr. Martin to give to the Society a description of the interesting route which he had just travelled from Peking to Shanghai; through part of a region, hitherto little known to foreigners, being the first journey of the kind made by a European. In that journey he visited the country in the vicinity of Kai-fung Fu, where the Yellow River had changed its course. Travellers previously, through the Northern Delta, had taken the route of the Grand Canal from Tientsin; but he traversed the Imperial highway from the capital to the provincial city, a distance of fourteen hundred *lee*, or about four hundred and seventy miles, without seeing the canal. This road he found skirted the mountainous region of Chih-li province, just on the western border of the Shan-tung plain, and passing along a fertile country, thickly populated with numerous towns and villages. The ground adjacent to the road, appeared admirably adapted for a line of railway, with no engineering difficulties beyond a few bridges over the small streams. He was also of opinion the amount of traffic existing appeared sufficient to render the line highly remunerative, while a vast increase might be calculated on, as it would be certain to monopolize the communication between the northern and central provinces.

When he arrived at Kai-fung, he crossed the Yellow

River, and found that its magnitude did not support its great reputation. Above that city the water was not more than six or seven feet deep, while its breadth at some points was reduced to less than one hundred yards. However, this was at the end of February when the river is at its lowest volume, in consequence of the upper waters and their sources being bound up in ice and snow. Below Kai-fung he ascertained that the divergence of the river took place at I-fung Hien, a town of the third order a few miles to the eastward; whence, after cutting off a small angle of Chih-li, it penetrates Shan-tung. Beyond this point it appeared to have gained in volume, though it had lost in velocity.

About three years afterwards Mr. Oxenham, attached to the British Legation at Peking, traversed the same route as Dr. Martin, and crossed the Yellow River thirty miles above Kai-fung. To reach that point his journey "lay along country roads, tolerable indeed, but narrow tracks after the broad highway along which I had been so long travelling . . . . On reaching the bank the yellow colour of the river attested the correctness of its name, but the current, though by no means slow, did not impress me by its rapidity. The breadth I calculated at about half-a-mile, and from the bank the stream had the appearance of deserving in some degree the approbation as well as the execration of mankind, for so broad a river must be of value to the commercial world; but, embarking in the ferry-boat, by which men, carts, and ponies are conveyed across, I found how I was deceived, for on proceeding across the river we were poled nearly the whole way."

In contrast to these descriptions of the volume and current of "China's Sorrow" above Kai-fung, we may appropriately quote Mr. Williamson's account of its aspect 120 miles below the diverging elbow. It was in the month of November, "when slowly the river dawned on our vision like a mighty yellow dragon lying at rest on the flat land. . . . After some bargaining we got our huge cart and ourselves on board a large flat-bottomed boat, and crossed to the other side. . . . I tried to fathom the river. Immediately on our being let go I found the depth 18 feet, but about the centre I could not find ground: owing not to the depth altogether, but to the current and the moving mud. When I first saw the river, with small islets here and there, I imagined it could not be very deep; but, after sailing across, my opinion altered. Here I had a good illustration of the way in which this wilful river behaves. As it flowed against the banks it visibly ate them away; the mud fell into its devouring jaws, reminding one of cattle browsing on, or a cutter mowing grass." Nevertheless, Mr. Williamson was impressed with the apparently diminished volume of the river to what he had seen in Shansi on its upper waters. This he accounted for by concluding that the Yellow River has an outlet for part of its flood by the Ku-lu Ho on its southern bank, and by the Wei Ho to the northward, both junctions being above Kai-fung. The former he inferred from information, that boatmen had joined the Whang Ho by that channel; and for the latter supposition by having met boats going in that direction, which they could not reach—as far as he knew—but by the Wei Ho.

Part of this information was obtained from Mr. Ney Elias, a merchant in Shanghai, who has contributed

a large amount of exploration to our knowledge of the geography of China. In the autumn of 1868, he, in company with Mr. Hollingsworth, was sent, under the auspices of the Asiatic Society, to explore the new course of the Whang Ho, from the point where the river leaves its old course, near Kai-fung, to its new embouchure in the gulf of Pe-che-lee. The exploration was conducted successfully as far as Tsi-nan Foo, the provincial city of Shan-tung. From that point Mr. Davis, of Chefoo, sailed down the river, and sounded its depth at intervals on his passage to the sea. The channel ranged from 18 to 26 feet; and a bar formed at its mouth averaged 10 feet at high water, over narrow ground extending about 2 miles. The country in the vicinity of the river appeared to be barren and uninteresting, and there was but a limited traffic of junks on the new channel. That was 10 years ago, when the inhabitants were not certain as to the permanent course of the stream; while they were just recovering from the devastation of their homes and farms by the Nyen-fei rebels, who had been subdued after a sanguinary campaign. Since then the people have laboured successfully under the auspices of the Government, in confining the wayward waters of the Yellow River within defined limits.

In the *Peking Gazette* for December 12th, 1874, we find some interesting information on this head, as follows:—"The Governor-General of the Yellow River, Kiao Sung-nien, memorializes, urging the abolition of the office he holds. . . . The functions it formerly involved were of a highly onerous nature when the Whang Ho pursued its ancient course to the Whang Hai (Yellow Sea). In addition to the fourteen guard stations connected with the embankments, there were six other stations appertaining to the Grand Canal, and the continuous stream of junks proceeding northward with grain tribute in its full amount of some millions of piculs, requiring administration and control. A change supervened when the Yellow River burst its banks at Tung Wa Siang early in the reign of Hien Fêng, whereupon five of the stations in Honan were abolished, and the whole of the river-work service in Shan-tung was done away with. What remains for the Governor-General of the Yellow River to do lies wholly within the province of Honan; and he is of opinion that greater efficiency would be secured if the functions of his post were concentrated in the hands of the provincial governor. There is now great reason for urging it, inasmuch as in the whole of Shan-tung there no longer exists any embankment works supported by Government, the river being wholly embanked by the people of the adjacent country."

From this memorial we learn that the Whang Ho diverged from its eastern to its northern delta in the early part of Hien Fêng's reign. Now, as that Emperor succeeded Taou Kwang in 1850, we may consider that it happened three years later, or about twenty-five years ago—as suggested in the first part of this paper. Concerning the other topics referred to, the Governor-General's request to relieve him of his post was acceded to, and his duties delegated to the provincial governor. Accordingly we find in the *Gazette* a long memorial from Ting Pao-chen, Governor of Shan-tung, respecting the cost of repairs to the embankments, after one of the river floods.

Surveyors had been sent out after they had subsided, when they reported that two breaches required to be filled up, the materials to be supplied by Government and the labour by volunteers. The cost was estimated at 100,000*l.*, and a dyke some 60 miles long would be upwards of three times that amount. So extensive were the works being carried out, that nearly 100,000 men were employed on them in 1874-5. Both banks of the river were maintained in security by unremitting efforts in sundry sections where danger from the force of the current manifested itself. At one spot, while engaged in strengthening a part of the embankment, a squad of the Government labourers were precipitated into the stream by the downfall of a newly-made earthwork, and two soldiers swept away by the flood.

The fatality attending the ravages of the river, has been proverbial from time immemorial; and hence, in conjunction with its erratic course, a superstitious dread regarding it exists to this day; not only by the people who term it "Family Ruin," but by the Government who have named it "China's Sorrow," or grief. A curious instance of this is published in the *Gazette* of February 1875, respecting the supernatural protection to the embankment works, which was afforded in the freshest season by a deified being known as *Wang Tsiang Kün*, signifying the "Heavenly General Wang." It is reported by the sub-prefect of Siang Ho, that at a time when the banks were in imminent peril from the floods, he appeared in visible shape; upon which incense was burnt and prayers were offered, and the danger forthwith passed away. The Governor in his memorial explains that this phantom from Hades was, during life, acting sub-prefect of the district, who "was precipitated into the river and drowned in 1867, through the slip of an embankment. Since then a temple in honour of his memory having been erected with the Imperial sanction, he has on repeated occasions supernaturally interposed for the protection of the works. An application has now been received from the gentry and people of the locality, forwarded through the proper officials, for the bestowal by his Majesty of a title of honour on this divine being." In this instance, and in many others, the request is generally granted, so that the deities who watch over the Yellow River are numerous; and solemn invocations are offered up at their temples on occasions where this supposed influence over its wayward waters has been beneficially exercised.

Notwithstanding these superstitious notions regarding the conservancy of the Whang Ho, the Chinese are eminently a practical people, who follow the old adage, that "God helps those who help themselves;" while the Public Works Department is one of the most efficient in the State. This is shown in the report of Ting Pao-cheng, Governor of Shan-tung, published in August 1875, giving an account of the completion and cost of the gigantic embankment works on the Yellow River, as already mentioned, where the only means of accomplishing the work could be that of calling up large masses of labourers from the different adjoining districts. Accordingly upwards of 100,000 of the peasantry of ten districts in Shan-tung were assembled for the purpose, over whom officials were placed as superintendents, to guard against dishonest or dilatory workmanship.



The heart of the people, moreover, was in the undertaking, the districts in question being those which had been either actually flooded by the river, or were in immediate proximity to the scenes of disaster. The difficulties encountered in the prosecution of the work were immense; and they were aggravated by the necessity of laying foundations in the water, and among ice in December and January. The line of the embankment, about 60 miles in length, was in many places carried over tracts of land across which the river had swept, eating out channels from 25 to 30 feet in depth, or extending to 2000 and 3000 feet in width. These were filled up to the level of the adjacent ground; and dykes of support had to be constructed for the protection of the embankment. The works occupied 18 months in construction, and were satisfactorily executed by the end of June.

Since then no further operations on a large scale have been carried out, but several memorials have appeared, recommending measures for securing the discharge of the Yellow River without obstruction by means of its new embouchure into the Gulf of Pechelée. The channel of the Ta Tsing Ho, which it now occupies, does not average more than one *lee*, or the third of a mile in width; and the embankment of some of the older channels, for the purpose of carrying off the surplus waters of the river, is advocated. Moreover, the dredging of the bar at its mouth is urgently recommended, in order to allow a free channel for navigation at all times of tide. These and other improvements are postponed for want of funds. The current annual expenditure for the conservancy of the river is stated to average upwards of two hundred thousand *taels*, or sixty-seven thousand pounds sterling.

As to the old course of the river there are but few notices in the *Peking Gazette*; and it would appear that most of the inhabitants of the eastern delta of the Whang Ho have migrated to the northern one, especially the junk population, whose occupation was gone when it dried up. Wheat and other kinds of grain now grow in its bed, where formerly the rush of yellow waters was the dread and wonder of that region. Its mighty power for good or evil has been transferred to the north, but from all the data herein given, it would appear to have diminished in volume and velocity.

SAMUEL MOSSMAN.

#### RUSSIAN EXPEDITION TO THE ALAIS AND PAMIR.

M. SEVERTSOFF, the learned geologist, known by his exploration of the Tian-Shan mountains in 1864 and 1865, conducted an exploring party from Osh in Ferghana to the Alai and Trans-Alai mountains in the autumn of last year, and promises to give the scientific world some very interesting information when all the materials which have been collected are prepared and collated. He is at present engaged in this labour with some of his fellow-travellers at Osh, making two communications from there, from which the following facts may be gathered:—

M. Severtsoff left Tashkend on the 18th (30th) of September, proceeding through Khodjend, Kokand, Marghilan, and Andijan to Osh, and passing thence to Gulcha. From this place the exploring party fol-

lowed the great Ferghana-Kashgar caravan route, ascending the river which bears in its various parts the names of Kurshab-Gulcha-Su and Taldyk-Su, to a point 10 miles above Sofi-Kurgan, where, from the main route which leads to the Terek-davan or pass, a Kirghiz track branches off to the Shart pass. M. Severtsoff took this latter track, crossing the Shart (12,600 feet, in the saddle): another path here runs over a neighbouring height of 13,000 feet. The ascent to this pass is 4000 feet but the winding pathway is 11,000 feet. The incline of the pathway is in most parts 30°; the descent to the south is equally steep, but falls short of a third of a mile. From the southern base of this pass issue the Kokbulak, one of the sources of the Kizyl-Su, or affluent of the Oxus river. Taking its rise at an elevation of 11,500 feet the Kokbulak has a fall of not more than 1000 feet in 10 miles (in its course to the Alai plateau).

The party halted on the 14th (26th) of October at the confluence of the sources of the Kizyl-Su, and proceeded on the next day to the Kizyl-Yart. Some snow had fallen, giving warning of approaching winter, therefore M. Severtsoff determined not to push far beyond the Kizyl-Yart. On the 16th (28th) he stood on the Pamir plateau (absolute height 13,420 feet), only 300 feet below the summit of the pass; the Alai Steppe on the north side being 10,100 feet, is thus 3000 feet below the level of the Pamir. The Kizyl-Yart pass is described by M. Severtsoff as one of the easiest over the Trans-Alai range, the ascent not being more than 150 feet per verst. A vast plain opens out on the south side of the Kizyl-Yart, which extends eastwards into the valley of the Koksai, terminating 10 miles to the east of the Kizyl-Yart in a narrow gorge at a height of 12,700 feet, which again widens in parts. The Koksai is a river flowing first in an easterly direction, then turning off to the north-east, and falling into the Kashgar daria near the Ulukchat picket post, forcing a passage through a cleft in the Mustau or eastern continuation of the Trans-Alai mountains.

There is a caravan road skirting the Koksai, which leads from the Kizyl-Yart and from Karakul lake to Kashgar. In avoidance of the gorge or cleft above mentioned, this road leads over a pass in the Mustau mountains, and M. Severtsoff encountered a small caravan from Kashgar which had come over without difficulty. There seems to be little doubt that here is one of the head waters of the Tarim river system of Eastern Turkistan, and although the river was not followed down by any of M. Severtsoff's party, yet the information procured this time corroborates that which was obtained in 1876. M. Severtsoff gives a series of levels beginning from Khodjend, and dwells on the vegetation in the valleys and plateaus of South Ferghana and of the Alai.

Looking to the east from the Shart pass, M. Severtsoff observed at no great distance several sharp peaks, the highest of which by geodesic measurement was found to be 15,534 feet, almost the height of Mont Blanc, but without glaciers or vast snowy plains. There was snow only on the summit, on the 13th (25th) of October, and also in the shady hollows or clefts, which descended to 9000 feet; but the rugged heights of 15,000 feet were completely bare. Narrow streaks of snow, about one fathom wide, occasionally intersected the road up to the Shart, but the sur-

rounding heights, as well as the summit of the pass, were snowless, dry, and dusty. The limit of eternal snow was easy to determine at that season, and M. Severtsof fixes it at over 15,000 feet. According to Fedchenko the snow line in the west is lower.

The entire Alai range was equally free of snow, but compact masses of snow covered the sides of the stupendous Trans-Alai range, descending to the craters in the foreground, *i.e.*, terminating at an elevation of from 13,000 to 14,000 feet. A heavy fall of snow overtook the party on the 20th and 21st of October (O.S.) when they were descending the Kizyl-Yart on their return from the Pamir, through which they had to wade in crossing the Alai plateau, erring about until their Kirghiz guide brought them out of their difficulty.

Although most of the Kirghiz had depastured their flocks retiring into the southern valleys, yet large studs of horses, with a few Kirghiz guarding them, remained to feed as long as possible on the luxuriant grasses of the vast Alai plateau. The grasses on the Alai were exclusively of the *Festuca* species, which retains its succulence later than any other kind. One member of the party found that towards the lower levels of the Alai, at Archa Bulak and further west, the *festuca* gradually gives place to the *Stipa*.

M. Severtsof changes the nomenclature of the mountain chains, giving the name of *Terek Davan* to the section of the Alai range on both sides of the pass of that name, which extends from east of the Kurshab to the Djaga-gart pass; the name of *Alai* to the continuation as far as the sources of the Sokh, Isfara, and Zarafshan, where the range terminates in a mountain knot and a gigantic glacier. From this point there are three other ranges, which he calls the *Turkestan*, *Zarafshan*, and *Hissar* ranges. To the south of this chain is the superior and towering Trans-Alai range, which visibly falls away in the west and abuts on the Hissar range.

M. Severtsof arrives at the general conclusion, from his observations on both sides of the Trans-Alai, and from the triangulations, that the Trans-Alai is not one continuous range, but a complicated system of mountain ranges uniting together, and broken by immense longitudinal valleys and hollows or basins. Two such hollows are observable from the Alai—one towards the east in the direction of Karakul, including the Kizyl-Yart defile and pass; the other to the west, towards the Muk-Su, and south of the sources of the Surkhab, including the defile and pass of Altynyn-dara. These hollows separate three groups of elevation, of which the centre one, 22,300 feet high, which is the height of Kaufmann peak, is the most elevated. M. Fedchenko observed this intersectional break, but M. Severtsof adds to this the longitudinal separations. The highest peaks on either side of the Kizyl-Yart are on two different elevations: the northern elevation, separated from that on the south by a stretch of 10 miles, is the *Gurumdin* elevation, distant 13 miles east from the Kizyl-Yart, presenting a series of peaks from 17,000 to 20,000 feet high, and an offshoot of which separates the sources of the Kizyl-Su of the Oxus river system from the sources of the Koksai, which belongs to the system of the Tarim: so that this Gurumdin mountain system forms one of the principal water-partings of the Pamir. To the west of its intersection, by the Kizyl-Yart defile, the Gurumdin

mountains are broken into a chain of detached peaks by the head waters of the Koksai, and these peaks evidently merge with the southern elevation in the vicinity of Kaufmann peak, which is on the southern elevation, about midway between the Kizyl-Yart and the Altynyn-dara defiles, about 27 miles from the first, and 30 miles from the last named. From this highest centre the southern Trans-Alai elevation falls to the east and west to both these defiles, terminating on the west in a declivity in the longitudinal valley of the Ters Agar, and dividing that stream into two branches one flowing to the north into the Kizyl-Su, and the other running south into the Muk-Su. To the east of the Altynyn-dara defile this section of the Trans-Alai forms the water-parting of these headwaters (Muk-Su and Kizyl-Su), of the Surkhab, near Kaufmann peak, somewhat to the east of the latter, and merges with a vast and massive elevation with towering peaks, and covered with eternal snows which stretches from the south and separates the sources of the Koksai, Muk-Su, and Kizyl-Su. To this massive elevation, which has not yet been explored, Mr. Severtsof attaches a primary orographic interest and importance.

The Mustau rises in the form of a precipitous cape on the elevated plain south of the Kizyl-Yart, with which it is connected by a ridge intersected by the Koksai. Rising to the east the Mustau forms the wall of the right bank of that river until the latter turns off to the north, from which point it follows the course of the Kashgar-daria ending in a projection in the Djetyshahr plateau almost directly south of Kashgar. The connection of the Mustau with the more southerly elevations of the Eastern Pamir is partially discernible from the plain of the Upper Koksai, but it has not been explored.

M. Severtsof alludes to a wide and elevated valley, said by the Kirghiz to be a favourite resort of numerous herds of Arkaras and Taks (a species of mountain goat of which two herds were seen), which he presumes is the valley of the Katyn-Kanysh, an affluent of the Koksai, and which must be in his opinion a very extensive hollow.

There is a great deal of interesting and valuable information in M. Severtsof's communications; his levels and heights form an important part of the results of the scientific expedition, although the explorers did not penetrate across the Pamir beyond the Koksai. We are obliged, however, to curtail our brief and we fear very superficial summary.

Besides the *Taks*, the explorers observed several red wolves or (*Canis alpinus*), whose howl resembles that of the jackal. He also found on the northern limits of the Pamir the common wolf, foxes, hares, marmots (*Lagomys rutilus nob*), and numerous field mice (*Arvicola*), besides 14 different kinds of birds of passage and others.

M. Spassi determined the heights of 10 peaks on both sides of the Alai plateau, and altogether 15 inaccessible points geodesically, besides numerous others barometrically, with mercury; while M. Severtsof made his with a Goldsmid's aneroid. M. Schwartz determined 7 new magnetic points, being the first to make magnetic observations on the Pamir.

M. Severtsof occupied himself during this expedition with geognostics and zoology besides barometrical

measurements and the formation of a natural history collection.

The party returned to Osh, by way of the Katyn-Art and Taldyk passes. M. Severtsov remains at Osh elaborating the results of his expedition, while the other members proceeded to Tashkend and Orenburg.

ROBERT MICHELL.

## THE DUTCH ARCTIC EXPEDITION.

### "OUR POLAR SHIP."

THE following article is translated from one in the *Eigen Haard* of Haarlem. (No. 18, 1878):—

The 'Willem Barentz!' Every Dutchman may look with pride on this beautiful schooner, just finished by our countryman, Schipperus. Thanks to the gifts and subscriptions of all classes of our countrymen, our tricolour will again, after a lapse of one hundred years, float on the seas and along the coasts so familiar to our ancestors. The ancient tradition of our polar voyages was nearly forgotten, but the beautiful poem of Tollens had preserved the memory of the voyages of Barentz and Heemskerck, while the voyages of discovery of so many other dauntless navigators had been thrown into the background. The polar voyages of Jakob May, with the ship 'De Gonden Kat'; of Jakob de Gouwenaar, with the ship 'De Orangien boom' of Enkhuizen; of Peter Jansz, with the ship 'De Viar Heemskinderen'; of Van Aart Havelaar, with the ship 'De Hazewind,' were as unknown as those of Jeunis Ijs, Cornelis Roule, Willem de Vlamingh, and many other brave ice voyagers. It does indeed seem strange that a country that formerly fitted out yearly more than 100 whalers should at present know so little of their polar voyages.

Our whale fishery was flourishing when the French war ruined all our merchant shipping, and even later, in 1813, there were occasional voyages to the north. The more profitable and agreeable voyages to our colonies undermined any wish to seek the old treasures of the bleak, inhospitable north; and it seemed that as the race of hardy ice captains died out, so with them died all interest in the north seas, that had been the field of exercise and cradle of our sailors, who knew so well how to uphold the honour of our country. The old traditional names given by Dutch discoverers to lands and seas gradually disappeared from maps and were replaced by others; the burial places of our ice voyagers were only visited by strangers; and the Dutch flag that during the first winters spent by Europeans in the polar regions had fluttered over the hut of Barentz was brought back to us by a stranger; and this last wound has been felt deeply in Holland. Men of consideration placed themselves at the head of a movement that was felt throughout the whole of the land, and showed what a strong feeling still prevailed among our people for their old traditions. The best bible for a people is their own history, and happy are those who can read it, and draw from it fresh strength. And we therefore rejoice that the 'Willem Barentz' steered to the north. Her voyage must be regarded as the first

step to restore our seamen to their place in the van of scientific voyages of discovery, a right that they have so long abandoned to strangers.

As far as is possible the 'Willem Barentz' is fitted out for her task, though it is to be regretted that there was not sufficient money to build a steamer for this purpose; but the scientific polar voyages of the Swedes, Norwegians, and Germans all show that great results may be obtained with small sailing ships. That the 'Willem Barentz' is only of 80 tons must be considered as one of her greatest advantages, for in seas covered with ice small ships have great advantage, as they can work through small openings in the ice, can in calms be towed, and can run into any bays or indentations in the coast. And when one considers that the voyage is to form ice navigators, one should rejoice that the 'Willem Barentz' is a sailing and not a steam-ship. Lieutenant Payer, who has spent three winters and five summers in the Arctic regions, says that far more experience and knowledge is to be learnt in a sailing ship than in a steamer. Much depends on chance progress, depending on wind and weather, and as the vessel is not manned by sailors experienced in these icy seas, there will, in their first voyage, be many and serious difficulties to encounter. Neither money nor trouble have been spared to make the vessel as strong and solid as possible. In the whole ship care has been taken to make the timbers support each other as much as possible, so if the ship is nipped by ice, the whole may resist the pressure as one mass. But the great strength of the 'Willem Barentz' consists in her wedge form under the water, so that she will be more easily pressed out of the water by ice than crushed. The bows are very sharp, so that the masses of ice instead of keeping themselves before the bow will glide along it, and the prow has iron plates, so if the ship strikes an ice field she will be raised out of the water on to the ice.

On the 1st of December 1877, at the wharf of Messrs. Meursing and Huygens at Amsterdam, the keel of 'Willem Barentz' was laid. The work was continued through the whole of the winter every day until 9 o'clock at night by lamplight, and, thanks to the care of Herr Huygens, she was safely launched on the 6th of April. The ship is 78½ feet in length, 19½ feet beam, and 10 feet deep. A between decks is brought 4½ feet under the upper deck, and serves to strengthen the vessel, and also as lodging for the crew; while the whole ship by two water-tight compartments is divided into three parts, each independent of one another, in case of a leak. The outer skin is of oak, and covered with planking called doubling; round the bows are iron plates fastened with ten iron bands. Inboard the 'Willem Barentz' is strengthened by cross beams and iron plates. The stern is vertical to the keel to facilitate the unshipping and shipping of the rudder; it is capped with very thick wood, and the bands are twice as strong as those in the generality of ships. She draws 8 feet, and is covered with Peacock's preparation to prevent the growth of weed. The 'Willem Barentz' is a two-masted schooner, she has two strong lower masts, and two low top masts. She has spare sails, and a spare rudder on board. On deck, between the masts, are two strong boats; she carries about 40 tons of drinking water, and has 18 months' provisions

The victualling and fitting out of the 'Willem Barentz' was undertaken by the Minister of Marine, and Government stores were used. Under the active and willing care of Overseer Huysman van Dueren, Magazine Master of the Royal Wharf at Amsterdam, all the provisions were carefully examined and packed. In clothing every advantage was taken of the experience already gained by foreign expeditions. In the after part of the ship are the officers' cabins and galley, and a small place where ropes can be kept. The water tanks are abaft the main mast; the powder-room and spirit-room are under the officers' cabins, and the rest of the hold under the between decks is stowed with coal. On the upper deck, abaft the main mast, there is a steam winch, made especially for this expedition by the engineer, Mijussen, of Amsterdam, to aid in drawing in the line after deep-sea soundings or the dredge net.

The crew consists of fourteen, namely, three officers, one zoologist, one doctor, one photographer, and eight sailors. All excepting the photographer are Dutch. The command of the expedition has been given to A. de Bruyne, lieutenant of the first class; under him are two lieutenants of the second class, L. R. Koolemans Beynen and H. M. Speelman, the last undertaking magnetic observations; Dr. Sluiter is the naturalist; and the Englishman, W. J. A. Grant is the photographer. He is a graduate of Oxford, and served in the same capacity with Sir Allen Young in 1876. The boatswain, the carpenter and cook belong to the Royal Navy; the rest of the crew consist of two sailors from the pilot service at Flushing, two fishermen from Marken, and a man from Nioudiep.

Fitted out with the greatest foresight and care, the 'Willem Barentz' sailed on the 5th of May. One must not expect too much from the first Dutch polar voyage of modern days, in the way of great discoveries. The voyage must be regarded as an experimental summer trip to the seas of Spitzbergen or Novaya Zemlya, in which experience will be gained, and many important observations made. The object of the first voyage of the 'Willem Barentz' is to form experienced officers and men in ice navigation, taking at the same time as many scientific observations as possible. The Minister of Marine has supplied the expedition with the best and newest instruments, so that much may be expected from a cruise of five or six months. Important observations may be made of the minute marine fauna of those seas.

The question of what is the object of this voyage can best be answered by giving an account of the expected results.

1. Deep-sea soundings, and observations of the temperature of the sea.
2. Observations as to the qualities of salt and temperature at different depths.
3. Observations of the fauna and flora.
4. Observations on the strength and direction of the currents.
5. As many observations as possible in meteorology and magnetism.
6. The determination of places by astronomical observations.

(a) Also to place white marble memorial stones, with inscriptions, as a simple mark of reverence to our dauntless forefathers.

(b) To make geographical observations on the land and trend of the coast lines.

(c) To form seamen who may later, if necessary, be entrusted with a scientific station.

(d) To obtain knowledge of the condition of pack ice in the seas first visited by Barentz, as far as is possible in a short summer trip, so as to prepare for scientific stations or Siberian trade voyages.

The expedition left Ijmuiden on the 5th of May, and may be expected to return in October. Its course will first be directed to Jan Mayen island, and from thence the edge of the ice will be visited, and scientific investigation in the Spitzbergen sea begun. Following the edge of the west ice, Amsterdam island, the north-west point of Spitzbergen will be reached, and there a few days rest will be taken. Smeerenburg, our old and now ruined station for boiling oil, will be visited, the fallen grave stones in the seaman's burial place replaced, and a white marble memorial stone erected, with the following inscription:—

IN MEMORY,  
SPITZBERGEN OR NIEULAND,  
Discovered  
79° 30' N. latitude,  
BY THE DUTCH.  
Smeerenburg, on Amsterdam Island in the Dutch Bay,  
Head-quarters of the Netherlands North Company.  
Here wintered 1633-1634,  
JACOB SEEGERSY AND 6 OTHERS.  
Here wintered and died, 1634-1635,  
ANDRIES JANSZ, OF MIDDLEBURG, AND 6 OTHERS.

After filling up with coal expected to be found in the coal mines of Advent bay in Ijs fiord, observations for temperature at various depths will continue to be taken until the 15th of July, when probably the expedition will reach Bearen island. These observations will be of double value, as the Swedes have visited this same place, and their observations can control ours. Then the Novaya Zemlya or Barentz sea will be visited for the first time by scientific voyagers, and in September the 'Willem Barentz' will return home. There is no school for making daring seamen to be compared with a scientific cruise in the polar seas; but as a great part of our countrymen have a dread of these voyages, it is advisable that our first polar trip should not depress their courage and spirits by remaining too long absent; and the commander has instructions to avoid if possible wintering in the ice. If the Barentz sea is to be again the exercising ground for our seamen, we must be careful that our first trip is ruled by calm courage and prudence. In the month of October the expedition may be expected back at Ijmuiden with, we trust, a harvest of scientific knowledge.

#### TOPOGRAPHICAL AND REVENUE SURVEYS OF INDIA, 1876-77.

##### RETIREMENT OF MAJOR-GENERAL THULLIER.

DURING the working season of 1876-77 there were seven topographical surveying parties at work, besides two in Mysore; but, owing to the short-sighted policy of the Government, the parties have since been reduced to five, two thoroughly organised and efficient parties having been broken up to save a few rupees, at a sacrifice of many admirably-trained men lost to the department, involving injury to the public service and eventual

waste. The diminution of the trained machinery by reductions of parties, at such a critical period of the progress of the great national work on which the Survey Departments have been so long engaged, is as much a mistake financially as it must be injurious to the crying wants and necessities of administrators of the Indian provinces, who must have the surveys they ask for sooner or later. The reduction is alike detrimental to the real interests of the Government, and to the prospects of old and zealous servants, who have freely sacrificed their health in the arduous and perilous duties of the surveys. In 1876-77, however, the work was pushed forward by a sufficient staff, securing an out-turn of 18,909 square miles topographically surveyed, 1749 square miles cadastrally surveyed, and 10,794 for revenue and village maps. From 1845 to 1877 there have been 493,293 square miles surveyed for revenue purposes in Bengal, Assam, Oudh, the North-West and Central Provinces, the Punjab, Rajputana, Sind, and Bombay; beside 1281 square miles cadastrally surveyed in the North-West Provinces, on a scale of 32 and 16 inches to the mile, from 1871 to 1877. Since 1860 the topographical surveys have been extended over 291,554 square miles.

The districts in which topographical surveys were making progress in 1876-77 were Gwalior and Central India, under Captain Strahan; Khandesh and the Bombay Native States, under Mr. Horst; Bustar, under Captain Holdich; the north-eastern division of the Central Provinces, under Colonel Depree; Bhopal and Malwa, under Captain Wilmer; and the Khasi Garo and Naga hills, under Major Bagley.

The map of the Daphla Hills and the course of the Subansiri river, by Major Godwin Austen, was completed. This distinguished surveyor, whose services were lost to the department by his retirement on June 12th, 1877, believes that the east branch of the Subansiri, near 94° east longitude, is the great river of Tibet, hitherto supposed to be the Dihong.

The Mysore topographical survey is under Captain Strahan and Major Thuillier, who have been at work in the Nundydroog and Nagar districts.

General Thuillier retired from the post of Surveyor General in the end of the year 1877; and was succeeded by Colonel Walker, who unites the two posts of Surveyor General and Superintendent of the Great Trigonometrical Survey in one appointment.

General Henry E. Landor Thuillier, C.S.I., F.R.S., entered the Bengal Artillery in 1832, and joined the surveying service in 1836. He was engaged on the Ganjam and Orissa Surveys, from 1839 to 1842, and afterwards surveyed Silhet and Cachar. In 1847, he succeeded Major Wroughton in the charge of the revenue surveys, and in 1851 was published his *Manual of Surveying for India*, which has been, for the last quarter of a century, the means of inculcating strict professional principles and vigorous procedure in the revenue settlement department. A second edition appeared in 1855, and a third in 1875. On the retirement of Sir Andrew Waugh, the two offices of Surveyor General and Superintendent of the Great Trigonometrical Survey were separated, and General Thuillier was appointed Surveyor-General of India on the 12th of March 1861. He had been Sir Andrew Waugh's Deputy, in charge of the office at Calcutta, from 1847 to 1861, and during those fifteen years the general usefulness of the surveying operations had been increased a hundredfold. During his Surveyor Generalship, covering a period of sixteen more years, his activity has never flagged. His energy and talent for organization have been devoted alike to improving the system of surveying in the field, and making its results more readily accessible to the public. In his time the use of photo-zincography was introduced into the office at Calcutta, and the out-turn of work by this means, already enormous, is yearly increasing. By photo-zincography the results of the

surveys are immediately made available for general use. In 1876 as many as 156,969 copies of maps and plans were thus produced. In 1869 General Thuillier arranged that the remaining sheets of the Indian Atlas should be engraved at Calcutta, having engaged a staff of engravers in England, and this branch of the department has also been very successful.

The public service owes a debt of gratitude to General Thuillier for his devotion and zeal during forty-five years, and for the great and lasting results of his able administration. We believe that so active a public servant will not be able to rest even after such long and severe service, and that geography will yet derive much assistance from his experienced labours; but most certainly he has earned some rest, and, in welcoming him back to England, we sincerely wish him many more years of health and happiness.

## Reviews.

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### ROUND ABOUT THE CARPATHIANS.\*

*Round about the Carpathians* is an extremely pleasantly-written volume, and gives a large amount of well-digested information about Transylvania. The author, leaving Buda-Pest in June 1875, proceeded by steamer down the Danube to Basiash, which, as the terminus of the railway, is a place fast growing into importance. From that point Mr. Crosse abandoned railways and steamers, and adopted the excellent plan of going his "rounds" on horseback. By this independent method of travelling he enjoyed exceptional advantages in becoming acquainted with the characters of the mixed populations and the varied scenery of Transylvania. The fine views of the Southern Carpathians are fully appreciated and well described. The author says:—

"The sides of this valley are clothed with dense forests, with broken cliffs obtruding in places. The height of the Carpathians in this part of the range must not be taken as a gauge of the scenery, which quite equals in grandeur the higher Alps in many parts of Switzerland and the Tyrol. Comparisons are dangerous, for the lovers of Switzerland will silence me with glaciers and eternal snows; these advantages I must concede, still contending, however, for the extreme beauty and wildness of the Southern Carpathians. The characteristics of the scenery are due to the broken forms of the crystalline rocks, the singular occurrence of sharp limestone ridges, and the deep forest-clad valleys, traversed by mountain torrents, which everywhere diversify the scene."

In addition to general descriptions of the country, Mr. Crosse enters briefly but instructively into its geological formation, and his remarks on the mineral wealth of Transylvania will prove extremely interesting to all those who are concerned in the material prosperity of Hungary. Probably no other part of Europe of the same area possesses such mineral wealth as Transylvania. At Petrosény one of the seams of coal is 90 feet in thickness. The production of coal seems, however, to be hampered by administrative abuses, which the author thus refers to:—

"While at Petrosény, I heard great complaints against the Government for selling coal at such a low price that they must actually work at a loss. The Kronstädter Verein say they are prevented in this way from making their fair profits, as they are obliged to sell down to the others. It would appear to be a

\* *Round about the Carpathians*. By Andrew F. Crosse, F.C.S. (Edinburgh and London: Blackwood and Sons, 1878.)

suicidal policy for the pockets of the taxpayers to be mulcted for the sake of securing a prospective monopoly and the ruin of a private enterprise."

To the general reader the most interesting portions of the volume will be the accounts the author gives of the people amongst whom he travelled. Whilst doing justice to the good points of the Hungarian character, such as patriotism, hospitality, and bravery, he does not gloss over or conceal their faults of pride and recklessness. Magyar intolerance of German is well exemplified by the following passage:—

"It happened to me once that I entered an inn in a Hungarian town, and addressing the waiter, I gave my orders in German, whereupon an elderly gentleman turned sharply upon me, saying—also in German, observe—'It is the custom to speak Hungarian here.' 'I am not acquainted with the language, sir,' I replied. 'German is not to be spoken here—Hungarian or nothing,' he retorted. I simply turned on my heel with a gesture of impatience. It was rather too much for any old fellow, however venerable and patriotic, to condemn me to silence and starvation because I could not speak the national lingo, so in the irritation of the moment I rapped out an English expletive, meant as an aside. Enough! No sooner did the testy old gentleman hear the familiar sound, invariably associated with the travelling Britisher in old days, than he turned to me with the utmost urbanity, saying in French, 'Pardon a thousand times, I thought you were a German from the fluency of your speech; I had no idea you were an Englishman. Why did you not tell me at once? What orders shall I give for you? How can I help you?'"

Of the Wallachians, the author is not inclined to speak so favourably, probably from having been brought more into contact with the antagonistic Magyars, but when we consider the good front that the Roumanians have displayed at Plevna and on other occasions during the late Russo-Turkish War, we cannot coincide altogether with the views of Mr. Crosse:—

"To meet a Roumanian possessed even of the first rudiment of education is an exception to the rule: even their priests are deplorably ignorant; but when we find them in receipt of such a miserable stipend as 100 florins, indeed in some cases 30 florins a-year, it speaks for itself that they belong to the poorest class. The Wallacks lead their lives outside the pale of civilisation; they are without the wants and desires of a settled life. Very naturally the manumission of the serfs in 1848 found them utterly unprepared for their political freedom. Neither by nature nor by tradition are they law-respecting; in fact, they are very much the reverse."

Along with other writers on Transylvania, Mr. Crosse refers to the ruthless destruction by fire of the beautiful woods that adorn the slopes of the southern Carpathians. At present there is an ample supply of forest, but the time must come when this reckless waste by the Wallachians will cause the country at large to suffer.

Like most young travellers who go for the first time amongst rough people he is constantly suspecting them of designs against his person, and brandishing his revolver rather too frequently.

At page 150 he commits a slight error by misquoting Mr. Danford in "The Ibis," with reference to the size of the trout in the Sebes, also in the volume referred to, which should be Vol. V. Series III. In another quotation from the same source, the names given Chamois-Eagle, Fisher-Eagle, King-Eagle, will look curious to the ornithological reader: in so quoting, the translation of the Hungarian names has been mistaken for the ordinary English ones. There are a few mistakes in names, such as *Ursa*, given as Wallach for bear, instead of *Ursu*, the proper word (*v.* page 123).

On the whole Mr. Crosse must be congratulated on having produced a book which gives a truthful and lively description of the populations and scenery of Transylvania, and which forms a very worthy companion to Boner's *Transylvania, its People and its Products*.

#### BURMA—PAST AND PRESENT.\*

IN these two handsome volumes Lieut.-General Fytche weaves together his autobiography and an exhaustive account of Burma, in the British portion of which he was employed for 30 years, and held the office of Chief Commissioner from 1867 to 1871. It was during his administration, and under his direction, that Major (now Lieut.-Col.) Sladen undertook his expedition to Bhamo and Momien.

On the eve of publication he was inclined to regret that he had not given his information in a more abstract form; in our opinion he may be satisfied with having communicated it in an agreeable and readable manner; nor are we disposed to quarrel with him for telling us about himself, as he does it so pleasantly and naturally, and had he chosen a more severe style we should have lost some characteristic and interesting anecdotes. His readers will see that though he lived so long among the votaries to Buddhism he has no fancy for the doctrine of *nirvana*, or self-annihilation. We are not sure, however, that a spice of *self* is not favourable, as a certain amount of ambition certainly is, to the production of that description of character to which we owe the acquisition and preservation of our great Indian Empire.

The General claims as his ancestor Ralph Fitch, who in the reign of Elizabeth travelled through India and penetrated as far as Burma, and whose quaint and concise narrative may be read in Purchas and Pinkerton. Another ancestor (in what degree we are not told) was William Fytche, President of Fort William, who died in 1752 at the early age of 35, and of whom an engraving from a posthumous but very striking portrait by Hogarth is given.

The account of Burma begins with an historical sketch compiled from the ancient Burmese chronicles and old Portuguese historians. This history, up to the time of the first collision with the British power, is a round of wars and revolts, of treacheries and murders repulsive in the extreme. The only points of any interest in it are the political intrigues of Spanish and Portuguese adventurers and the three invasions of Burma by the Chinese. The government is an absolute despotism; there is no hereditary rank or title in the kingdom; the only check on the tyranny of the king is the fear of insurrection. When set side by side with the enlightened government of the English, the natives were not slow to discover the advantages of the latter. Ever since the first Burmese war all the surrounding populations have immigrated in large numbers into the British provinces.

"In 1826 the provinces of Arakan and Tenasserim were annexed to the British dominions, whilst Pegu remained under

\* *Burma—Past and Present, with Personal Reminiscences of the Country*, by Lieut.-General Albert Fytche, C.S.I., late Chief Commissioner of British Burma, and Agent to the Viceroy and Governor General of India. In 2 vols., with Illustrations, (London: C. Kegan Paul & Co.) 1878.



Burmese administration. The population of Arakan amounted at that period to about 100,000 souls, and that of Tenasserim to about 70,000. In 1855 the population of Arakan had increased to more than 350,000; whilst that of Tenasserim had increased to more than 210,000. Within 30 years the populations of both provinces had trebled under British rule. This vast increase was due to immigration from provinces under Burmese government, and notably from Pegu.

"Shortly before the completion of this period, Pegu was wrested from the Burmese Government, and the interposition of the new British province almost immediately caused emigration to the two older provinces to subside; thus proving that the cause which had given rise to it had been removed. The tide of life flowed no longer from Pegu when a Government which respected the rights of individuals had been established; but commenced to flow into it from Upper Burma in a continuous stream, and in a very short time more than recouped it for the multitude who had abandoned that province for Arakan and Tenasserim. In 1855 the population of Pegu was about 700,000; in 1865 it had swelled to 1,400,000; in 1875 it was 1,750,187."

Our author adds that the Burmese dynasty has always possessed a strong hold on the reverence and imaginations of the people, and he justly argues that—

"The desertion of their own sovereign and country by these masses, and their voluntarily placing themselves under an alien rule, coupled with the vast increase of prosperity in every shape of the portion of Burma which has become British, must, at least, as far as British Burma is concerned, unequivocally convince the minutest admirer of native rule and institutions of the excellence of British over native rule."

The book contains a good popular account of Buddhism, as professed by the Southern Buddhists. It has been supposed by some travellers in Burma, from seeing many religious buildings going to decay, that Buddhism was declining. This, the General tells us, is not the case. A much larger amount of honour and merit attaches to the foundation of new temples and monasteries than to the repairing of old ones: hence many sacred buildings go to ruin at the same time that new ones are erected.

The many points of similarity between the Buddhist and the Roman Catholic religions have been dwelt upon by numerous writers, and they struck General Fytche no less than they did Messrs. Huc and Gabet, though among the Southern Buddhists they are not perhaps so startling as among the followers of the less pure religion of Tibet. We have never yet seen a sufficiently satisfactory explanation of these strange points of resemblance. The General speaks of them as superficial, and certainly, as far as forms, ceremonies, and Church government go, they may be so considered. But this resemblance goes deeper: the ethics of the Buddhists have a remarkable analogy with those of the Christian Church, and it has been remarked that in reading the life of Gautama it is impossible not to be reminded of many circumstances in the life of our Lord.

The Buddhists may justly claim superiority over the Christians on two heads. They have never propagated their religion by fire or sword. And they have been the first to establish a general system of education. The account given by the General of the national schools of Burma is most interesting. They originated in the monasteries, but have extended beyond, the lay, or, as they are called, *House schools* being free from some of the disabilities that are attached to the religious seminaries, notably the exclusion of female pupils. "Owing to these two classes of indigenous schools, there is scarcely a man in

Burma who cannot read, write, and cipher. . . . The discipline is strict, and there is no sparing of the rod when such is necessary." At the suggestion of Sir Arthur Phayre, these schools have been made the basis of a more extended system of national education, the success of which seems to be assured.

We are very far from having noticed all the topics of interest in General Fytche's work: our readers will easily light on many more. His book has the great merit of being written by one who thoroughly understands what he is writing about; it is well got up, and is supplied with an excellent map and many illustrations.

#### PARIS UNIVERSAL EXHIBITION OF 1878.\*

THE attentive reader of this handbook will scarce fail to regret that so exhaustive and able an exposition of the history of Indian trade and Indian art should be presented to the world in a form which is necessarily more or less ephemeral. The careful historical and artistic researches which Dr. Birdwood has entered upon, and the thought with which he has marshalled his facts into a serried phalanx of arguments all tending to shew the vital political importance of the Euphrates valley route to India deserves a much more careful examination than is wont to be bestowed on handbooks. The main contention of the author here is that the States and Empires along the *littus Arianum* rose and fell in prosperity according as they gained or lost the trade of the East, and this theory is argued with considerable dialectical skill, though all may not find it possible to agree in the conclusions that a great overland trade must spring up between Russia and India, with an emporium at Merv, or that the commerce of the future between India and Europe will gravitate, as sure as the fall of a plummet, to the line between Banda Abbas and the Caspian.

A chapter on the master handicrafts of India will abundantly repay perusal. It notices, with truth, how primitive in one respect is the civilisation of India, where everything is hand-wrought, and therefore more or less a work of art, and justly protests against the "improvement" of such a people in the practice of their own arts. We heartily concur in the spirit of such a sentiment, though, of course, everything must depend on the manner and extent of the improvement. No lover of art could wish to see "improved shawl patterns from Paris" thrust on the Cashmere weavers, whose former handiwork and designs have achieved such deserved world-wide reputation. On the other hand, education may, if rightly directed, eliminate much that is lacking in purity of thought, and much that is grotesque, from Indian art. The author's obvious dread is the general introduction of machinery into India, and the consequent sacrifice of decorative art, as has been the case in the United States of America and elsewhere. It must not be forgotten, however, that the extraordinary abundance of cheap labour in India will always form a bar to the wholesale supersession of manual labour which we see in more highly civilised countries.

The following description of the traditional handicrafts of a Deccan village is so picturesque that we cannot forbear reproducing it:—

"Outside the entrance, on an exposed rise of ground, the potter sits by his wheel moulding the swift revolving clay by the natural curves of his hands. At the back of the houses, which form the low irregular street, there are two or three looms at work, in blue, and scarlet and gold, the frames hung between the acacia trees, the

\* *Handbook to the British Indian Section of the Paris Universal Exhibition of 1878.* By George C. M. Birdwood, C.S.I., M.D. Edin. (London, 1878.)

yellow flowers of which drop fast on the webs as they are being woven. In the street the brass and copper smiths are hammering away at their pots and pans; and further down, in the verandah of the rich man's house, is the jeweller working rupees or gold mohrs into fair jewellery, gold and silver earrings, and round tires like the moon, bracelets and tablets and nose rings, and tinkling ornaments for the feet, taking his designs from the fruits and flowers around him, or from the traditional forms represented in the paintings and carvings of the great temple, which rises over the grove of mangoes and palms at the end of the street above the lotus-covered village tank. Now it is half-past three or four in the afternoon, and the whole street is lighted up by the moving robes of the women going down to draw water from the tank, each with two or three water jars on her head; and so going and returning in single file, the scene glows like Titian's canvas, and moves the stately procession of the Panathenaic frieze. Later the men drive in the milk-white kine from the moaning jungle, the looms are folded up, the coppersmiths are silent, the elders gather in the gate, the lights begin to glimmer in the fast-falling darkness, and the feasting and the music begin, and the songs sung late into the night from the Ramayana or Mahabharata; and the next morning with sunrise, after their simple ablutions and adorations performed in the open air before their houses, the same day begins again. This is the daily life going on all over Western India in the village communities of the Deccan, among a people happy in their simple manners and frugal way of life, and in the culture derived from the grand epics of a religion in which they live and move and have their daily being, and in which the highest expression of their literature, art, and civilisation has been stereotyped for 2000 years."

The description of two such specialties as Indian arms and jewellery is conceived in the author's happiest style, and almost compensates one for the absence of the objects referred to. We are next introduced to the interior of a wealthy native's residence in Bombay, and so gain an acquaintance with the household decoration and art furniture prevalent in that and other Presidencies of India. Woven fabrics, such as muslins, bleached and unbleached calicoes, silks, brocades, &c., appear to be well represented in the Exhibition, and the history of their manufacture is treated in most interesting fashion in the handbook. We should have liked to have had rather more information about one of India's most beautiful products—the famous shawls of Cashmere, the finer qualities of which fetch such enormous prices.

We have had occasional grumbles in England from trades who have imagined that their interests have been injured by the competition of gaol-industries; but we regret to see that in India carpet manufacturers have better cause of complaint than the English mat and brush makers. Dr. Birdwood informs us that the Indian Government, in one of its ruinous fits of small economies, hit upon the plan of using their gaols for the supply of the now lucrative trade in carpets, and that by underselling the honest caste weavers, the latter have been impoverished and ruined, and their beautiful and historical art handed over to the Thugs, who have simply strangled it.

One of the most suggestive parts of Dr. Birdwood's book is the concluding chapter, wherein he has developed a very consistent and ingenious theory regarding the "knop and flower" decoration. This cannot be well understood without the aid of the woodcuts illustrating it, but it may suffice for a review to explain that he traces a distinct similitude between the knop and flower as depicted on Sind pottery and the same on the palace of Kouyunjik, which he regards as a further proof of the remarkable affinity between Assyrian and Indian decorative art—an affinity probably due to the fact that the earliest civilisation of India before the Aryan invasion, was Turanian, as well as the pre-

Semitic civilisation of Babylonia and Chaldæa. The development of this knop and flower pattern the author further traces in the Greek "honeysuckle and palmette" scroll, the "tongue and dart" and "egg and tongue," the various modifications of which are analysed with considerable perspicuity. We take our leave of this most interesting handbook with the feeling that its production is a credit to the author, and we trust that the favour with which it has been received will encourage him to issue it in a more permanent form.

**THE ROYAL NAVY LIST.** Containing Dates of all Commissions, and Statement of the War and Meritorious Services, &c., of the Officers of the Royal Navy and Royal Marines on the Active and Retired Lists. By *C. E. Warren, R.N.*, and *Lieut.-Colonel F. Lean, R.M.L.I.* (April 1878.)

THIS undertaking deserves all possible encouragement, as it supplies a great want for the Navy, which has long been felt. *The Royal Navy List* is on the same principle as Hart's *Army List*, and it contains much very useful information which could not be obtained previous to its publication, without great difficulty. The special points in this new Navy List are the dates of all commissions of each officer, a most important piece of information; the war and meritorious services of officers, which are given in no other book of reference; the causes of awards, with official details of the deeds of gallantry for which the Victoria Cross, the Humane Society's and Albert Medals &c., have been given; causes of special promotions; and civil appointments held by officers, especially in the retired list. We trust that the editors will be promptly supplied with additional information, so as to make their most useful section on war and meritorious services complete.

## Log Book.

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**The President of the Royal Geographical Society.**—The Earl of Dufferin, who will return from Canada in the course of the summer, has accepted the post of President of the Royal Geographical Society for the year 1877-78. The Vice Presidents will be Sir Henry Rawlinson, Sir Rutherford Alcock, Lord Cottesloe and Sir Harry Verney.

**Professor Nordenskiöld's Arctic Expedition.**—Signor G. Bove, the Italian officer attached to Professor Nordenskiöld's expedition to the Siberian Polar Sea, reports that he has been most graciously received at Stockholm by His Majesty King Oscar, who showed great interest in Arctic matters, and in the Italian doings in Central Africa. Two vessels are engaged for the expedition—the 'Vega' (see our number for November 1877, p. 297) and the 'Lena,' a steel-clad steamer of about 500 tons, commanded by Captain Johannesen, who has already navigated the Sea of Kara. This latter vessel is the property of M. Siberiakoff, and it is proposed that the two vessels shall voyage in company as far as the delta of the Lena river, and that the 'Lena' shall then ascend the river to Yakutsk. But if, by any mischance, the 'Vega' should ground on the banks northward of the Katanga and the Kolyma, the 'Lena' will endeavour to proceed on to Behring's Straits.

**Hydrographic Surveys in North Eastern Asia.**—Lieutenant Onasetvich has recently communicated to the Imperial Russian Geographical Society an account of his hydrographical labours in the seas off the eastern coast of Siberia during the years 1875-76. Between January and October of the former year he was engaged mainly in astronomical work, and for the en-

suing twelve months in taking soundings. He executed several surveys in the vicinity of Vladivostock Bay, and connected that town by means of chronometric measurements, with Hakodadi, Yedo, Hong Kong, and intermediate positions. He then made an excursion in the clipper 'Vsadnik' to the Straits of Behring and the Arctic Ocean, in the course of which he determined astronomically the position of Petropaulovsk and other points on the N.E. coast of Asia, and surveyed several parts of the coasts, including that portion of the Arctic Ocean between Behring Straits and 70° N. latitude.

The following positions determined by Lieutenant Onasetvich will prove of great use in the construction of future maps:—

	Lat. N.	Long. E. of Greenwich.
Vladivostock ... ..	43° 6' 51" 4	8h. 47m. 33s. 31 (in time)
Kirpitchin Zavod Bay	43 8 24	8 47 37 75 "
Holy Trinity Bay ...	42 34 57	8 44 36 72 "
Korsakov Port ... ..	46 38 52	9 31 0 26 "
Jijiginska Bay ... ..	61 47 54	10 41 37 66 "
Jamska Bay ... ..	59 34 10	10 17 33 16 "
Tawiska Bay ... ..	59 31 52	9 56 45 57 "
Aian ... ..	56 27 27	9 12 45 15 "
Feklistov Island ...	54 56 1	9 7 6 00 "
Mamga River ... ..	54 24 5	9 7 11 13 "
Saint Olga Bay ... ..	43 44 24	
Saint Gabriel Bay ...	62 23 30	179° 3' 8" (in distance)
Holy Cross Bay ... ..	65 27 54	181 14 5 "
Providence Bay ... ..	64 21 55	186 36 1 "
East Cape (S.E. extremity) ... ..		190 7 0 "
Cape Serdtse Kamen	67 3 1	188 27 7 "

**Explorations in New Guinea by Signor L. M. D'Albertis.**—From the diary of Signor D'Albertis, published in the *Sydney Morning Herald* of the 8th of March last, we learn that he has recently returned to Sydney after one of the most adventurous and dangerous voyages that had ever been made in New Guinea.

For the purpose of exploring the Fly River the New South Wales Government had placed at his disposal the steamer 'Neva,' in which he left Somerset in May of last year under rather unfavourable auspices. He had been particularly unfortunate in the selection of his crew, who proved refractory and mutinous; and he also met with great hostility from the natives, on several occasions being obliged to have recourse to arms in self defence. The results of the expedition add little to our geographical knowledge, and consist chiefly of additions to his natural history collections. We understand it is not the intention of Signor D'Albertis to make any further attempt at exploration in this region, the climate having been found exceedingly trying.

**Captain R. Burton's recent Explorations in the Land of Midian.**—With the object of examining into the mineral wealth of the Land of Midian, Capt. Burton left Suez in December 1877, returning in April last. The results of these four months' travelling, in which upwards of 2500 miles were traversed, add very considerably to science generally. Besides maps and plans of the whole country, including 22 ruined cities, the expedition returned with 25 tons of ores of gold, silver, copper, tin and lead; several cases of ethnological and anthropological collections; numerous sketches in oil and water-colours, and photographs of the chief ruins. He also discovered three deposits of sulphur, three turquoise mines, and immense masses of gypsum, saltpetre, and rock salt; and he proposes at once to take measures for working these promising mines. Specimens of ores are to be sent to London and Paris, and the rest analysed in Cairo, while the various curiosities after being exhibited at Cairo will be forwarded to the Paris Exhibition.

**Expedition from Senegal to Timbuktu and Algiers.**—M. Paul Solleilet, who endeavoured a few years ago to open up a commercial route between

Algiers and Senegal, has started from Bordeaux on a second expedition with the like object for Saint Louis, in Senegal, from which port he intends to journey into the interior to Timbuktu, from thence to In-Salah, and from In-Salah to Algiers. M. Solleilet is an energetic man, accustomed to the climate of the Sahara desert, and in his former journey he succeeded in gaining the respect and liking of the Arabs and Berbers. It appears very likely that he will be successful in obtaining the prize of 10,000 francs propounded by the French Geographical Society, for the task he has set himself.

**The Italian Expedition into Central Africa.**—A telegram from Gordon Pasha, dated Khartum, 23rd March, states that Messrs. Gessi and Matteucci, the Italian explorers, had passed through Fazoklu, the frontier Egyptian town, and had safely reached Fadasi, the first station in the Galla country, and the extreme point reached by Marno, the Austrian traveller. According to Gordon, the chief difficulties in the way of the Italians would be found between Fadasi and Kaffa, where, for thirty days' march, they would have to travel among hostile, savage, and cruel tribes. Gordon's intention is to establish military posts between these two stations, but it is beyond the power of Egyptian finances to bear the expense of maintenance just now. Gordon Pasha proposes to inspect the ports of Berberah, Zeyla, Massowah, and Suakin, and thence to return to Khartum, after which he will make for Darfur. He has promised to telegraph to Signor De Martino, at Cairo, any further intelligence respecting the Italian expedition.

**A New Patagonian Volcano.**—The United States' flag-ship 'Omaha,' in the morning of the 18th of last January, was in the channel which separates Wellington Island from the mainland, in Magellan's Strait. At 4.30 A.M. an immense cloud-like column of smoky vapour was seen to rise with great velocity to a height of several thousand feet. At 9.20 A.M. this phenomenon was repeated, and at 11.30 A.M., being opposite Libertad Bay, lat. 48° 55' 30" South, through a break in the high land bordering the channel, bearing east a little northerly, distant from 30 to 40 miles, a partly snow-covered peak, emitting vapour, was clearly seen, from which, judging from its position, the preceding eruptions must have taken place. This volcano does not appear to have been seen before. The name of the ship, 'Omaha,' is therefore proposed for it.

**Colonel Prejevalsky** is on his way home to St. Petersburg, having put off his projected expedition to Lhasa to a more favourable opportunity. We fear (though it is not so stated) that his recent illness must have incapacitated him from further exploration for the present. He appears to have profited by his stay at Zaisan by making some natural history collections.

**The Late Mr. T. T. Cooper.**—The death, by assassination, of Mr. T. T. Cooper, British resident at Bhamo, at the comparatively early age of 41, is a sad occurrence, though it is satisfactory to observe that it probably proceeded from no political motive such as must have prompted the murder of Mr. Margary. Mr. Cooper's chief reputation as a traveller rested on his remarkable journey up the Yang-tse-kiang across the province of Szechuen, and the frontier of Tibet to Bathang and thence to Wesi in Yunnan. His well-known work descriptive of this feat achieved a deserved popularity, and showed that he possessed in no small degree those necessary qualities of an explorer, courage, decision of character, and endurance. His next attempt to explore a route between India and China was made by way of Assam, but in this instance he was unable to get more than a few miles beyond the frontier. Had his life been spared geographical science would no doubt have been benefited by one who has been described by a high geographical authority as "one of the most adventurous travellers of our time."

## Proceedings of Geographical Societies.

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### THE ROYAL GEOGRAPHICAL SOCIETY.

*Meeting of 13th May, 1878.*

Sir RUTHERFORD ALCOCK, President, in the chair.  
The paper of the evening was by Capt. H. TROTTER, R.E.

#### ON THE GEOGRAPHICAL RESULTS OF SIR T. D. FORSYTH'S MISSION TO KASHGAR IN 1873.

In introducing the author to the meeting, the PRESIDENT remarked that Captain Trotter had penetrated to those elevated regions north-west of Kashgar, of which previously very little was known. He had crossed mountain passes 15,000 to 20,000 feet above the sea level, and made accurate observations of the lofty plateau and passes of the Pamir, which in the imaginative language of the Persians was called the "Roof of the World."

In our number for September 1875, we published a most valuable paper by Captain Trotter on "Notes on Recent Explorations in Central Asia," in which he gave a summary of the principal geographical results of the Mission to Kashgaria under Sir Douglas Forsyth of which he was the geographer. Also in our number for November 1876, in our review of Sir Douglas Forsyth's Report of his Mission to Kashgar in 1873, we alluded to the important geographical observations and discoveries made by Captain Trotter; it is therefore unnecessary for us to now give an extended notice of the paper referred to.

In the course of his travels through the territories of the late Amir Yakub Beg Captain TROTTER stated that he had determined some unsettled questions with regard to the geography of the region, and had fixed the heights of the principal passes of the Pamir and Karakoram ranges. He doubted whether the Russians were better acquainted with the country on this side the frontier than we were, although within their own boundary they had of late carried on their explorations far more satisfactorily. One great task Captain Trotter had set himself was to determine the position of Lake Lob-nor, and everything was arranged for starting from Kashgar with this object in view, when at the last moment the Amir withdrew his permission for the expedition to proceed. This was a great disappointment to Captain Trotter, who had set his heart upon the exploration of this mysterious lake and of the surrounding country. This honour, however, has fallen to the Russians, Colonel Prejevalski having not only discovered the lake, but set at rest all doubts of the existence of the wild camel, by obtaining skins of these creatures, as detailed in our last number.

In the discussion which followed the reading of the paper the PRESIDENT remarked that the region which had been described was one of the most interesting in Central Asia, and that the recovery of Kashgar by the Chinese was a remarkable instance of the tenacity and perseverance with which they held on to any territory they had once possessed. A great many years ago, when the question of an alliance with Kashgar was under consideration, he (Sir Rutherford) expressed his conviction that the Chinese Government would never fail, sooner or later, to make such vigorous efforts as would probably recover the lost province. Yakub Beg had now passed away, and nearly the whole Mussulman population had been exterminated for the second time, which was the only way in which these Eastern races understood the conquest of a country. They had done the same in Yunnan and the South-Western Provinces, and, in fact, had carried on the practice for two thousand years, and, to all appearances, would con-

tinue to do so. The campaign, however, was a very strange one. Finding that their commissariat was insufficient, and that there was no food for them, the army from China turned their swords into ploughshares for a season and grew a crop of rice. Then they moved on again. This was a new mode of warfare. It required that time should be no object, and that there should be men in abundance. Although he did not suppose that the days of Yengis Khan or Timour would return, there was no doubt that the Chinese Government could send two or three million men across the whole breadth of the continent, if they chose to do so.

Sir DOUGLAS FORSYTH said he wished to add his mite of applause to that which had been given to his friend Captain Trotter, and to congratulate him on being the Gold Medallist for the year. When Lord Northbrook determined on sending the Mission to Kashgar, he decided not to leave the scientific results to haphazard, and therefore appointed two professional scientific men to take advantage of the opportunity to collect all the information they could regarding the interesting region to be passed through. One of these officers was Captain Trotter. He (Sir D. Forsyth) had witnessed the patience, endurance, and marvellous care with which he had pursued his investigations, and therefore he most heartily joined in congratulating him on having achieved such glorious results. Captain Trotter had been at an elevation of 19,000 feet, not only for one, but for several days, and had worked his instruments in a most laborious way. It might seem an extraordinary thing to people at home to learn that the cold was so intense in those parts, but from September till April the thermometer at night never rose above freezing-point, and for weeks together it was below zero. For the greater part of that time the Mission lived in tents. He recollected one morning, the cold being very severe, calling out to Captain Trotter, who was in the next tent, to know what the thermometer had registered during the night. The answer that came back was, "25° below zero." On one occasion Colonel Gordon, when out shooting, omitted to keep his gloves on, and on touching his rifle-barrel his hand became one mass of blisters. Captain Trotter, however, worked his instruments night and day with the utmost care, notwithstanding all the difficulties he had to contend with. Referring to the remark of the President of the Pamir being the "Roof of the World," as though it was the highest part, he had no doubt, that was the popular idea, but the Karakorum mountains were much higher: and while the passes over the Pamir were only from 13,000 to 14,000 feet, those over the Karakorum were from 19,000 to 20,000 feet. Until within the last fourteen or fifteen years the Chinese, who were masters of Yarkand and Kashgar, would not let any foreigner, European or Hindu, enter the country, which was therefore a sealed book, until the wave of Muhammadan rebellion, which began in the Western portion of China proper, spread towards Yarkand and Kashgar; and then Yakub Beg founded his kingdom. It was quite true that he established his power by a great deal of severity, but the result was that the most perfect peace reigned throughout the whole of his kingdom to such an extent, that bales of goods which unfortunate travellers had been compelled, by the loss of their ponies or camels, to leave on the road, remained untouched, as nobody would dare to meddle with them. The inhabitants too were all Muhammadans, but of a different type from what had lately been supposed to characterise Muhammadans. They were a simple, industrious, hospitable, friendly people. Wherever the English party went they were received with the utmost kindness. This must be put to the good account of the late Yakub Beg, who, however, was rather afraid of giving offence to the Russians, and therefore would not allow the Mission to carry out all the explorations that they had intended. Yakub Beg was assassinated about the middle of last year, and, in the anarchy

which followed, the Chinese general was able to push his troops forward, and to enter Kashgar. After slaughtering an immense number of people, he had now re-established the Chinese rule. He did not, however, think that all the male inhabitants had been killed. He hoped the Chinese would not fall back upon their old system of exclusion. By the Che-fu convention they had agreed to open many ports of the Empire, and perhaps they might be induced to allow the English to establish a Consulate at Yarkand. Setting aside these political considerations, he thought that a country which, within the last eight years had produced three or four Gold Medallists, must be one in which the Royal Geographical Society would feel considerable interest. He trusted that Sir Henry Rawlinson and the other members of the Indian Council who were connected with the Society would do their utmost to keep that region open for the benefit of future explorers.

In conclusion the PRESIDENT said the Council of the Society were perfectly unanimous in voting the Patron's Medal of the year to Captain Trotter as one who had richly earned any distinction which they had it in their power to confer. If the region which had been described was really the cradle of the race, it must be a very large cradle, for it had sent forth a very numerous progeny. He could not agree with Sir Douglas Forsyth in his estimate of the slaughter which had taken place by the Chinese in the territory formerly governed by Yakub Beg. He believed that they had, as nearly as might be, exterminated all the male inhabitants. They did the same thing in Yunan, and when he was in Canton 70,000 men were decapitated in one year in the execution grounds. Sir Douglas Forsyth had not touched upon the physical difficulties which the passes presented to commerce, but he was afraid that there was not much chance of ever establishing a large and lucrative trade by caravans between India and Kashgar. Still it was desirable, if possible, to have a friendly and continuous communication between the two countries, and no doubt this would have been secured by such diplomatists as Sir Douglas Forsyth, and such accomplished scientific explorers as Captain Trotter, but for the assassination of Yakub Beg and the destruction of the people over whom he had ruled.

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#### ITALIAN GEOGRAPHICAL SOCIETY.

*March 10th, 1878.*—Signor MALVANO, Vice-President, in the chair. The Baron F. VON HELLWALD read a paper on "Recent Discoveries in Central Asia," a term which he considered should, strictly speaking, be limited to the region between the Tian-Shan and the Himalayas, where the Russians and English had of late years shown such great activity in geographical exploration. Professor DALLA VEDOVA next read a paper on the history of exploration in the southern half of the continent of Africa down to the latest times.

*March 19th, 1878.*—Il Commendatore CORRENTI, President, in the chair. The PRESIDENT introduced Captain Martini, of the African Expedition, to the meeting, and gave an account of the progress of the expedition, and of the results brought home by the captain. These comprise a series of geological notes on the route between Shoa and the sea; a route survey, with notes, on the important mountain chain called Ittu, which is not to be found on Petermann's, Johnston's, or Cora's map; and a mass of ethnological, botanical, and other notes, scientific and general, on the country traversed by Signor Chiarini, the Marchese Antinori, and Captain Cecchi.

Captain MARTINI then gave a brief account of the difficulties encountered by the expedition, and exhibited two maps, one compiled by Captain Cecchi and the other by himself. They contain some points determined

astronomically, and will be published, with the narratives, in the next issue of the *Memoirs*.

The latest intelligence regarding the progress of the Gessi-Matteucci expedition towards Shoa and the Galla country will be found in the Log Book of our present number.

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#### SPANISH GEOGRAPHICAL SOCIETY.

At the end of 1877, and commencement of the present year, Don Francisco Coello was President of the Geographical Society of Madrid; and in all respects the progress of the institution has been satisfactory. The collection of maps and geographical books has been largely increased, and the number of Fellows is now 547. The *Boletín* for November 1877 contains the Address of the President on the progress of geographical work. Respecting the Spanish share of this work, Señor Coello announces that the geodetic operations in Spain itself are being steadily advanced towards completion, and several sheets of the atlas have been engraved. The *Boletín* contains a map of Spain showing the network of principal triangulations. On the 31st of December 1870 the Census of the Spanish peninsula and islands was completed, under the direction of the Geographical and Statistical Institute; and every precaution was taken to secure greater accuracy than was attained in 1860, the last time that a Spanish census was taken. The Report has now been issued. The population of Spain is 16,794,963, being an increase of a million since 1860. The Spanish Hydrographical Department has executed new work both in the Mediterranean and on the coasts of the Philippines, and charts have been completed of various anchorages in Mindanao and other islands. The Spanish Geological Survey has brought out the first part of the fourth volume of its *Boletín*, containing physico-geological descriptions of the provinces of Burgos, Logroño, Soria, and Guadalajara, with maps. Progress has also been made in the completion of a forest map of Spain, to illustrate the catalogues of trees and memoirs on State forests. The publication of fourteen new sheets, on a scale of 1:100,000, of the Map of Cuba is announced, completing twenty-eight published, while eight yet remain to finish the work. An important memoir on Puerto Rico, by Don Leonardo da Tejada, with a map, to show the roads and other means of locomotion, has also been finished; and a road map for the island of Luzon, one of the Philippines, has been completed by the Chief Engineer, Don Eduardo Lopez Navarro.

#### NOTICE.

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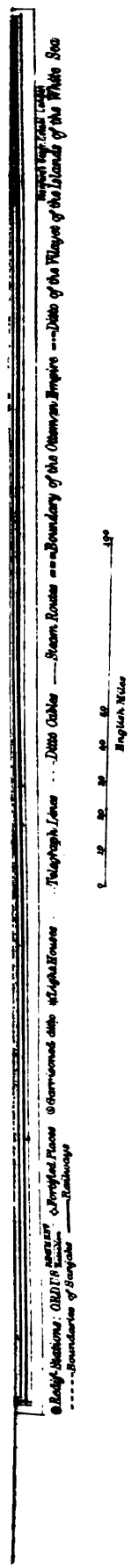
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THE  
GEOGRAPHICAL MAGAZINE.

JULY, 1878.

THE VILAYET OF THE ISLANDS OF THE  
WHITE SEA.\*

I.—INTRODUCTION.

JUST as the whole Archipelago of the "Greek" or "White" Sea bears the character of the adjoining continent in its animal and plant life, so the history of the separate islands and groups has always been connected with that of Asia Minor and Greece.

Inhabited in the most ancient times by people of various origin, all the islands of the Mediterranean from Corfu to Cyprus, and from Crete to the Prince's Islands fell at the period of the expansion of the Hellenes as an annex to the great continental possessions which the Greeks had mastered in Southern Europe and in Western Asia. With Greece they passed under the Roman yoke. After the division of the Roman Empire the Archipelago remained to the Emperors of Byzantium till 1185, when the Venetians got possession of a few of the islands. In 1207 the Venetian Marco Sanudo conquered a larger portion of them, and assumed the title of an independent duke. His successors ruled the islands as dukes of Naxos for nearly three centuries, till, in 1556, the twenty-first duke, Crispo, was taken prisoner by Sultan Selim II., when the islands were handed over to the Jew, Michez. He, however, was soon dispossessed, upon which the Archipelago was united to the Ottoman Empire, and remained thenceforward entirely under its control (excepting that the Venetians took temporary possession of a few islands in 1686), until the foundation of the kingdom of Greece, to which the Cyclades, the Northern Sporades, and Skyros were ceded.

The old Hellenes divided the Greek Archipelago into the two main groups of the Cyclades in the west, and the Sporades in the east; but the line of demarcation between these can scarcely be determined, for even Strabo and Pliny, as well as later authorities, reckon a few of the islands now to the one, now to the other group, although in general all the Archipelago, and especially the many small islands along the coasts of Lycia from the gulf of Telmissus to the defile of Mount Climan, were much better known in ancient times than they are at the present day.

\* The Vilayet of the Islands of the White Sea (*Bahr i sefid jenairi*), the Privileged Beylik of Samos (*Syssam*) and the Mutessariflik Cyprus (*Kybris*). Statistical and Military Notes from the papers of A. Ritter Zur Helle von Samo, formerly military *attaché* of the Imperial Austro-Hungarian Embassy in Constantinople, published in the *Proceedings of the Geographical Soc. of Vienna*.

In an administrative point of view, after their seizure by the Turks the islands of the Archipelago belonged to the regency of the Kapudan Pasha or Great Admiral, whose office it was to superintend the fleet and to provide for the protection of the coasts. Originally all the Pashaliks, Beyliks, Ziamets, and Timars along the coasts and on the islands of the Osmanli Empire were placed under this regency; towards the end of the 17th century, according to Count Marsigli's (*Stato militare del Imperio Ottomano*), it embraced the Pashaliks of Gallipoli, Caffa,\* Trebizond,† and Cyprus‡—that is 27 Beyliks, 217 Zaims, and 2,216 Timariotes, which provided in all 6,336 soldiers.§ The whole revenue amounted to 221,560 Risdales.||

The residence of the Kapudan-Pasha was first at Rhodes, but he was afterwards represented there by a Serdar, to whom the superintendence of the territory of the White Sea was entrusted.

Before the separation of Greece, in 1830, the Eyalet of the islands, which constituted the domain of the Kapudan Pasha, included also the sanjaks of Negroponte (capital, Euribos), Lepanto (capital, Ainabachit), Morea (capital, Tripolitza), and Mistra, with the islands Naxia and Andro.

In the year 1852, in obedience to the law of the Tanzimat, the Turkish islands were organised into the Vilayet Jezairi (the islands), with six sanjaks—Rhodus, Bosje Adassi (Tenedos), Limni (Lemnos), Midillü (Mytilene), Sakyss (Chios), and Kybris (Cyprus). The island of Crete already formed an independent vilayet. The present administrative division of the vilayet, which embraces also a portion of the continental land, is shown in the second part of this paper. The numerous partly-uninhabited islets which are not named in official returns, but which from their geographical position belong to the sanjaks of this vilayet, are also noted in the tables in the second part.

\* Under the Pasha of Caffa were the Beys of Negroponte, Lepanto, Mytilene, and Sigario.

† Under the Pasha of Trebizond were Batum, Tefterkyayassi, Khoja-Ili, Rhodes, Bigha, Misistra, Chios, Vanakia and Veendo (*sic*).

‡ Under the Pasha of Cyprus were Deguisse, Esner-Tefterdar, Timar-Tefterdar, Karai, Alaj, Tarsus, Sy, Ban, Cerinia, and Menosebeg (*sic*).

§ According to Ricaut, Salmons, and Van Gach, nine sanjaks belonged to the office of the Kapudan Pasha (Negroponte, Mytilene, Khoja-Ili, Gallipoli, Rhodus, Betgai, Misistra), 124 Zaims, and 1152 Timariotes, which furnished 3544 men.

|| Sixty aspers, made 1 Risdal (Kara Grush); 270 aspers made 1 German ducat.

The eleven islands (Nicaria, Patmos, Kalymnos, Castelrosso, Nissyros, Symi, Tilos, Stampalia, Scarpanto, Kassos, and Halki), which still bear the old collective name of the "Sporades," had received, by the Imperial firmans of the years 1645, 1685, 1751, 1771, 1772, and by the ordinance of 1860, the privilege of autonomy, governing themselves by representative councils, and paying, in place of the various imposts, only a very insignificant fixed tax (Mahtu). When the introduction of the vilayet law became general, its provisions were extended administratively to these islands also; but the prescribed imposts were not enforced there till the year 1872.

In a military point of view it suffices to glance at a map of the Archipelago to discern what kind of movements would take place in case of war, the choice of important vantage-points being determined by the relative positions of the coasts and islands, by their remarkable arrangement, and by the many obstacles in the way of navigation.

The southern chain of islands of the White Sea, including Cerigo and Crete, appears like a range of detached forts, and thus may be compared to the outmost maritime line of defence of this region, guarding the great cosmopolitan city of Constantinople from attack. On this account it is evident that their possession cannot be a matter of indifference to the Ottoman Government, and it is on that account that its enemies have taken every opportunity of freeing the islands from the supposed oppression of the Turks. In fact, at the present time this natural system of defence is in an ethnographic point of view almost completely—politically also for the most part—in the hands of the Greeks, who are always more or less inimically inclined towards the Porte. Within it the Greek Syra is the most important point, as it is the central station of steam lines uniting the Pyræus, Crete, Smyrna, and Constantinople. How far the region under consideration is prepared for eventual struggles is shown in the military statistics which have been put together in the third part of this paper.

## II.—ADMINISTRATIVE DIVISIONS, AREA, AND POPULATION.

Divisions.	Area in Eng. sq. m.	Population.	No. to a sq. m.
A. The Vilayet of the Islands of the White Sea	5621	448,248	79
B. The Privileged Beylik of Samos	212	34,300	160
C. The Independent Mutessariflik of Cyprus	3682	144,000	39

### A.—The Vilayet Bahr i sefid Jezairi.

The administrative division of the vilayet into the sanjaks of Bigha, Mytilene, Chios, Istanchio, and Rhodus, and its subdivision into kazas and nahies is shown in the table on the facing page, according to the official reports for 1875.

The sanjaks or livas, each of which is under a *Mutessarif* or governor, are divided, according to the vilayet law introduced in the Turkish empire in 1867,\* into kazas or kaimaklik, each of which is governed by a *Kaimakam*, or representative of the governor; the kazas are for the most part again subdivided into nahies or müdirlik.

\* Before 1867 the eyalet of the islands included the sanjaks of Kybriä, Bosje-Adassi, Midillä, Rodos, Sakys, Limni, and Istantkoi. Syssam (Samos) was a separate kaimaklik, and the eyalet Creta was divided into the sanjaks of Kania, Canea, Kandia, and Rettymo.

At the head of the Government stands the General-Governor, or *vali*.\* As high officials of the vilayet (Erkhiani vilayet) there assist the vali: the chief judge (*Müfettisch i Hiikiam*); the *Defterdar*, to whom the financial affairs of the whole province are entrusted; and the chief of the correspondence (*Mektubji*). The other officials directly under the vali, or related to the central Government, through him, are: the *Divan-Reissi* or *Naib*; president of the Court of Appellation (*Divan i temjis*); the president of the Commercial Tribunal (*Tidjerat-Reissi*); the *Alaj Bey*, or Chief of Police, who is at the same time colonel of the gendarmierie of the vilayet; the *Evkaf-Mudiri*, or comptroller of the properties of the mosques (*vakufs*); the *Erasi-Mudiri*, or manager of the State possessions; the *Emlak-Reissi*, or chief of the survey. There is farther, as a rule, a director of public works, an officer for the inspection of trade and agriculture, and a director of the distribution of sums devoted to public use. The tax and customs' officers (*Gümruk*), as well as the quarantine, post, telegraph, and harbour officers, the lighthouse agents, &c., are directly under the control of their central offices in Constantinople.

### B.—The Privileged Beylik Syssam (Samos).

The privileged beylik of Samos (Syssam Adassi), inhabited almost exclusively by Greek Christians, received administrative autonomy and a Christian governor in consequence of the international conference held at London in 1829 and 1830. At the side of the governor stands four senators, chosen from the population of the island, as a legislative council. The Chamber of Representatives, consisting of twenty-six deputies and the Archbishop, meets every year. Permission to bear a special flag was granted to Samos in 1830, and Dr. Ross (1843) described it as a white Greek cross on a blue field, with a narrow red stripe, which last indicated the dependence upon the Porte. A short time ago (1874) the flag was changed, and now a bicoloured flag, red above, and blue below, the horizontal arms of an upright white cross, is in use.

Samos (Parthenia, Anthemusa, Melamphyllus-Syssam Adassy) was conquered between 888 and 911 by the Saracens, in 1125 by the Venetians: in 1204 it fell to the Franks, and in 1223 Jean Ducas gave the island back to the Byzantine Emperors; it was taken in 1453 by the Turks; in 1550 it was re-peopled by the Kapudan Pasha Kilyj Ali, and played an important part in the so-called Greek war of liberation.

When Dr. L. Ross (see his *Journeys in the Greek Islands*, vol. ii.) visited Samos in 1841, Logothetis, who ruled the island during the period of the Greek insurrection, had returned to Athens, where he had taken the position of a colonel in the Greek army. The Bey of Samos at that time was the Fanariote Stefan Bogoridis, who had gained the favour of the Sultan through his loyal conduct in the war of the Porte with Russia, and who had been rewarded with the title of Prince of Samos. According to Dr. Ross (p. 143), the Bey paid a yearly tribute to the Porte

\* At the time of the formation of the vilayet of the islands in 1867 (1283) Ahmed Kaiserly Pasha was nominated General-Governor; to him succeeded, in 1872, Nazif Pasha; Omer Fewzi Pasha; and Ibrahim Pasha; in 1876, Sawa Pasha.

Sanjaks.	Kazas.	Nahies.	Area in English sq. miles.	MALE POPULATION.			Islands belonging to the Division, but not named in the Reports.	Has belonged to the Ottoman Empire since
				Muhammadians.	Non-Muhammadians.	Total		
BIGHA	With the capital ... Bigha ... Lapsaki Aiwajik Eznie (Ineh) ... Bozje Adassi (Tenedos) ... Limni Adassi (Lemnos) ... Total	Chanak Kala ...	2,779	3,302	3,115	6,417	Taushan Adassi (Kaninchen I.) ... Kasino ... The island of Thasos is under Egyptian government.	1322, finally in 1657 1462 1478, finally in 1657
		Ajeabad ...		1,958	3,219	5,177		
		Ranköi (Erenköi) ...		...	1,181	1,181		
		Dematoka ...		2,949	1,465	4,414		
		Chan ...		1,305	530	1,835		
		Chan ...		3,120	218	3,338		
		Geikly and Tedid ...		3,960	364	4,324		
		Bairamitsh... ..		7,543	1,056	8,599		
		Kum Kalä... ..		4,260	1,154	5,414		
		...		6,182	322	6,504		
		...		542	878	1,420		
		...		11	554	1,461		
...	102	...	3,070	3,070				
...	76	5	1,084	1,089				
...	180	916	9,239	10,155				
...	13	...	560	560				
Total				3,161	36,606	28,916	65,522	
MIDILLÜ (Mytilene)	Midillü ... ... ... ... Molyvo ... ... Total	With the cap. Midillü ...	1,604	11,614	17,718	Kumaki, Sigri, Vassitis, Eleos.	1462	
		Plomar ...	...	7,511	7,511			
		Polhenet ...	419	1,030	2,349			
		Yonda (Muskonisia) ...	...	1,614	1,614			
		Yero ...	477	2,340	2,817			
		Kalonia (Akerona) ...	3,761	5,838	9,599			
Total				656	6,818	37,596	44,414	
SAKYSS (Chios)	Sakyss ... Ipsara (Psyra) ... Total	With the cap. Chios	361	692	17,786	Oenussæ, Coni, Venetiko, Antipsara.	1566	
		Koyun Adassi (Spal-mador) ...	28	...	826			
		...	...	...	268			
Total				389	692	18,880	19,871	
ISTANKÖI (Kos)	... ... ... Kalamios (Kalymnos) ... Lerios... ... Patmos (Patmos) ... Kariot (Nikaria) ... Total	With the capital Kos	113	836	5,020	Rigusa, Ráchia, Kendeluisa, (Madonna, Panagio), Tria N. (Sereti), Sofrana (Plaka), Karasi N., Unia N., (Plana), Avga N., Kamila N., Safrani (Adelphoe), Kunupia, Tragonisi (Sondikonisi), Kermenisi, Hágios, Yani (Symai), Tzerni, Gaidaro, Pharmako, Strongylo, Kunei, Psatho N., Pserimos, Arki, Lipso (Lepsia), Kalavo (Kalopodí), Chalavropa N., Archangelo, Levethia (Labinthos), Majiro, Kinara (Kinaros), Arcti Pharmako (Galairo N.) Telandos, Nera-Nisi, Saphonisi, Kappari, Amidro, Petro Karavia, Prasonisi, Furni, Mimas, Themina, Antro (Korasiä), Alata.	1523	
		Injirli-Adassi (Nisyros)	64	...	2,000			2,000
		Astropalea (Pylea)	...	...	1,300			1,300
		...	47	...	5,000			5,000
		...	23	...	2,500			2,500
		...	16	...	2,000			2,000
		...	114	...	5,260			5,260
Total				377	836	23,080	23,916	
RITODOS	... Meis (Megisla Castelorosso) Sambeki (Synii) ... Kashos (Kasos) ... Total Total	With the cap. Rhodos Kastalonia (Kastalos)	559	2,209	1,867	Limnonia, Makri, Theodoros, Tragusa, Okionia, Pazimada.  Nethenos, Kiskilleas.  Saria, Armathia, Plati, Stahida.	1523	
		...	23	120	4,000			4,120
		...	30	...	8,000			8,000
		Chergit (Charki) ...	25	...	550			550
		Iliaghy (Episkopi) ...	...	...	500			500
		...	166	...	11,000			11,000
		...	...	...	25,000			25,000
Total				803	2,570	62,917	65,487	
Total				5,386	47,522	171,389	218,911	
Adding 138 sq. m. and 5,213 inhabitants for Thasos, and 96 sq. m. for the sum of the uninhabited isles.				5,620			224,124	

of 400,000 piastres, while he himself received the tenth of all products of the soil and taxes, so that, after the deduction of the costs of administration, a goodly sum remained over and above. In later years, from 1859 onward, the island was governed by M. Aristarchy Bey, then by Pavlaki Mussurus Bey; from 1873, by Costaki Adossidis Bey. In 1874 the last named was succeeded by Costaki Photiades Bey.

According to the official report, published in the French language, for 1866, the island of Samos is divided into four arrondissements, with twenty-six communes, as follows:—

Arron-dissements.	Communes.	Population.
VATHI	Port de Vathi	1883
	Vathi	4091
	Paleocastro	613
	Vourliotes	1685
	Six Quarters	1762
		10,034
CARLOVASSI	N. Carlovassi	2736
	M. Carlovassi	720
	V. Carlovassi	591
	Lecca	1006
	Castania	787
	Sourni	659
	Platane	836
	Condeique	273
Kondakeos (Condakeique)	611	
		8219
MARATHOCAMPO	Calabaktasse	523
	Marathocampo	3630
	Neochori (Esereo)	436
	Coumeique (Kamarea)	1095
Scoureique	395	
		6043
CHIORA	Spartarées	645
	Pagenta (Régonta)	1752
	Pyrgos	1533
	Albanais	723
	Mavraja	267
	Chora	1398
Mytilinée	3404	
		9722
Total		33,998

The population figures here given are those of the year 1863.

NOTE.—The number of Muhammadans on the island is estimated at about 300, including the permanent Turkish garrison of two companies of the 4th Infantry Regiment, so that the whole population of the island may now be reckoned at about 34,000.

C.—The independent Mutessariflik Kybris (Cyprus), dates as such from July, 1870; previously it belonged to the vilayet of the islands. The accompanying tabular view of the political divisions and population is taken from Lacroix's description of the island:—

Districts.	Capital, Towns.	POPULATION.		Total.
		Muham-madans.	Non-Muham-madans.	
Larnaka	Larnaka	3,000	10,000	13,000 <sup>1</sup>
Limasol	Limasol	2,000	6,500	8,500
Kilassi and Avdimu.	Kilassi	800	5,000	5,800
Baffo and Kuklia	Ktima	4,000	7,000	11,000
Chrysochu	Chrysochu	1,500	3,500	5,000
Lefka	Lefka	2,400	4,600	7,000
Morpha	Morpha	1,000	4,500	5,600 <sup>2</sup>
Lapita and Kerinia..	Kerinia	3,000	5,000	9,000 <sup>3</sup>
Ormi and Tillyrgha..	Lithrodonda	600	5,400	6,000
Kytrea	Kytrea	2,000	5,500	7,500
Messorea (Messaria)	Vatili	2,000	8,000	10,000
Karpas	Famagusta	3,000	5,000	8,200 <sup>4</sup>
Nicosia (Lefkosia)...	Nicosia	8,000	3,700	12,000 <sup>5</sup>
Total		33,300	73,700	108,600 <sup>6</sup>

<sup>1</sup> Including 500 Catholics; <sup>2</sup> with 100 Maronites; <sup>3</sup> with 1000 Maronites; <sup>4</sup> with 200 Armenians; <sup>5</sup> with 300 Maronites; <sup>6</sup> with 1400 Maronites and 200 Armenians.

The island of Cyprus (old Gr. Kypros, new Gr. Kypro, Turk. Kybris) on account of its fertility, its riches and its excellent harbours, has been an object of strife from the most ancient times. From the fifteenth century onward Cyprus was in possession of the Venetians; the Turks, under Selim II., conquered it in 1571; in July 1832, Mehemet Ali laid hands on it, and was formally presented with it by the Sultan in 1833; in 1840 it again passed under the direct control of the Porte.

The revenue of the island in 1841 amounted to 3,084,020 piastres, made up from (1), the *Charaj* or *Beledié*, military tax of the Rajah's; (2), the *Miri*; (3), the *Gümruk*; (4), the dues on the saltworks of Larnaka and Limasol and (5) a tythe on silk and reserved lands.

At the ending of the Venetian rule in 1571 Cyprus is said to have had 860 villages; in 1853, on the other hand, it had only 610, 89 of which were purely Turkish, 6 Maronite, and 515 inhabited by Greeks and Turks. The numbering of the people made in the year 1841, by order of the Governor Talaat Effendi, gave as its result a total sum of from 108,000 to 110,000 inhabitants, of whom 75-76,000 were Greeks, 32-33,000 Turks, 12-13,000 Maronites, 500 Roman Catholics, and 150-160 Armenians. The population of Nikosia was then set down at 12,000, including 8,000 Turks, 3,700 Greeks, 150 Armenians, and about 100 Maronites. According to a consular report of the year 1846, the total population at that time was estimated at 90,000 (55,000 Greeks and 35,000 Muhammadans). Ritter, in 1854, gave 110,000, Synvet (in 1871), 180,000, including 120,000 Greeks, 55,000 Muhammadans, 1250 Maronites, and 500 Europeans. During my stay in Cyprus in the year, 1874, the political divisions of the island were as follows:—

	Kaimakamliks.	Kazas.
Seat of the Mutessarif LEFKOSIA or NIKOSIA.	1. Lefkotsha (Lefkosia).	Dejermenkoi (Kytrea). Dagh Karrassy.
	2. Famagusta (Maussa).	Maussa. Messaria (Messorea). Karpas.
	3. Tuzla (Larnaka).	Tuzla.
	4. Limasol ... ..	Limasol. Piskopi (Episkopi). Gilan.
	5. Baffo. ... ..	Baffo. Chrysochon. Evdim (Avdimu). Kuklia.
	6. Kirne (Kerinia) ...	Kirne. Lefka (Lafka). Morpha.

The number of the male inhabitants is reckoned by the political staff at 72,000, of which about 50,000 is non-Muhammadan. From this the whole population might be set down at 144,000—44,000 Muhammadans and 100,000 non-Muhammadans.

In an ecclesiastical point of view there are four dioceses for the Rajahs—the archbishopric of Lefkosia and three bishoprics of Larnaka, Kerinia, and Baffo. The clergy of the Christians in Cyprus is said to exceed 1700 persons! The Archbishop of Cyprus is the independent head of the Church in the island, and owes allegiance to no patriarch: with the aid of the three Bishops he regulates the contributions and the school system of the Christians.

## III.—MILITARY STATISTICS.

In the Introduction I have noticed how the geographical grouping of the islands in the Archipelago prescribes the mode of warfare that would be adopted in case of need. The line of Cerigo-Crete-Rhodes in the first place, then the inner island girdle which extends through a width of 70 miles between Greece and Asia Minor, and, lastly, the group of the northern islands would form as many ramparts protecting the entrance to the Dardanelles against attack from the south, if only one will and one intention prevailed throughout them, and if, in consequence of their ethnographic relations and their present political divisions, the greater part of this power had not been already neutralised. As things are, the flanking positions of the islands of Rhodes, Stanchio, Chios, Mytilene, and Tenedos, which directly cover the coast of Asia Minor, alone give some protection. As the relative positions of the islands, the configuration of the coasts, and the practicable trade routes between the numerous dangers of the Archipelago, indicate the most important points for military purposes, so history—and especially that of the Greek war of Independence—shows which of the islands will play the most important parts in future as in former wars.

Like the last redoubts of this extensive natural system of defence lie the *Dardanelles*, about 185 miles from Constantinople. Thus are named the four old Turkish castles which stand in pairs on the European and Asiatic sides of the strait, opposite one another, which now, with newer fortifications, command the passage between the *Ægean* and the Sea of Marmora.

The south-west entrance of this channel is guarded by the two newer castles of Sedil Bahr and Kum Kalä, 14 miles apart, which were founded in 1659 by Muhammad IV. for protection against the Venetians. Eighteen miles further north-east, almost at the narrowest pass, only 5300 feet apart, stand the old castles of Kilid Bahr and Chanak Kalässi, or Kalä-i-Sultanie, which Muhammad II. caused to be built in 1453, after the conquest of Constantinople. Trusting to the fame of the Dardanelles castles, the Porte, during last century, had allowed them gradually to fall in ruins, so that on the 26th of July 1770 the Russian squadron of three ships of the line and four frigates under Admiral Elphinstone, was able to sail past the first pair of castles in chase of two Turkish men-of-war, without being touched by a single shot, since the Turkish batteries, from want of stores, could only fire once. Warned by this incident, the Porte accepted the offer of Baron Tott to restore the old castles; but the "impregnable" state in which they were placed did not last long, for on the 19th February 1807 the British Admiral Duckworth, with eight ships of the line, four frigates, and several gunboats, accomplished the passage of the Dardanelles without loss, so that on the 20th of February of that year a hostile fleet appeared in view at Constantinople. Previously, as also in the treaty concluded in 1809 between the Porte and England, Great Britain had recognised the principle that at all times ships of war should be forbidden to enter the straits of the Dardanelles and the Black Sea. In 1829 the Dardanelles were closed by a Russian fleet with England's consent, and in 1833, during the Egyptian war, the British and French fleets were not

permitted by the Divan to pass, though at the same time, a Russian fleet anchored at Buyukdere.

In a treaty concluded in September 1841, the five Great Powers of Europe gave a fresh promise that no ship of war should be allowed to enter the Dardanelles. At the commencement of the War in the East in June 1853, the British-French fleet anchored south of Kum Kalä in Besika Bay, whence in the end of October its ships passed through the Dardanelles and on the 3rd of November cast anchor in Beikos Bay of the Bosphorus. In the first appendix to the Paris peace treaty of 1856, the agreement of 1841 was in substance confirmed. According to this in time of peace the Dardanelles and the Bosphorus are closed to all but Turkish ships of war; but the Sultan retained the power to grant firmans for the passage of such light vessels as are required on the service of the embassies of foreign powers. The same privilege was reserved for the vessels which the contracting powers, by the terms of the treaty, were empowered to place at the mouths of the Danube; not more than two for each power. After the renunciation of the stipulations of the Paris Treaty by Russia, the prohibition against the passage of non-Turkish ships of war through the strait was further insisted upon by the London Conference of 1870.

All that has been done by the Turkish Government towards preparation for defence in the region of the Archipelago may be summed up as follows:—

1. The erection of a permanent naval station in Crete (since 1869); the fortification of this island; and the construction of the arsenal and port of Suda.
2. The attempt to increase the Muhammadan element in some of the larger islands, partly through various inducements, partly by the settlement of Muhammadans from the possessions in Africa.
3. The formation of new and the improvement of the old fortifications in some prominent points favourable for defence.
4. The increase of the lighting of the coast and of communications—(steam lines, telegraphs, light-houses).

The fortification works in Crete and the construction of the arsenal of Suda were taken in hand in 1869, and have advanced, if very slowly, since that time. The number of ships, which, in the beginning of 1869, was proposed for the Cretan squadron was 28, but in 1874 only 4 or 5 were stationed there.

The introduction of Muhammadans was first attempted in recent years, chiefly of Arabs from Tripoli and Bengazi to Crete; this is as yet too recent an event to enable us to judge of the future influence of this new element. The native Muhammadans of the islands are, with exceptions, the officials, soldiers, and settlers, chiefly renegades of the first or second generation; they are thus distinguishable from the Greeks, whose language they use, only through their newly-adopted religion. On most of the other islands almost all who are not officials or soldiers are Greeks.

The fortifications of the Hellespont may be divided according to their mode of construction into three groups, which correspond to the necessities of the times in which they were built. The remains of the castles of Muhammad II. and of Muhammad IV. are now only of historical interest. On the Asiatic side of the Strait some works were erected at the time of



the attack made by Mehemet Ali, because it was feared that he might attempt to master this important channel. These, as well as the old castles which were partially restored and strengthened at the time of the Crimean war, are characterized by their circular ramparts—low and very strongly-built stone walls with numerous loopholes for heavy guns. To the newest buildings belong the four coast batteries, begun in 1867, under the direction of the former Prussian engineer officer, Blum Pasha, at Naghara, Mejdije, Dejerburnu, and Namasghiach, which correspond more nearly to the present systems of armament. The former circular forts are being gradually extended into straight earthworks, and their chief strength centres between Naghara and Kilid Bahr.

Most of these batteries are commanded by the heights which rise behind them, and on that account, as was shown in the Reports of the British General Makintosh, of the 6th July and 11th October 1853, some defensive works on the land side across the narrowest part of the isthmus would not be superfluous: for example, at the line about 6 miles N.E. of Gallipoli, where the formation of the ground is favourable for such an outwork. As regards the possibility of a landing being effected from the side of the Bay of Laros, the stationing of one or more ironclads, or the laying of a few torpedoes would suffice to defeat the attempt.

A disadvantage which is at once evident to the visitor in the new batteries is, that of the sandy earth of which they are built, and which in spite of the efforts to clothe and bind the slopes with living turf, breaks into ruts and rifts which require perpetual mending. The bases of the works are simple straight walls with loop holes. The armament of the forts and batteries as I found them in June 1874 was as follows:—

Fort *Sedil Bahr* (built by Baron Tott at the time of the Crimean war).

The new battery *Namasghiach* (still in construction), planned for twenty-six guns, contained five iron guns and fourteen newer guns, including one 300-pounder Armstrong.

The old works of *Kilid Bahr* (Izz Kalässi) contained nine large old bronze guns (Kemerliks), for stone shot, and four iron guns (24-36 pounders).

The new battery of *Dejerburnu* (nearly completed), with stone beds for twelve guns, contained thirteen iron guns and two mortars.

The old fort of *Cham Kalässi*, for fifteen guns—with twelve iron guns and one mortar.

The old fort of *Boyalä Kalässi* contained thirty-two guns.

On the Asiatic side:—The old fort *Kum Kalässi* contained thirteen old guns.

The old fort of *Sultanié Kalässi* (a main work with two wings) contained forty-five guns and four mortars.

The new battery *Mejdije* (nearly completed) contained thirteen iron guns and one Armstrong.

The old fort *Köshe Kalä*, for twenty-six guns, contained fifteen iron guns and two old howitzers.

The new battery *Naghara*, planned for fourteen, contained eight guns.

*Note.*—In all, the fortifications on the Dardanelles contained about 250 older and newer smooth-bore guns, chiefly 24-36 pounders. The calibre of the oldest varied between 1 and 1600 lbs., and the greater

number of these were of bronze. The old Kemerliks require a charge of about 150 lbs. of powder: their stone shot, which are said to have a range of from 2 to 3 nautical miles, have a diameter of 2 ft. 9 in.

At the time of Count Molike's visit to the Dardanelles (1836) there were 580 old guns in the fortifications. A large number of these have since that time been sent to Constantinople to be recast.

Two Armstrong guns, one of which stands in the Namasghiach battery, the other in that of Mejdije, were exchanged by the English government for two antique Kemerlik guns. The works of a newly-projected battery south of Sultanié Kalässi have been stopped for the present on account of the deficiency of suitable soil.

At the outbreak of the Russo-Turkish war, in April 1877, the fortification works were said to be completed, and a large number of the old guns had been replaced by new Krupp's. A new battery had also been built on the *Punta dei barbari*, and forts Kumkalä and Sedil Bahr had been renovated.

On the larger of the islands in the Turkish Archipelago there are still a number of old works, castles, and blockhouses (*pyrgo*), the most of which were built by the Venetians, and which are only of military importance in view of possible insurrectionary disturbances.

As a permanent garrison for the above-mentioned fortifications of the Dardanelles there are two foot-artillery regiments, Nos. 1 and 2, the first for the Asiatic, the second for the European side of the channel.

Besides this there are in Chanak Kalä a *fortification commission*, consisting of 1 colonel, 1 vice-major, &c., a *military works' commission*, an *intendance division*, and lastly a *Sanaï Tabur* or battalion of artizans, the workers in a small supplementary arsenal to that of Tophane in the fortification itself, for preparation of ammunition, repairs, &c. The military medical staff in Chanak Kalä consists of 1 lieutenant-colonel, 1 major, 3 apothecaries, and 1 surgeon. Besides the first artillery regiments there is another foot-artillery division, the distribution of which over the islands of the White Sea and in Cyprus is as shown in the following table:—

Foot Artillery— Division of	Compa- nies.	Distribution.
Tenedos ... ..	2	Tenedos, 1 company. Lemnos, 1 Mytilene, 1 Molyvo, half company.
Mytilene ... ..	2	Ligri Baba Kalä, 1 sub. and 6-8 men. Chios, 2 companies.
Chios ... ..	3	Yenikalä Ligadik. Cheschme, 1 com. (in Vilayet Aidin)
Istanköi ... ..	2	Istanköi, 2 companies. Budrun (1 sub. and 5-6 men).
Rhodus ... ..	3	Rhodus, 3 companies.
Cyprus (Lefkosia) ...	2	Lefkosia, 2 Larnaka. Limasol. Famagusta Kerinia

The command of the whole of the fort garrisons of this region, to which Crete (with 3 divisions of 2 companies) and Tripoli, in Africa, belong, is vested in a colonel whose head-quarters are at Chanak Kalä, under whom are an Alaj-Emini (regimental chief), and an Alaj Kyatib (regimental secretary). Lieut.-colonels are stationed at Mytilene, Cyprus (Lefkosia),

and in Crete (Canea). Both the fort regiments of the Dardanelles and the fort division of the islands above noted, are under control of a Ferik Pasha, or Divisional General, resident at Kalā Sultanié. In consequence of the resolution in 1874 to increase the army recruiting district, the inhabitants of the coastlands, formerly reserved for the supply of the marine, were formed into Redif regiments and battalions; and besides three new regiments "of the Black Sea" a new regiment of the Dardanelles was raised and placed as the 7th Redif-regiment of the I. Ordus. The staff of this regiment has its head-quarters at Kalā Sultanié.

To the military region of the Archipelago must be added the Gulf of Smyrna and the old fortifications of Yenikalā, Cheschme, Skalanova, Sigajik, which since 1870-71 have been destined to be gradually abandoned. Eski and Yeni Fotsha were abandoned in 1871, and the old guns of these places were carried to Constantinople.

Smyrna is garrisoned by the staff of the 5th Redif regiment of the III. Ordus. 1 battalion of the 6th Infantry regiment, of the I. Ordus, and half a battalion of the 4th Infantry regiment of the I. Ordus: the other half of this battalion is stationed in Samos (2 companies), Chios (1 company), and Aivali (1 company) detached.

*Navy.*—Of the Turkish Navy there are in the Dardanelles, in Smyrna, and the harbours of the larger islands permanent naval stations as follows, (June 1874):—

In the Dardanelles,	the steamer 'Kandia.'
In the harbour of Smyrna,	the sailing-frigate 'Ertogrul.'
" "	Mytilene, the S.s. 'Esser i Nuzhet.'
" "	Chios, " 'Sejar.'
" "	Samos, " 'Istanköi.'
" "	Istanköi, " 'Ainaly Kavak.'
" "	Rhodus, " 'Muhassil.'

Farther there are 4 steam-dredgers, one of which is in Mytilene, one in Smyrna, one in the Dardanelles, and one in Chios, for the cleansing of the port. Within the space included between the four new forts of the Dardanelles there lies a small war vessel, the 'Nuvaid i Futah,' for the revision of the firmans of the ships coming from Constantinople.

IV.—COMMUNICATIONS.

In a military point of view the most important lines of communication in the region of the Archipelago coincide with the routes of ordinary maritime traffic, and to these they must conform still more closely as the terminal points of railways from the interior increase in numbers on the coasts. Whilst the local traffic between the numerous islands has remained almost a monopoly of their own trading vessels, the steam lines of several great companies lead through the White Sea, and touch also, in their passage to the central points of trade in the East, at the most important intermediate points on the coasts and islands. Among these companies the Austrian Lloyd's has hitherto held the first rank, in spite of the concurrence of the French *Messageries*, the Russian *Compagnie de Commerce et de Navigation*, the Italian *Trinacria*, the Turkish *Asizié* (from 1878 *Mahsussé*), and the Egyptian *Khedive Company*, besides the English steamers, which, indeed, provide the largest contingent for the transport of the immense quantities of grain brought from the harbours of the Black Sea.

Besides the regular routes of the great company lines, an English steamer goes every fourteen days from Smyrna to Adalia, touching at all the larger Turkish islands and coast towns. The traffic in the Gulf of Smyrna, between the city and Vurla and Buja, is provided for by two small local steamers.

The Turkish naval marine maintains, as aforesaid, several vessels in the Dardanelles, in the gulf of Smyrna, and at the islands of Mytilene, Chios, Samos, Istanköi, and Rhodus, as station ships; whilst Crete, with its arsenal and naval port of Suda, has been the central station of the Mediterranean squadron since 1869. (The existing and projected lighthouses as well as the telegraph lines are indicated on the accompanying map.) Land communication in the interior of the islands is almost exclusively confined to that which is afforded by beasts of burden; as such the mules of Cyprus and of Crete are famed, just as are the ponies of Crete and Mytilene. In Cyprus many camels are also employed.

THE COUNTRY OF THE WHITE HORDE OF KIPCHAK.

In writing the second volume of my *History of the Mongols*, which deals with the very complicated history of the Golden Horde, and the various fragments into which it broke up, such as Krim, Astrakhan, Kazan, the Kirghiz Kazaks, the Uzbeks, the Nogays, &c., and which is now passing through the press, I have had to examine with some care the topography of some difficult regions. Among them perhaps the most difficult is the land occupied by the White Horde, which was ruled by the senior line of the house of Juchi Khan, and occupied the country east of the Karakum sands. I venture to think that an examination of this area may interest some of the readers of the *Geographical Magazine*.

The country occupied by the White Horde is certainly one of the least-known parts of Asia. Once dotted with flourishing settlements, these have long since for the most part disappeared, and are now marked merely by ruins or mounds. As the country has been little explored, we can only in a few cases fix the sites of these old settlements.

It would seem that the land of the White Horde was conterminous largely with that occupied by the Oghuz Turks of the Arab writers. Thus it included the Lower Jaxartes and the valley through which it flows, the western part of the Alexandrofski range, the valley of the Sarisu, the Ulugh Tagh and Kuchuk Tagh mountains, and the present camping ground of the Middle Horde of the Kirghiz Kazaks. Its boundary on the east, where it was conterminous with the Khanate of Jagatai, is very uncertain. Von Hammer enumerates Sighnak Otrar and Taras as its chief towns (*Golden Horde*, 329), and we find that in Ssanang, Setzen the Golden Horde is spoken of as the Khanate of Togmak, which name it doubtless derived from the town of Togmak, on the Chu. This seems to show, what is otherwise probable, that it included all the valley of the Chu, a famous river, which loses itself after a considerable flow in the sands of Karakum.

On the north it was apparently limited by the Khanate of Sheiban, on the west by the Horde of Batu, on

the south-east by the Alexandrofski mountains, and on the south-west by the deserts of Kizil Kum, which separated it from Khuarezm. As I have said, this country is at present singularly unexplored. Once it was no doubt a very thriving region. We have reason to believe that the Chu once rose in lake Issikul and flowed into the Caspian, and that the Talas and the Sari-Su were its tributaries. Its banks were thickly peopled, and its borders irrigated with artificial canals. It was traversed too by the great highway which in Mongol times connected the east and west, and was then much frequented. We can only throw a partial light on the topographical riddles that meet us here at every turn. First let us consider this trade route.

The problem of tracing out some of the vaguely-described journeys of ancient travellers is much facilitated by certain physical features, which limit our hypotheses very considerably. Oceans cannot be crossed without ships, nor huge mountain ranges by large armies except at certain passes. This is familiar enough, but it is hardly as familiar that deserts are almost as impassable as oceans, and that we cannot therefore hypothecate a direct march from one point to another unless we know the nature of the intervening country. It is the necessity of avoiding physical barriers that makes ancient trade routes in the east so persistent, perhaps more persistent than any human institutions.

The great trade route from China to Persia, which was traversed by Chinese as well as Western travellers led by all accounts along the northern slopes of the Alexandrofski range, along the road which still remains the only route from Togmak to Avlie Ata. It is well delineated in Colonel Walker's capital maps of Central Asia. In traversing this district it crosses the very numerous head streams of the Chu, which spread out like a fan and form the well-known Mingbulak or the thousand springs to which I shall presently refer. Between Togmak and Avlie Ata its course is pretty nearly east and west, and it is bounded on the south by the impenetrable Alexandrofski mountains.

At Avlie Ata the mountain range is broken by a gorge, through which flows the river Talas or Taras. This gorge forms one of the most important passes in the world, the pass which connects Iran and Turan, and by which it is probable that many of the earlier nomadic invaders of Persia entered the valley of the Jaxartes. This important site, now marked by the town of Avlie Ata, was formerly the meeting place of two distinct trade routes. One of these has been almost discontinued, and formerly led westwards along the northern slopes of the mountains towards the sea of Aral. The Uzbeks and other nomades have swept away its towns and made it otherwise impracticable. The other route is still frequented and goes through the gorge to the south-west to Chimkend.

From the fact of two great roads meeting there, and from the fact also of its being the only feasible trade route across the mountains, the gorge I have referred to must always have been a very important station, and it is, I believe, universally held now, that in former times it was commanded by the town of Taras, and that Taras occupied a site not far from the modern Avlie Ata. "Avlie Ata owes its name," says Mr. Schuyler, "to the tomb of the patron saint of the

Kirghiz Avlie Ata, holy father, said to have been a certain Kara Khan, and a descendant of the Sheikh Ahmed Yasavi, who is buried at Turkestan. The tomb itself, which is an ordinary brick building, is in a woful state of dilapidation, and is by no means as interesting as the similar monument erected over the grave of Assa bibi, some female relation of Kara Khan, which can be seen on the road side 10 miles west of the town. Ten miles below Avlie Ata on the Talas, amidst the sands of the Muyun kum, are the ruins of what was apparently a city, called by the natives 'Tiime Kent,' which the author adds "may perhaps prove to be those of the city of Talas." Tradition says that a maiden once lived there who was beloved by the prince of the Divs, giant spirits who dwelt in the neighbouring mountains. In order to prepare a fit residence for her, this Div began to build a city, and for that purpose threw down immense stones from the mountains of Makbal. The city was never finished, but its remains are still visible, called by the natives Akhyrtash (Akhyrtepe) or Tashkurgan. The legend may be absurd, but the ruins, which are about 30 miles east of Avlie Ata, \* are very curious. They consist of an immense unfinished building 600 feet by 450 feet of reddish sandstone, the lower layers of the front being built of large stones 7 feet long by 4 feet broad. M. Lerch, who investigated the ruin, thinks it was intended for a Buddhist monastery. The scattered stones are supposed by the natives to have been mangers, or feeding troughs for an encampment, and hence the name Akhyrtash, stone[manger]. The Chinese traveller, Chang Chun, who passed here in 1221, says, "We travelled westwards along the hills, and after seven or eight days' journey the mountains suddenly turned to the south. We saw a city built of red stone, and there are the traces of an ancient encampment. To the west we saw great grave mounds placed like the stars in the Great Bear." These mounds also still exist, and from a short distance they indeed appear to be seven, disposed like the seven stars of the Great Bear. In reality, however, there are 16 mounds of different sizes, the largest being from 200 to 250 paces in circumference. They are called by the Kirghiz, Jitte tepé, or the seven mounds. On one of them M. Lerch found a stone bearing a Manchu inscription, relative to a victory of the Chinese over the Sungars, in 1758 (Schuyler's *Turkestan* ii., 121-122).

Having shown that there are abundant ruins to satisfy those who wish to have tangible proof of the former existence in this neighbourhood of a large city, we will now pass on to collect such notices of it as we can find.

It is probably one of the oldest sites in the world. Edrisi writes the name Taran, and I would suggest as possible that the name Turan, the complement of Iran, is connected with it, for Taras commands the main pass which leads from Iran into Central Asia. It first occurs in the pages of Menander Protector who wrote towards the end of the 6th century, and who, in describing the embassy of Zemarchus to the Turkish Khan Dizabulus, in the year 569, tells us that while the Khan was engaged in an expedition against the Russians, and while his camp was pitched at a place

\* He says above they are 10 miles below Avlie Ata, and perhaps a different set of ruins is here meant.

called *Talas* an ambassador from the Persians went to meet Dizabulus, who invited him to dinner, as well as the ambassador of the Romans (*Cathay, and the Way Thither*, clxv).

About the year 629 Hiuen Tshang, the famous Chinese pilgrim passed through Taras. He tells us "that about 400 *li* west of the Su ye (*i.e.* the Chu) he arrived at Tshien-tshiuén (*i.e.* the thousand springs answering to the Mingbulak of the Mongols). The country of Tshien-tshiuén was about 200 *li* square. On the south it was bounded by snowy mountains, and on three other sides by continuous plains. The land was well watered, and the vegetation abundant. . . . The Turkish Khan went there every year to pass the summer heats. After travelling about 140 or 150 *li* to the west of Tshien-tshiuén he arrived at the town of Ta-lo-si" (Vivien St. Martin, *Memoir on Hiuen Tshang's Travels* 18).

The thousand sources called Tshien-tshiuén or Ping-yu by the Chinese, Mingbulak by the Mongols, and Pingul by the Turks, is a name occurring in several places, and meaning in effect a well-watered country. This Mingbulak, which was bounded on the south by snowy mountains, was doubtless the district watered by the cluster of small rivers and torrents which form the head waters of the Chu, and the Ta-lo-ze of the Buddhist traveller is no doubt Taras. In the Tang-shu or history of the Tang dynasty under the article Shi (*i.e.* Jash or Tashkend) we read of Ta-lo-sze as a city situated west of the river Sui-ye (*i.e.* the Chu)—(Bretschneider, *Notes on Mediaeval Geography, &c.*, note 59.)

In the travels of Chang Chun, who visited Western Asia in 1221, and whose narrative is very confused, he mentions that four days after leaving Almaligh he arrived at the river Talasu Molien (*i.e.* the Talas Muren) a river which is described as deep and broad, coming from the east and cutting across the Yin Shan mountains, and running in a north-western direction. To the south of the river were snow-covered mountains (Bretsch. *Notes on Med. Travellers, &c.*, note 34.) In the Si-shi-ki, describing Shang-tis' journey westwards in 1259, he tells us that he passed Ta-la-sze without mentioning whether it was a river or a town (*id.* 75). In the Si-yu-lu we are told that several hundred *li* to the west of Hu-sze Wo-lu-do, the capital of Kara Khitai, was the city of Ta-la-sze, which last town was 400 *li* from K'u-jan, *i.e.* Khojend (*id.* 114 and 115). All these references point to one conclusion only, namely, to the Ta-lo-sze of the Chinese being the city of Taras or Tatas, identified with Avlie Ata.

Let us now turn to the Western authorities. Edrisi calls Taras, Taran. He says it was a place of passage for the Mussulmans who had established fortifications there against the Turks, for he says the country to the north was occupied by the Khizilji Turks, with whom the Mussulmans were for the most part at war. When there was peace between them then there was an exchange of commodities in merchandise, cattle, furs, &c. (*Edrisi ed. Jaubert* ii., 208 and 209). This answers surely exactly to the frontier town of Avlie Ata, but the fact is made certain when we examine the route which he gives from Samarkand to Taran, which we can trace step by step to Isfidjab, now called Chimkend, whence it was three days' journey to Taran with one intervening station at Badakhkath, between which and Taran was a wild country without inhabitants or cultivation (*id.* 214).

In a work quoted by Quatremere as the *Mesalek alabsar fi memalek alamsar*, whose author was born in the year 700 and died in 749 *Hej.*, we are told it was twenty days' march from Samarkand to Yanghi, and that Yanghi consisted of four towns, separated from each other by a distance of a parasang each. They all had distinct names, and were known as Yanghi, Yanghi-baligh, Kenjek, and Talas (Quatremere, *Notices et Extraits*, xiii., 224-226).

In the *Tarekhi Rashidi* we read that Taraz was called Yanghi by the Mongols, and that there were many people of Yanghi in Maveran-un-nehr who were called Yangilik. In the steppe of Yangi, says its author are found the ruins of several cities, and of domes, minarets, and schools; but, he adds, it is not known which of these ancient cities was Yanghi, or what were the names of the others (Veliaminof Zernof, *Hist. of the Khans of Kasimof* ii., 156).

In the Geography of Keft Iklim we are told that Taraz was formerly a celebrated town, now destroyed by the Uzbegs. Its environs, to which the name of Taraz was given, were desert (Quatremere, *loc cit.*).

Baber and the Akbar Nameh confuse Yanghi and Otrar; and Klaproth, and others among modern writers, have confused it with Yassy or Turkestan.

Having fixed the site of Taras, let us now proceed further. There is a passage in the history of the Kara Khitai which has not hitherto been rightly explained. We are told that after the Gurkhan had conquered the country which he ruled over, he appointed governors from Kum-kidjik—*i.e.* the desert of Kipchak to Barsendjan, and from Taras to Tanidj, *i.e.* to Tamghadj or Taugas, answering to Uighuristan.

Barsendjan has been a puzzle to most inquirers. Dr. Bretschneider says that Du Halde, in the map of China appended to his *History of China*, in 1734, places "Bersajean la haute" or Sairam, on the River Talas (*op. cit.*, 37). This name of Sairam, or Kara Sairam, reminds us that Mikhond associates it with Taras, and tells us it was a vast town, a day's journey from end to end, having forty gates, and inhabited by Mussulmans, and that it belonged to Kaidu (*Notices et Extraits*). On turning to Edrisi, we find him mentioning two Bersedjans—Upper Bersedjan, remote from the neighbourhood we are describing, and Lower Bersedjan, a town surrounded with inhabitants and cultivated fields, and 33 miles from Taran or Taras (*op. cit.*, ii., 217). Again, in reporting the famous voyage made by the Arab Salam among the Turks in the ninth century, he tells us that in returning homewards from the East he came by way of Gharian, Bersadjan, and Taran to Samarkand (*id.* ii., 420). These extracts seem to show that Bersadjan was situated on the grand route to the East, some 33 miles from Taran, which agrees very well with the site of the ruin of red stones mentioned by Mr. Schuyler, which he tells us was 30 miles east of Avlie Ata, and which he seems to have confused with other ruins some 10 miles further down the Talas than Avlie Ata, as I have mentioned.

On journeying eastwards from Taras the first really important place met with is the fort of Togmak, on the Chu. Mr. Schuyler says "The old town of Togmak, of which now only almost undistinguishable ruins remain, was about 15 miles above the present one, which is a small place with a Russian population of 300, and is on the site of a Khokandian fort, cap-

tured in 1860 (*id.* 126). Togmak must have been of great importance in mediæval times, for it gave a name to the Khanate of Kipchak. The name Togmak, as Dr. Schmidt says, was used by the Mongols to designate the Khanate of Kipchak. Ssanang Setzen, whose geography is not very clear, applies the name also to the empire of Khuarezm (*op. cit.* 87 and 383, note 41). He calls Juchi "Khan of Togmak" (*id.* iii.), and speaks of the ruler of Togmak, in 1452 as a descendant of Juchi (*id.* 165).

Abdul Razzak, in describing Timur's campaign in 1391, calls the people of Kipchak Togmaks, and after their victory the soldiers of Timur sang a song, in which they boasted of being the vanquishers of the Togmaks.

Rubruquis on his journey towards Karakorum travelled southwards for eight days from certain Alps or mountains, which were doubtless the Urtagh chain and its shoulders, arrived at a well-watered and cultivated plain, bounded on the south by high mountains, and entered a town which the Saracens (*i.e.* the Muhammadans) called Kenchak, and which was watered by a large river which sprang in the mountains and was lost eventually in the sands, and which was six days' journey from Talas. Mr. Schuyler has identified Kenchak with Merke, and I formerly followed him in so doing, but I am now convinced that Togmak must have been the town otherwise called Kenchak. The distance from Taras as given by Rubruquis suits it better than Merke, where Mr. Schuyler puts it, and it is further the converging point of the trade route along the north of the mountains, and that east of the River Chu, which latter seems to have been followed by Rubruquis.

Taras and Kenchak are associated together several times by the Persian writers. Thus Rashd ud din speaks of the meadows of Talas and Kenchak, and Haidar Razi talks of "the meadows of Talas and Kenchak which are commonly called Meski and Taraz." The two towns were at each end of the well-watered track of Mingbulak, and the whole district is thus well described by its limiting towns.

Kenchak was apparently a new name given to the town after the Mongol conquest, for I do not meet with it before. It seems to mark the site of the famous capital of the Kara Khitai, Balasaghun, which has been the subject of much controversy.

Having examined the topography of the country east of Taras, let us now turn to that west of that city. Here unfortunately we have but scant information. The road followed by nearly all travellers was through the gorge at Avlie Ata, and down upon the Jaxartes by Chimkent, a route which is well known. For information as to the road westward along the northern flanks of the Alexandrofski range, we are, in fact, limited to one writer, namely, the Armenian royal traveller, Haithon. He went to visit Mangu, and travelled from Cilicia by way of the Kipchak. It would seem that it was his intention to return by the same route. When he, therefore, reached Taras on his way home, and had there had an interview with Khulagu, he tells us he turned to the north-west, and came successively to Kutukchin, Berkent, and Sukulkhan, none of which places are apparently named elsewhere, but they were doubtless on the main route from Avlie Ata to Suzak. They then reached Urusokan. Ur is a particle occurring in many

Turkish names, as Ur-tepe, Ur-tagh, &c., and simply means high. Usokan is assuredly but a form of Uzkend. Uzkend was one of the cities captured by Juchi, as I have mentioned, and I have also shown that this Uzkend was not the Uzkend on the eastern limits of Ferghanah, but was situated much further west. It is not at all improbable that it was the same place which Haithon calls Urusokan.

Let us follow his further steps. After leaving the latter places he passes Kayikent(?) and then arrived at Khuzak. This is identified by Mr. Schuyler with great probability with Suzak, a well-known town marked on Colonel Walker's map, and mentioned in the account of M. Nazarof's journey to Tashkend in 1813. He reached it after crossing the Chu, and traversing some lands beyond (Levchine Kirghiz Kazaks, 104). After leaving Suzak our traveller passed successively Kamotz, Khandakhuir and Signnak.

Signnak was a famous town, the capital of the White Horde, and it is curious that its site should be quite unknown. Haithon, in speaking of it, says "there is the mount Kharchuk whence the Seljuks came and where mount Thoras begins." The mountains of Karachuk were no doubt the range in which the river Kara Ichuk, a tributary of the Jaxartes springs. Klaproth says Signnak was situated on the Muskan, a tributary on the right of the Jaxartes, which had its origin in the Kharchuk mountains (*Nouv. Journ. Asiat.*, 285 note). He does not cite his authority, but this position is in itself probable. Sherifuddin speaks of Sabran and Signnak as the two frontier towns of Turkestan, and tells us Signnak was situated twenty-four miles from Otrar, while a biographical work, cited by Von Hammer, speaks of it as being near the town of Yassy (Von Hammer *Golden Horde*, 11 note). Vambéry, I know not on what authority, says it was united to Jend by a canal (*Hist. of Bukhara*, 124). These various hints point to the neighbourhood of Babai Kurgan (which is named on Colonel Walker's map) as the most likely site for the capital of the White Horde. It would therefore seem that Haithon on leaving Suzak crossed the mountains by the Bikpik pass and went to Signnak. Thence he retraced his steps again to pay a visit to Sertak, who was on his way to Mangu Khan. After which he returned to Signnak, and thence went on to Sabran, which he tells us was extremely large. Sabran is a well-known site on the main route from Yanghi Kent, to Turkestan, and is marked on Colonel Walker's map.

Edrisi says that Sabran was a town where the Ghuz met to make peace or a truce and to trade in times of peace. He tells us it depended on Nukath, the capital of Ilak (*op. cit.* 207). In another place he tells us that after passing Sabran one enters the desert of the Ghuz (*id.* 209). Its site was passed by Schuyler a little above the Russian fort of Julek. He says its ruins lay some distance from the post station, so that he could not visit them. "They were noted a few years ago for containing two tall brick towers or minarets of very graceful construction, having spiral staircases within; one of them fell a few years ago, and as the other was also greatly injured by the Kirghiz it is now also probably in ruins."

From Sabran, Haithon went to Kharchuk, situated doubtless on the river of the same name flowing

between Sabran and Turkestan, and then went on to Yason, *i.e.* Yassy, the old name for the town of Turkestan, recently visited by Mr. Schuyler. From Yason our traveller went on to Savri, which is probably to be identified with the ruins north of the river Aris, marked on Colonel Walker's map. The next station he reached was the famous Otrar whose ruins are still to be seen a little to the north of the river Aris. It was a famous city in early times, and I have elsewhere described how the truculence of its governor led to the invasion of the Khuarezmian empire by Jingsis Khan, and how his people wreaked their vengeance upon it. It was also at Otrar that the great Timur died. It first appears under the name of Otrar in the 13th century and was previously known as Farab. It is mentioned by Ishtakhir (Ouseley's *ed. passim*) and seems to have been the capital of a small territory, a position which it retained after its change of name, for in the Chinese account of the travels of Yelu Chutsai (Bretsch. *Notes on Med. Trav. &c.*, 115) we are told ten other cities were dependent on it. In Pegolotti's land routes to Cathay, compiled in the first half of the 14th century, we are told Otrarri was 45 days' journey with packages from Almaligh, while it was a journey of 35 or 40 days with camel waggons from Urgendj (*Cathay, and the Way Thither*, 288). As Colonel Yule says, Otrar was the great frontier city between the Khanates of Kipchak and Jagatai, and we find it with the other towns of the White Horde assigned as the appanage of Toktamish by his patron Timur.

On leaving Otrar, Haithon crossed the Jaxartes and went on by way of Zernuk whose ruins are marked in several maps on the left of the Jaxartes, and Jizakh, which still retains its name, and so on to Samarkand.

We have not completed our survey of the towns of the White Horde, and still have to consider those which were to the west of Signak. In speaking of the mountains of Kharchuk, Haithon says they began with the Taurus and reached to Parchin. This will be recognised as the name of a mint-place of the Golden Horde.

Among the towns captured by Juchi in his first campaign was Barchin, otherwise called Barkhalykent. It is called Bar-jen in the Yuan Shi, and Bar-chilikan in the Chinese map published by Dr. Bretschneider (*Notices of Med. Geography*, 193 *et passim*). It is also mentioned by Carpini under the name Barchin (*op. cit.*).

These are all the notices of this town known to me, and it seems to have been situated at the western termination of the long chain of mountains known now as the Alexandrofski range, where all accounts agree that the country is strewn with ruins as yet unexplored. Between this point and Suzak is the station of Aksumbe, marking, no doubt, one of Timur's halting places on his journey towards the Urtagh and which he calls Ak Saman.

Let us now examine the towns on the Lower Jaxartes. Of these the most important in every way was Yanghi Kent. Yanghi Kent simply means new town, a name which is in some measure misleading since it is mentioned in early days. Mr. Erskine tells us it is the Alkariah al Jadideh of the Arabs (Baber, *xi* note 6). It is mentioned by Masudi, under the name of Haditse, *i.e.* "the New" and he tells us it was situated a fersenk from the Sihun or Jaxartes, and two days' journey from its outfall into the lake of

Khuarezm. He tells us further it was the chief winter residence of the ruler of the Oghuz Turks (D'Ohsson Abul Cassim, 147). Edrisi in describing the course of the Sihun or Jaxartes tells us that after passing Sabran it entered the desert of the Ghuz, and passed at a distance of three miles from the town of Ghozzia the New, and then fell into the lake of Khuarezm at two days' journey from that town. He tells us this town was the capital of the Ghuz and the winter residence of their ruler, and that Mussulmans were found there. It was twelve days' journey from Khuarezm and twenty from Farab or Otrar (*op. cit.*, *ed. Jaubert*, 209 and 210).

Carpini mentions the town under the name Janckint. Abulfeda tells us Yanghi Kent was situated on a river which fell into the lake of Khuarezm. It was 10 days' journey, he says, from Urgenj; 20 from Otrar; 25 from Bukhara (*Davezac op. cit.* 513, note 2).

Levchine tells us its ruins are situated at a distance of an hour's ride on horseback from the Syr or Jaxartes, and a day's journey from its mouth. In the last century it belonged to the Karakalpaks. Gladychef, who was sent on a mission to these people in 1742, found the town then in ruins, but its ramparts and towers still remained, and the Khan of the Karakalpaks lived inside the enclosure. It was afterwards occupied by the Kirghiz Kazaks, who reported that its primitive inhabitants had been driven away by serpents (*op. cit.* 114).

M. Lerch explored the ruins of Yanghi Kent in 1867. He opened several of the mounds and found various articles of pottery and household ware, but nothing which could enable the age of the ruins to be ascertained (Schuyler *op. cit.* 68 and 401).

It would be a great boon to students if Mr. Michell or some other Russian scholar would translate this tract of M. Lerch, on the Archæology of Turkestan, and I fancy it would be very welcome to the subscribers to the *Geographical Magazine*, if its most Catholic editor would find a corner for it.

Another town of the Lower Jaxartes which was captured by the army of Juchi Khan, and which occurs frequently in Eastern history, is Jend or Jund. I have no doubt it is the Kojend of Edrisi (not to be confounded of course with his Khojend further east). He mentions it as one of the three cities of the Ghuz on the Lower Jaxartes (*op. cit.* ii., 209). Masudi expressly calls it Jend in a passage which was probably copied by Edrisi (D'Ohsson *op. cit.* 14). It is very probable that the name of Lemfinc, a town mentioned in this neighbourhood by Carpini is a blundered legend for Jend. M. Lerch, who has studied the archæology of Turkestan so diligently, fixes the site of Jend at some ruins on the right bank of the Jaxartes between the fort of Kazalinsk and that known as number 2. Of this famous city where the founder of the family of the Seljuki went over to Islam and died, there only remain some mounds of rubbish and tombstones with Arabic inscriptions. Bricks have been largely used by the modern Kazaks to build their mausoleums with (*Russische Revue* i. 31). I may add that the third town of the Ghuz on the Jaxartes is called Khuara by Maendi. The name is written Hawara in the translation of Edrisi.

H. H. HOWORTH.



### ORIGIN OF THE ORDNANCE TRIGONOMETRICAL SURVEY.

IN our numbers for February and June 1873, we gave a series of articles by Captain Palmer, R.E., containing a history of the progress and modes of procedure of the Ordnance Survey, which was afterwards published in a separate form by Mr. Stanford. The following paper treats of the origin of the Ordnance Survey, and relates some events connected with its early history which were not referred to in the same detail in the previous articles on this subject, and which will be interesting to geographers.

After nearly a century from the time of its practical inauguration, the Ordnance Trigonometrical Survey is drawing to a close. Hitherto the public notices of its origin and progress have been more or less fragmentary, as the annual reports of the superintendents have been presented to Parliament. These necessarily briefly relate to the financial and field operations of the preceding year. A consecutive narrative of its interesting annals from the period of their inception has yet to be written. Meanwhile, a few passages of the more salient points in its history may be appropriate at the present day.

From the last report issued by Lieut.-General Cameron, Director-General of the Survey, we learn that—"The field survey of Scotland having been completed before the end of the year 1877, the whole force of field surveyors in Great Britain is now concentrated in England." This implies that the trigonometrical mensuration of North Britain and Ireland is finished, and it only remains to measure certain English counties in order to complete the cadastral survey of the United Kingdom. So far that is correct; but in a scientific, topographical point of view, concerning the primary and secondary triangulations, which form the fundamental basis of this great national survey, it is now virtually completed. England was the first of the three kingdoms measured and mapped by the Ordnance surveyors, during the latter part of the last century and the first decade of the present. But these were published on the limited scale of one inch to a mile, after being plotted by the draftsmen on a two-inch scale. Therefore, although England is apparently last in the field of operations, she was in reality the first.

When the English county maps on the one-inch scale were published, the authorities and the public considered them excellent and suitable for all practical purposes. At the beginning of this century the survey was no longer confined to purely abstract theories, or military strategical plans, which engrossed the attention of the Board of Ordnance previously. All classes of the community became more or less interested in the accurate delineation of their native land, and the new maps on the one-inch scale were eagerly sought after. Townspeople looked forward to the issue of correct plans of their boroughs from the Topographical Map Office in the Tower of London, with keen interest, to see the proper disposition of the thoroughfares and buildings. Country folks, both landed proprietors and tenants, examined the county maps carefully to trace their boundaries, and those of estates and farms. Incumbents of church property scanned the limits laid down of their benefices with jealous eyes. Parochial authorities were equally

watchful of parish bounds, so that there should be no encroachments of their limits. Political parties in Parliament contended with each other to see that the divisions of counties and boroughs were not altered to the detriment of constituencies. In fine it was seen that the new system of surveying and mapping accurately under the auspices of Government, would ere long make a revolution by peaceful progress throughout the social, political, and municipal institutions of the realm. And so it has done, increasing the importance of the survey from year to year, until the original one-inch scale was found insufficient for the correct minute valuation of lands for fiscal and like purposes, and a scale of six inches to a mile was sanctioned by Parliament, for the whole United Kingdom. This was first commenced in Ireland in 1824, and extended to Scotland in 1838. These being completed, the final field survey for enlarged scales is now prosecuted vigorously through England and Wales.

It is not the purport of this paper to enter into any account of these results, but to relate some events concerning the origin of the survey, that are not generally known. These are not only of interest to scientific men but they furnish incidents of a popular character, that may command the attention of the general public. Most people who take cognizance of such apparently common-place records relating to land surveying, are apt to form opinions that these are circumscribed within technical bounds, only interesting to professional men. This may be the case where the area of survey is confined to a few acres, or even square miles; but when it embraces the boundaries of a kingdom, the phases of surveying are enlarged, altered, and expanded into the sphere of world-wide geodesical boundaries. Hence the project of a trigonometrical survey of the United Kingdom, on that system of mensuration which includes the British Isles as a segment of the earth's circle, was grand in its scientific inception, and developed genius in executing the design with instruments of unparalleled accuracy. Like most great and beneficial projects for the advancement of civilisation, the Ordnance Survey, now so gigantic in its operations, rose from small beginnings: and these were, as it has often happened, of a military nature.

On the roll registering the names of the many talented officers who have conducted the field operations of the survey, that of Major-General Roy, R.E., stands first and highest—without disparagement to his successors—and he may be designated the "Father of the Ordnance Survey." Among the many excellent remarks contained in his papers published by the Royal Society in the *Philosophical Transactions*, the following on the general subject is appropriate:—"Accurate surveys of a country are universally admitted to be works of great public utility, as affording the surest foundation for almost every kind of internal improvement in time of peace, and the best means of forming judicious plans of defence against the invasions of an enemy in time of war; in which last circumstances their importance usually becomes the most apparent. Hence it happens, that if a country has not been actually surveyed, or is but little known, a state of warfare generally produces the first improvements in its geography: for in the various movements of armies in the field, especially if the theatre of war

be extensive, each individual officer has repeated opportunities of contributing, according to his situation, more or less towards its perfection. These observations being ultimately collected, a map is sent forth into the world, considerably improved indeed, but which, being still defective, points out the necessity of something more accurate being undertaken, when times and circumstances may favour the design."

In these remarks General Roy succinctly defines how the military element first suggested the design of a national survey previous to its scientific inauguration. He informs us that the rise and progress of the rebellion which broke out in the Highlands of Scotland in 1745, and which was suppressed at the Battle of Culloden in the following year, convinced the Government of what infinite importance it would be to the State that a country so inaccessible by Nature should be thoroughly explored and laid open, by establishing military posts in its inmost recesses and carrying roads of communication to its remotest parts. With a view to the commencement of arrangements of this sort, a body of infantry was encamped at Fort Augustus in 1747, where Lieut.-General Watson was officially employed as Quarter-master, and Roy, at the time a Lieutenant, was his assistant. Watson first conceived the idea of projecting a Map of the Highlands, on the principles of trigonometry, and subsequently he obtained permission to execute it with the assistance of Roy. At the outset his observations were confined to these districts, but afterwards they extended to the Lowlands, and thus made the survey general in what related to the mainland of Scotland.

For eight years General Watson and Lieutenant Roy were engaged in this military survey, with a party of soldiers and camp equipage, which cost an extra sum to their pay annually while traversing the country; yet that was inadequate to the execution of so great a design in the best manner. Moreover the trigonometrical observations were carried on with instruments of the common, or even inferior, kind used at that period; hence an accurate map of Scotland could not be produced from manuscript drafts, so that it was never published. At the same time it perfectly answered the purpose for which it was intended, and was considered as a magnificent military sketch map. It would, however, have been completed, including the smaller Scottish Isles, and many of its imperfections no doubt remedied; but the breaking out of the Continental war in 1755 prevented both, by furnishing service of other kinds for those who had been employed in it.

When peace was restored in 1763 the Government took the matter into consideration for the first time, and they entertained favourably the project to make a general survey of the whole of Great Britain and the adjacent islands at the public cost. The map of Scotland was to have been made subservient, by extending the great triangles quite to the northern extremity of the island, and filling them in from the original manuscript draft. Thus that imperfect work would have been effectually completed, and the nation might have reaped the benefit of what had already been done at a very moderate extra expense. By this time General Watson had died, and now Lieut.-Colonel Roy, having been promoted, the direction of the survey was to be committed to his charge. His hopes of entering the field were delayed from year to year, although the

times were pacific and favourable for carrying a work of so laudable a nature into execution. Nevertheless twelve years elapsed since the scheme had been first proposed without any advance in the field, when again war broke out with the American colonies in 1775, which checked the attempt of prosecuting this peaceful pursuit.

Notwithstanding these delays and checks to the prosecution of his favourite project, Colonel Roy manfully bore up against them, feeling satisfied that in time they would be carried out; but peace must be once more restored before any new effort could be made for the purpose. Meanwhile, in the ordinary course of his military duties, wherein the very best opportunities, as an officer of the Royal Engineers, offered of acquiring a thorough knowledge of the country, he did not fail to observe, in a general way, such situations as seemed to be best adapted for the measurement of base lines that would be necessary to form the nucleus of triangulation. While in London and the suburbs in 1783, he embraced the opportunity, for his own private amusement, to measure a base of 7,744'3 feet across the fields which then existed between Marylebone and St. Pancras. This he intended as the foundation for a series of triangles, carried on at the same time, to determine the relative situations of the most remarkable steeples and other edifices in and about the capital with regard to each other and the Royal Observatory at Greenwich. While thus engaged, peace had been concluded with America, and the hopes of the enthusiastic officer rose at the prospect of undertaking a national survey. In that he was not mistaken, and much sooner than he expected; but the successful influence came from an unexpected quarter, superseding the original military scheme by the powerful element of science.

Roy relates the circumstances which led to the practical inauguration of the Ordnance Survey as follows:—"In the beginning of October 1783, Comte d'Adhemar, the French Ambassador, transmitted to Mr. Fox, then one of his Majesty's (George III.) principal Secretaries of State, a memoir of M. Cassini de Thury, in which he sets forth the great advantage that would accrue to astronomy by carrying a series of triangles from the neighbourhood of London to Dover, there to be connected with those already executed in France; by which combined operations the relative situations of the two most famous observatories of Europe, Greenwich and Paris, would be more accurately ascertained than they are at present. This memoir the Secretary of State, by his Majesty's command, transmitted to Sir Joseph Banks, the very respected and worthy President of the Royal Society, who, about the middle of November, was pleased to communicate it to me, proposing at the same time that I should, on the part of the Society, charge myself with the execution of the operation. To this proposition I readily assented, on being soon afterwards assured, through the proper official channels, that my undertaking met with his Majesty's most gracious approbation." Not only did King George III., then a young man, approve of the project, and the appointment of Colonel Roy as superintendent of the survey, but he "supplied the funds that were judged necessary." On his part, Roy acknowledged that "what his Majesty has been pleased to give so liberally, it is

our duty to manage with proper and becoming frugality, consistent with the best possible execution of the business to be done, so as to make it redound to the credit of the nation in general, and of the Royal Society in particular."

From these facts extracted from the *Philosophical Transactions* of that venerable and liberal-handed Society, it will be seen that this semi-military trigonometrical department of the Government, is indebted to royal munificence and private aid for its practical development, after being shelved for more than a quarter of a century. Moreover, but for the timely astronomical proposition of the French *savants*—members of the Academy of Sciences—it is probable that our national survey would have been postponed indefinitely. Therefore, a measure of indebtedness is due to France, for raising up a friendly rivalry in the field of science on British ground, which has culminated in a trigonometrical survey of the United Kingdom, that has no parallel in the world for accuracy of detail and geodetic principles of design. When the executive Government of the day were impressed with the importance of the undertaking, they at once placed the embryo scheme under the Master-General and Board of Ordnance, with power to appoint engineer and artillery officers, with soldiers and artillery-men, to conduct the operations, and that is how it obtained the name it bears up to the present day.

Having secured the royal patronage and Government sanction to prosecute the survey, "being the first of the kind on any extensive scale ever undertaken in this country," Colonel Roy and Sir Joseph Banks, with other colleagues assembled in Council to consider the plan of the first operations and the instruments most suitable for microscopic mensuration and telescopic triangulation. As stated by Roy, the operation naturally enough subdivided itself into two parts. First, the choice of ground and measurement of a base line, with every possible care and attention, so as to form the foundation of future work. Secondly, the disposition of the triangles, where the base was to be connected with such parts of the English coast as are nearest to the coast of France, and the determination of their angles by means of the best instrument that could be obtained for the purpose. On inquiry of the Astronomer-Royal, Dr. Maskelyne, concerning the latter, their resources were miserably deficient, especially as compared with the French terrestrial instruments and apparatus. Not only had these to be constructed, but new designs invented. Fortunately, a scientific instrument maker named Ramsden, on being consulted, proved himself to be the man for the occasion, and, ultimately, through the liberality of the Royal Society, eclipsed the Parisian makers in design and manufacture.

Without delay the Council entered the field of action under the guidance of Roy, who conducted them on the 16th April, 1784, to Hounslow Heath—a locality at that period infested by highwaymen. This level ground had always appeared in his eyes to be one of the most eligible situations for a base, because of its vicinity to London and the Royal Observatory at Greenwich; also its great extent and the extraordinary levelness of its surface without any local obstructions to render the measurements difficult.

At that time it was a wide bleak expanse, with only a few villages and farm houses dotting the plain, where now suburban towns flourish. The party began their observations at King's Arbour, at the north-west extremity of the heath; and having proceeded in a south-east direction by Hanworth farm, they finished at Hampton Poorhouse near the side of Bushey Park. It was then and there decided that the first base line should be measured between these two points.

At this period a tolerably fair map of Middlesex existed, but the meridians were calculated from London, where a private observatory stood at the corner of Argyll Street. With this map in hand, Colonel Roy estimated the distance of the mensuration ground to be upwards of 5 miles. During the inspection it was perceived that the first part of the operation, in order to facilitate the measurement, would be the clearing from furze bushes and ant-hills a narrow tract along the heath, as soon as the ground should be sufficiently dry to permit the base to be accurately traced out. "Chiefly with a view to the more effectual execution of the work, it was judged to be a right measure to obtain and employ soldiers, instead of country labourers, in tracing the base, clearing the ground, and assisting in the subsequent operations. For, at the same time that this was obviously the most frugal method, it was evident that soldiers would be more attentive to orders than country labourers, and by encamping on the spot would furnish the necessary sentinels, particularly during the night, for guarding such apparatus as it was foreseen must remain carefully untouched, in the frequent intervals of discontinuing and resuming the work. Accordingly a party of the 12th Regiment of Foot, consisting of a sergeant, corporal, and ten men, were ordered to march from Windsor to Hounslow Heath, where they encamped on the 26th of May, close by Hanworth Summer-house, to which spot the necessary tents, camp equipage, and entrenching tools had been previously sent."

Without delay the troops commenced clearing the ground, which was divided into three sections, averaging 8 feet in breadth. In directing the telescope for this purpose it was accidentally found that by leaving Hampton Poorhouse a little to the westward, or right, the line would coincide with the spire of Banstead Church. As there could not be a better situated or more conspicuous object than this, therefore, it formed the first or south-east section of the base. When this was cleared the second section began between the Summer-house and the great road leading from Staines to London. Here a pyramidal bell-tent was placed at the station; and camp-colours were then arranged from distance to distance, so as to be in a line with it and Banstead Church spire. In like manner the third section comprehended between the Staines Road and King's Arbour was traced out. This first tracing of the base was done by means of a common telescope, held in the hand only, that no time might be lost by employing the soldiers to smooth the track that was to be measured. Subsequently he traced out the line more accurately with a transit instrument, his own property, for which a portable stand had been for some time preparing. This candid admission of Roy that he commenced operations with inferior instruments of observation shows his zeal on the one hand, and on the other a

want of resources from which he might have been supplied, such as Greenwich Observatory. But it is evident that up to that period Government paid little or no attention to stores of this peaceful description beyond the astronomical requirements of that noble institution. In that respect it may be said that the inauguration of the Ordnance Survey began a new era in the design and manufacture of instruments and apparatus for accurate territorial mensuration. As already mentioned these were greatly facilitated by the skill of Mr. Ramsden, who had earned a reputation by inventing a sextant and an improved series of mathematical instruments. Accordingly, the Council of the Royal Society gave him orders to furnish a special apparatus for measuring the line on Hounslow Heath, with the greatest possible accuracy and at the cost of the Society.

During the preliminary work of tracing the line and clearing the ground more time had been expended than Colonel Roy had calculated upon, in consequence of the unusual rainfall of the season, which prolonged its progress to six weeks. Therefore it was not until the beginning of July that the actual operation commenced. These otherwise unimportant circumstances are mentioned in order to illustrate the difficulties that attended the bantling survey on its introduction to the world, and the care bestowed by its sponsors in watching over its birth.

SAMUEL MOSSMAN.

#### MARINE SURVEY OF INDIA, 1876-77.

IN March 1876, Captain A. D. Taylor, the Superintendent of Indian Marine Surveys, undertook a visit of inspection to Akyab, Bassein, Rangoon, Moulmein, Tavoy, Mergui, and Pakchan, on the coast of Burma, for the purpose of testing existing charts and correcting errors; and he extended his tour to Junkseylon (Salanga), on the Siamese coast. His conclusion was, that no large port so much required to be carefully surveyed as Amherst, the existing chart of which was found to be most incorrect and incomplete. Accordingly, Navigating-Lieutenant Jarrad, R.N., was despatched to execute a survey of Amherst in the 'Clyde,' during the season of 1876-77. The chart of Tavoy was also found to be dangerously erroneous, and Captain Taylor himself took observations which enabled him, with Mr. Carrington's assistance, to produce a more reliable chart of that place; and an excellent preliminary survey of Junkseylon was obtained from Captain A. de Richelieu, of the Siamese navy. In July 1876, Captain Taylor, accompanied by Navigating Sub-Lieutenant Petley, R.N., went on a visit of inspection to False Point Harbour, and on his return he furnished the Government with reports on the projected improvements.

In March 1877, Captain Taylor was deputed to visit the harbours of Carwar and Marmagao on the west coast of India, in the Government steamer 'May Frere,' to report upon their relative merits as anchorages during the S.W. monsoon. He came to the conclusion that Marmagao was superior as a natural harbour; and he and Mr. Carrington have since constructed a new chart of Goa and Marmagao. In April 1877, Captain Taylor started on a tour of inspection of all the ports between Calcutta and Bombay, with

the object of testing the charts, and to gather information of general use for navigation. The details of this tour will appear in the report for 1877-78.

A survey of the Madras roadstead, commenced by Navigating-Lieutenant Jarrad, R.N., has been continued by Navigating-Lieutenants Hammond and Pascoe, who arrived there in February 1877, and extended the soundings for  $3\frac{1}{2}$  miles, both northward and southward of the screw-pile pier. Meanwhile, Lieutenant Jarrad proceeded to his work on the Burmese coast, accompanied by Lieutenant Coombs, R.N., who joined the 'Clyde' at Moulmein.

The 'Clyde' having been proved to be unsuitable as a surveying vessel, a new steamer has been ordered to be built at Bombay, and until it is ready, the surveying operations have had to be carried on by boat parties.

The Department publishes hydrographic notices, the annual return of wrecks and casualties in Indian waters, and the tabular statement respecting lighthouses and light-vessels. Mr. Carrington has also been indefatigable in the compiling and drawing branch, and the services of this very accomplished and able draughtsman have been invaluable. In addition to the finished drawings prepared for engraving and photo-zincography, several new charts have been compiled which were much wanted, and are eagerly sought for by masters of vessels.

The progress of the Marine Surveying operations, under Captain Taylor, has been most satisfactory, and a department producing really important work has thus been fully established.

#### SIR GEORGE BACK.

THERE has passed away from among us the last survivor but one\* of those famous North Pole Captains who were contemporaries of Parry, Franklin, and the Rosses. George Back has gone in the fullness of his years, yet few men will be more missed than the kind and staunch old Admiral, none will be more deeply mourned.

George Back was born at Stockport in 1796. He entered the navy in 1808, on board the 'Arethusa,' and served in boat actions on the north coast of Spain. In one desperate affair, when 14 were killed out of a crew of 18, young Back was taken prisoner by the French, and detained at Verdun until 1814. He afterwards served in the 'Akbar' and 'Bulwark.' In 1818 he served as a mate, under Franklin, in the 'Trent' during the Spitzbergen voyage, concerning which he often told many interesting and amusing stories. He next joined Franklin's land expedition down the Coppermine river, and along the Arctic coast of America from 1819 to 1822, performing the duties of surveyor and draughtsman. The party was heard of at long and uncertain intervals until they returned to astonish their countrymen with the tale of their hardships, fortitude, and achievements. Sherard Osborn truly describes the story of Franklin's expedition as an Iliad in prose, full of pictures of rare devotion to the most ennobling of causes, the advancement

\* Admiral Bird, the companion of Parry in his attempt to reach the Pole in 1827, the Captain of the 'Terror' in the Antarctic voyage, and of the 'Investigator' in the Arctic voyage of 1848-9 is still alive.

of human knowledge. Prominent among its episodes is Back's fearful winter journey to bring succour to his chief. In 1821 young Back attained the rank of Lieutenant, and served in the 'Superb' in the West Indies and at Lisbon from 1822 to 1824. In 1825 he joined Franklin's second land expedition, and made a survey of the Arctic shores of America as far as Return Reef. He became a Commander in 1827.

In 1833 George Back was in Italy when he heard rumours that apprehensions were entertained for the safety of Captain Ross, who had left England in 1829. He, with a true chivalrous spirit, hastened home to offer his services to the Government for the conduct of an expedition to search for the missing explorers. His offer was accepted, and on February 17th 1833 he left England, with five followers, for the Hudson Bay Company's Territory. In this journey, Back discovered and explored the great river which bears his name, down to its mouth. The sufferings endured during this famous voyage were appalling, and the obstacles which were overcome were sufficient to try the boldest spirit. The whole story is modestly but ably told by the commander in his work published in 1836, which is beautifully illustrated by his own drawings; for he was a most accomplished draughtsman.\* For his great service in discovering and tracing the Back or Great Fish River for 500 miles to its mouth, he was made a captain in 1835 by an Order in Council. King William IV. said to him, "You and I, sir, are the only two captains by Order in Council in the navy."

In 1836 the Royal Geographical Society recommended that a voyage should be undertaken with the object of reaching Wager River or Repulse Bay, and thence exploring the coasts by travelling parties, as far as the mouth of the Back river on one side, and Hecla and Fury Strait on the other. The command of this expedition was given to Captain Back, in H.M.S. 'Terror.' His first lieutenant, William Smyth, had recently made an adventurous voyage down the Amazon, and was an exquisite draughtsman. Owen Stanley, Graham Gore, and Robert McClure, names afterwards well known to geographers, were among the officers. In July 1836 the 'Terror' crossed Davis Straits and entered Hudson's Bay. Captain Back attempted to follow the course of Parry in the 'Fury' and 'Hecla' up Frozen Strait, but was stopped by heavy flocs off Cape Comfort. They wintered in the moving pack, and when the 'Terror' was at length extricated in the following summer, she was almost in a sinking state. "The whole voyage," says Sir John Barrow, "was of a nature so extraordinary and unparalleled in the history of voyages, ancient and modern, as not to be forgotten even by the readers of it, still less by the spectators." During this service Captain Back displayed all the qualities of a great commander, and to his constant good-humour and cheerfulness, firmness and presence of mind in moments of peril, and seamanlike skill were due the preservation of the crew, and of the good ship which was destined to see much more service. The narrative of this famous voyage, beautifully illustrated by Lieutenant Smyth, forms one of the

\* *Narrative of the Arctic Land Expedition to the Mouth of the Great Fish River, and along the Shores of the Arctic Ocean.* By Captain Sir George Back, R.N., in 1833-35. (Maps and Plates, 8vo., 1836.)

classics of Arctic literature.\* On his return from this disastrous voyage Captain Back received the honour of knighthood.

Sir George Back was awarded the Founder's Gold Medal of the Royal Geographical Society in 1836, in which year he also became a Fellow; and he served for many years as Vice-President and on the Council. He was also a Gold Medallist of the French Geographical Society, a Fellow of the Royal Society, and D.C.L. of Oxford. He was one of the earliest members of the Raleigh Club (the forerunner of the Geographical Society and Club), and was President of the Raleigh in 1844. He became a retired Rear-Admiral in 1857, Vice-Admiral in 1863, and Admiral on October 18th 1867.

During the anxious period when the searches for the Franklin Expedition were organised, Sir George Back was an invaluable adviser, and an active member of the Admiralty Arctic Committee. He took an intense interest in the fate of his old friend and commander, Sir John Franklin, and after the sad story was revealed by the discovery of McClintock, and relics were brought home from King William's Land, Sir George Back, always treasured up with religious care a little book of devotions which he had himself given to Captain Graham Gore, one of his old Lieutenants in the 'Terror,' and which was found among the relics.

When Sherard Osborn undertook the labour of obtaining the renewal of Arctic exploration, he received the warmest encouragement and support from Sir George Back; who at once concurred in the objects to be sought for, and the route that should be taken. His great experience and sound judgment made it impossible that he should err on these points. He was President of an Arctic Committee appointed by the Council of the Geographical Society in 1872, and of a similar Committee in 1874. His authority was based on the experience of 57 years, during which time he was either foremost in the ranks of the explorers, or was aiding and encouraging younger generations by wise advice and cheering words. He visited the 'Alert' and 'Discovery' before they sailed, and took a deep interest in the expedition. Nothing is more inspiring to young men than to receive real kindness from their seniors, and this Sir George Back gave in full measure to the young officers who sailed for the Arctic regions in 1875. For Captain Markham and Commander Beaumont, especially, he felt very warm personal friendship.

On the return of the Arctic Expedition its conduct was attacked in the press, and then it was that the grand old veteran came to the front for the last time. As Macaulay truly said, "A man whose work is approved by his own profession need not care for the ignorant criticisms of outsiders." The nonsense of the newspapers was answered by a most emphatic rejoinder. The old Arctic officers assembled at a dinner to show their appreciation for the glorious work of their successors. They came up on purpose from all parts of Great Britain and Ireland, all uniting to approve most cordially of the achievements of their young successors. There assembled

\* *Narrative of the Expedition in H.M.S. 'Terror,' undertaken with a view to geographical discovery on the Arctic Shores,* By Captain Back, R.N. (Maps and Plates, 8vo., 1838.)

on the 6th of December 1876 as many as twenty-eight old Arctic officers, and Sir George Back, the Father of Arctic discovery, was in the chair. He spoke of the difficulties of the work, of the valuable results, of the ability and gallantry of the young explorers, and when he concluded such rounds and rounds of British cheers were sent forth as left no doubt of the verdict of old Arctics.

This memorable occasion was the last on which Sir George Back appeared in public. His life was one of great usefulness, especially at Ramsgate. For many a year his friends will remember the bright pleasant dinners at Gloucester Place, and the capital stories of their kind, warm-hearted host. He had led a good life, and on Sunday the 23d of June 1877 this true-hearted and gallant sailor passed painlessly away at the great age of eighty-two.

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## Reviews.

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### CAPTAIN MARKHAM'S GREAT FROZEN SEA.\*

THE history of the Arctic Expedition of 1875-76 is recorded in the work of Sir George Nares with its exhaustive appendix by Captain Feilden, and in the Parliamentary Blue Books. It is a memorable and glorious tale of work well done, and of great difficulties overcome. But there was also needed a more popular account of the proceedings of the expedition, and this has been supplied by Captain Markham.

There are many precedents for the publication of a supplementary story of Arctic adventure by an individual officer, in addition to the official history of an expedition. Dr. Fisher wrote and gave to the world a briefer and more popular account of Parry's first voyage. Captain Lyon, whose talented pencil furnished the illustrations for Parry's second voyage, also published his own charming narrative. Sherard Osborn in his *Stray Leaves from an Arctic Journal*, gave us the most fascinating picture of life in the far North that has yet appeared; and Macdougall's *Voyage of H.M.S. 'Resolute'* is a valuable contribution to Arctic literature.

Captain Markham, following these excellent precedents, has given a popular and most entertaining as well as deeply interesting narrative of every-day life on board H.M.S. 'Alert,' and while away sledging, during a very eventful service. He brought several special qualifications to the work. As a young lieutenant in 1865 he was a volunteer for Arctic service, and he watched with eager interest the efforts of Admiral Sherard Osborn to secure a renewal of Polar research during the succeeding years. So thoroughly imbued was Albert Markham with the true old spirit of Arctic adventure, that he undertook a voyage in a whaler in 1873, and penetrated down Lancaster Sound and Barrow Strait into the Gulf of Boothia. His account of a *Whaling Cruise to Baffin's Bay*, for which Admiral Sherard Osborn wrote an Introduction, is exhaustive in itself, and is the only

\* *The Great Frozen Sea: A Personal Narrative of the Voyage of the 'Alert' during the Arctic Expedition of 1875-76.* By Captain A. H. Markham, R.N. (Daldy, Isbister & Co., 1878).

complete description of the work of a whaling voyage that has appeared since the days of Scoresby. Thus when Albert Markham was appointed commander of H.M.S. 'Alert,' ice navigation was no new experience to him. He had already acquired that love for the ice-floes and for the unequalled scenery of the far North which never leaves a true Arctic officer. His position as commanding officer in the 'Alert,' and the lead he took in the organisation and conduct of the sledging work, gave him further special qualifications for his task; while his *Cruise of the 'Rosario'* and his *Whaling Cruise* had proved his literary talent and skill as an author.

*The Great Frozen Sea* will be found to be a pleasantly-written narrative of a very important and memorable service, describing the events and the daily life as they presented themselves to an individual member of the expedition. It is, however, more than this. Captain Markham is the leader who has been nearer to the North Pole than any other man, alive or dead. He has won the blue ribbon of Arctic adventure, which had belonged of right to Sir Edward Parry during the previous forty-nine years. Captain Markham's work contains the record of that unequalled achievement. In one chapter he gives all the details of sledge travelling, the weights to be carried, the system of depôts, the scale of provisions, the clothing, the tents, the cooking apparatus, the construction of the sledge, and the programme of work. In another he describes the routine of sledging, the encamping, the tent life, the meals and cooking, the halts, and the work over the ice. Then follows the terrible story of the advance over the "Great Frozen Sea," which culminated in the attainment of the highest northern point ever reached by man, and concluded with a story of appalling sufferings most nobly and courageously borne.

It is this history of the most memorable of all Arctic sledge journeys, written by its commander, which will give Captain Markham's work a permanent place in English literature; but the whole volume is entertaining and instructive, and does not contain a single dull page. *The Great Frozen Sea* takes rank with Sherard Osborn's *Stray Leaves* as a model of what an Arctic narrative should be; while the maps and illustrations give it a completeness which was lacking in Osborn's charming book. Captain Markham dedicates his work to the memory of Admiral Sherard Osborn, who was the moving spirit in securing the despatch of the Arctic Expedition, and whose bright example inspired to further efforts the gallant band which followed in his footsteps, and strove to emulate his deeds.

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### STANLEY'S DESCENT OF THE CONGO.

THE second volume of Mr. Stanley's work\* contains his narratives of the navigation of Lake Tanganyika, of the march across Manyema to Nyangwe, and of the descent of the Congo. On Tanganyika he was following in the footsteps of Cameron, but from Nyangwe his own great discoveries commenced.

On the 5th of November 1876, Stanley set out from Nyangwe with 154 followers—men, women, and

\* *Through the Dark Continent.* By Henry M. Stanley. (Sampson Low, 1878.) Vol. II.



children, armed with rifles and muskets, but of these only forty were trustworthy fighting men, the rest being mere *pagasis*, or carriers. It was a great undertaking, one of the greatest in the annals of geographical discovery. The Congo had been a mystery for centuries. The vastness of its mouth and lower course proved that the mighty river drained an enormous unknown area, and the head waters discovered by the Portuguese and by Livingstone indicated to geographers the extent and direction of the great stream. But from Nyangwe to the falls discovered by Captain Tuckey, a distance of 900 miles, the course of the Congo was unknown. It was to solve this great problem by descending the river, that Stanley turned his back upon Nyangwe, and marching northwards on the left bank, plunged into a dense forest. On the 19th the party reached the banks of the Congo in  $3^{\circ} 35'$  S. latitude, and  $25^{\circ} 49'$  E. longitude, where it was 1200 yards in width. Here his boat, the 'Lady Alice,' was put together and launched on the river. The party then advanced in two divisions, one in the boat and the other following the bank, which alternated with forests and cultivation surrounding villages. Market places, at intervals of three or four miles, are central resorts of the people from either bank, and are considered as neutral ground. Many of them are wide grassy spaces under the shade of mighty spreading trees, with black forest in the background.

On the 22nd of December, Stanley parted with the Arab escort which had accompanied him thus far. The explorer, with his one English companion Francis Pocock, then proceeded on this perilous voyage down the river, with the exploring boat 'Lady Alice' and 22 canoes. The banks were now very populous, and the river 1800 yards wide.

On December 30th they came to the mouth of the great tributary flowing from the south-east called the Lowwa, a thousand yards in width, with an impenetrable forest fringing its banks. A mile lower down the Congo, in latitude  $1^{\circ} 28'$  S., is two thousand yards in width. Down to this point there had been four great affluents, the Luama, Liva, Uvindi and Lowwa, in a course of 200 miles. The mouth of the Lowwa is 50 miles north of the north-end of Lake Tanganyika, and its sources are supposed to be near the south-west corner of the Albert Nyanza. Up to this point the tributaries from the east are unimportant.

Then came the series of cataracts which the discoverer has named the Stanley Falls. Here the Lumami affluent enters the Congo with a mouth 600 yards wide, in about  $0^{\circ} 32'$  S. At the foot of the fifth cataract the river is 1630 feet above the sea, and still running N.N.E. Then it widens again to 2000 yards, and contracts again at a sixth cataract, which is nearly on the equator, and there is yet a seventh cataract. It occupied the explorers a period of twenty-two days of desperate labour to pass these falls by cutting roads through the forests, during which period they were beset and attacked by cannibal savages who had made the islands amid the cataracts their fastnesses. On the 28th of January 1877, they were again on the broad river, flowing between hilly banks to the west-north-west. The river gradually increased in breadth from 3000 to 4000 yards, with numerous forest-covered islands.

On February 1st they reached a great tributary

called the Aruwimi, flowing from the north-east, the mouth of which is about 340 miles north of Nyangwe. This is the most important affluent of the Congo from the eastward country, and Mr. Stanley conjectures that it is the Wellé of Schweinfurth. Below the Aruwimi the great Congo becomes much wider, and is full of islands, densely covered with forest. The river reaches a north latitude of  $1^{\circ} 40'$  N., and then bends to the southward. On February 18th they were on the equator again, the river continuing its course southwards, the volume becoming enormous. In S. latitude  $3^{\circ} 14' 4''$  is the mouth of the Quango, a powerful river issuing through a cleft in the tableland. Now the shores become lofty and picturesque, here bold and precipitous, there wooded from base to summit, and, flowing onwards, the river forms an extensive pool 2500 yards across, bordered by white cliffs, with a grassy tableland above. It received the name of "Stanley Pool," and extends over thirty square miles to the first cataract of the lower Congo falls, in  $4^{\circ} 3'$  S.

Mr. Stanley gives a minute and graphic description of these lower falls, which were first made known to us through the labours of Captain Tuckey, who so nobly sacrificed his life in the cause of geography. The first cataract is a two hundred yards stretch of broken water, the next is half a mile of dangerous rapids, and the third is four miles in length, a confused mass of roaring waves and tempestuous surf. Then follow other dangerous rapids, over one of which a canoe, containing Stanley's favourite servant Kalulu, was hurled, every soul on board being seen no more; and shortly afterwards, on June 3rd, 1877, poor Frank Pocock, the last of the three English companions of Stanley, was drowned. On July 31st the explorers completed their great work by reaching the furthest point of Captain Tuckey, at the Yellala Falls of the Congo. Stanley then wisely struck overland for Embomma, the nearest European station on the lower Congo, abandoning the 'Lady Alice' to her fate. On the 9th of August, Stanley, with his wayworn party of 115 men, women, and children, reached Embomma, where they received a hearty welcome from the European merchants, and all their wants were attended to.

We must refer our readers to Mr. Stanley's own pages for the hair-breadth escapes, the fights with savages, the desperate struggles with natural difficulties of all kinds; as well as for descriptions of scenery, and for much interesting ethnological information. In this review it has only been possible to furnish a general account of the physical features of the newly-discovered course of the great river Congo.

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TO THE ARCTIC REGIONS AND BACK IN SIX WEEKS.  
By *Capt. Alex. W. M. Clark Kennedy, F.R.G.S., F.L.S., F.Z.S., &c.* (Sampson Low, Marston, Searle, and Rivington; 1878).

AFTER reading the title of this book, we at least expected that the author would have carried us with him to the bleak shores of Novaya Zemlya or to Spitzbergen; but on opening the work we have found that it is merely an itinerary of a drive in a carriage from Christiania to Trondhjem, and from thence by coasting steamer to Tromsøe. "Across the Arctic Circle" would have been a more suitable title. To eke out a volume of over

400 pages describing a well-known route, yearly travelled by scores of our countrymen on their way to the more northern parts of Norway, in pursuit of sport or business, the author has drawn copiously on the guide-book, and quoted profusely from other writers on Scandinavia. To call a passage in a coasting steamer along the western shores of Norway, a journey to the Arctic Regions, is drawing somewhat largely on the good-nature and credulity of the public. With equal justice might a passenger through the Suez Canal entitle himself an African traveller.

Throughout the pages of this book Captain Clark Kennedy figures to even less advantage as a naturalist than as a geographer. He appears to be uncertain whether seals and *cetaceæ* are not the same order of animals, and has a lingering belief in the appearance of the Kraken, or sea-serpent, on the Norwegian coasts. Several of the illustrations originally appeared in a well-known and popular work, descriptive of real adventure in the Arctic regions, by one of our most distinguished Polar navigators; and they have no reference whatever to anything in the text of the present volume.

### THE HIMALAYAN SYSTEM.

A REVIEW BY BARON F. V. RICHTHOFEN.

Translated from the "Verhandlungen der Gesellschaft für Erdkunde zu Berlin, Band v. No. 1 u. 2."

1. TRELAWNY SAUNDERS. *A Sketch of the Mountains and River Basins of India*. London, 1870.—I. *The Himalaya Mountains and Tibetan Plateau* (p. 4—7).
2. CLEMENTS R. MARKHAM. *Narratives of the Mission of George Bogle to Tibet and of the Journey of Thomas Manning to Lhasa*. London, 1876. Introduction.
3. CLEMENTS R. MARKHAM. *The Himalayan System*. (*Geographical Magazine*, May 1877, p. 113 et seq.)
4. TRELAWNY SAUNDERS. *The Himalayan System*. (*Geographical Magazine*, July 1877, p. 173 et seq.)
5. ROB. B. SHAW. *Water partings versus Ranges*. (*Geographical Magazine*, December 1877, p. 314 et seq.)

IN the history of orography three stages may be distinguished. As hydrography generally precedes topography, so water-partings come to be hypothetically regarded as mountain ranges; those between the principal rivers being considered as ranges of the first degree, and those between minor streams as ranges of lower degrees. By a knowledge of the elevations and depressions of a country, we arrive at the second stage, and find that the mountain ranges do not always coincide with the water-partings. Some of the ranges are found to be intersected by rivers, and the most general features of the structure become apparent. A third stage is reached when we have obtained from the geological composition not only a scientific knowledge of the main features of the formation, but also understand the laws of the arrangement of the secondary features. The transition from the first to the second stage can be seen most distinctly in those mountain systems which have only in our own time become known, as, for instance, in the case of the Tian-Shan and the Pamir mountains, where, in the unexplored districts, the water-parting system still regulates the drawing of our maps;\* whilst, in all districts which have been surveyed more accurately, range after range appears distinctly, with frequent fluvial intersections. In the case of the Himalaya mountains their cartography preceded a correct conception of their main features. Captain Herbert, in the year 1818, investigated the orography of the Himalaya for the first time scientifically, took the water-parting between the Upper Indus, the Upper Sutlej, and the Yaruzangpo on the one hand, and the tributaries of the two former and the system of the

Ganges on the other, as the principal range of the mountain system. But as he knew very well that the highest points were not on this line, but south of it, and between the rivers that follow a southerly direction, he took for granted that between the latter, spurs projected from the principal range, which were crowned with the highest points. Most of his successors took the same views, even such men as Dr. Thomson, Dr. Hooker, and Mr. Brian Hodgson. Ritter and Humboldt have not expressed any opinion about the great ranges of the inner system of the Himalaya. A. Cunningham had the merit of having prepared the way in his important work on "Ladak," by dividing the North-western Himalaya into a number of parallel ranges without regard to their interruption by rivers. The Pir Panjal quite coincides with the newer views. The works of Strachey (1854) made a further contribution to the scientific view of the north-west mountains; but it was Stoliczka who supplied the geological formation thoroughly for a small portion of the mountains.\* These views, however, have advanced but a little way up to the present time, and even now in Germany it is often thought that the highest points of the Himalaya are situated on spurs of the principal range. Lately, it has been distinctly laid down, especially by Saunders (in his *Mountains and River Basins of India*, 1870),† and again by Markham (in the *Memoir on the Indian Surveys*, 1871, and in his *Bogle and Manning*, 1876) that three principal chains can be distinguished, two of which are placed by Saunders, and all three by Markham, in the system of the Himalaya. Both united into one range, the high series of points which are divided into a number of separate masses by deep valleys, which they called the Southern range, and distinguished from it the principal water-parting range as a range of minor orographic importance.‡ Markham called the Middle range Saunders's Northern range. Both agreed also in adopting a third range further north, drawing it, however, not according to the same principles as the first, but according to the water-parting principle. Markham attached it to the Himalaya, and called it Northern range; he divided it into two parts, of which the Western should form the water-parting between the Indus and the Basin of the Lob-nor, and the other between the Yaruzangpo and the table-land of High Tibet, which possesses no outflow. Saunders had previously defined the two ranges, calling the Western the Karakoram range, the Eastern the Gangri ("snow capped") range, and considered both as not belonging to the Himalaya.

These views were lately severely attacked in India. The character of a range is denied to the Southern range, on account of its frequent intersections; and a continuous function as a water-parting is put forward as the necessary mark of a mountain range. Both geographers have replied thereto, and acquired the merit of having triumphantly established the principle adopted long ago from a purely geographical point of view by geologists, but rarely admitted by geographers, *that mountain ranges are to be considered independently of interruptions and intersections by river valleys*, and that the latter are only to be regarded as solutions of continuity of a secondary importance. They have succeeded at the same time in bringing forward a concrete example of their principle in that most important case—the range of the high points of the Himalaya. The Middle range of Markham forms almost a continuous principal water-parting,

\* In 1865 H. B. Medlicott contributed a Memoir and Geological Map of the sub-Himalaya between the Ganges and Ravi to the *Memoirs of the Geological Survey of India*, vol. 3. Ed.

† And more especially in the article on the Himalayan System, with a map, in the *Geog. Mag.* July 1877. Ed.

‡ It is rather of distinct than minor importance, because so far as it has been surveyed, there is no reason to suppose that its altitudes are inferior to those of the Southern range. As a water-parting it is of greater importance. Ed.

\* See, however, an exception in the map of the Himalaya and Tibet, by Saunders, *Geog. Mag.* July 1877, in which the great ranges of the Himalayan System are connected with those of the Pamir. Ed.

only interrupted at a few points by rivers; and yet it is thought to be of less importance than his Southern as a mountainous range, although the latter is broken up into separate masses like a string of beads. A table appended to Saunders's paper gives 68 high points all distinctly located by the three co-ordinates of geographical latitude and longitude and height above the sea, attaining more than 20,000 feet, and 18 of them more than 25,000 feet. What Saunders proves by his striking logic, is pictorially shown by the plastic drawing which always gives such a special value to the maps of the distinguished Geographer of the India Office. It is to be expected that with reference to the Southern range, the range of the highest point of the Himalaya at present known, this view will, on the whole, be maintained, though with regard to some parts, the knowledge of the geological formation may produce changes.

It is only employing in another case the principles put forward by the geographers above mentioned, when Shaw differs from their views of the Karakoram range, and thereby from all previously-expressed opinions. The primitive conception of a water-parting system, supposed to surround the sources of the Shigar and the Shayok in a great circle, and also to embrace that high point of 28,278 feet known as K 2 (also erroneously named Dapsang), as well as the Karakoram pass, had hitherto regulated theories and cartography. And yet it is just here that the aspect of the river course shows with special distinctness the presence of some ranges parallel to the North-west Himalaya. Their existence is, moreover, made probable by the geological observations of Stoliczka and Bellew. Shaw, whose topographical descriptions show a rare talent for the conception of plastic proportion of the ground, was able to come to the same conclusion on the basis of this view. He compares the table-land in which Karakoram pass is situated, and which he surrounds by the Muztagh chain in the south-west and the Kuenlun chain in the north-east, to a terrace supported by two walls above it. "If one of these walls become damaged, so that the rain accumulating on the terrace escapes through crevices, we have no right to say that it is no longer a supporting wall, but is itself supported by the terrace, and surrounds the little streams that run through its crevices." But such is the case of the Karakoram pass, which is situated far behind the wall of the Muztagh, on a smooth table-land, and from which the springs of the Shayok gather, in order to escape through the crevice in the hard mountain-range. The case is similar, according to the descriptions of travellers, with the sources of other rivers of the Shayok basin. Thus the relief confirms the conclusions which we have drawn on a former occasion from the contributions of Stoliczka. A principal range, for which the name Muztagh range (instead of Dapsang range or Karakoram mountains) ought to be retained, must be introduced in consequence of its parallel course, with increasing certainty, as a member of the Himalayan system. South-west of it, towards the Indus, further subordinate, yet still important, parallel ranges seem to spring up; whilst in the north-east follows the Karakoram zone, marked by softer structure (belonging to the trias and coal formations), which, with its covering of atmospheric *débris*, gives it a smooth surface.\*

The map appended to the article of Mr. Saunders contains, like his previous works, much interest. It would lead us too far to go into the controversy which it invites by its hypothesis as to the development of the mountains from Assam to Northern China. However, we are glad that the author, contrary to his former opinions, regards the Lan-tsang-kiang and Nu-kiang as no longer leading to the Brahmaputra, but as the upper courses of the Mekong and the Salwen.

\* Mr. Shaw's views have been controverted in this Magazine for January last, and in the present number, by Mr. Saunders. ED.

THE COUNTY OF EDINBURGH OR MID-LOTHIAN: ITS GEOLOGY, AGRICULTURE, AND METEOROLOGY. with an Agricultural Map of the County; Statistics showing the Acreage and Annual Value of the Chief Landed Estates, &c. *G. Ralph Richardson, F.R.S.E.* (Edinburgh 1878.)

THE illustration of agricultural statistics by means of maps and diagrams is a branch of cartography which is still in its infancy, but which will no doubt be elaborated hereafter, so as to become a very important aid to the study of economic science. In 1874 M. Achille Delesse published an agricultural map of France, in the *Bulletin* of the Geographical Society of Paris for July, intended specially to show the different soils. Mr. Richardson has constructed a map of the county of Edinburgh on the principle of the "Carte Agricole de la France" of M. Delesse, but instead of showing the soils, he has conveyed to the eye, by means of colours on the map, the various agricultural rentals of the county. A second map of the various soils, classified according to their mineralogical and chemical constituents, would complete the work of illustration; and the two maps would show a close connection with each other, and form admirable guides to the study of the agricultural statistics of the region. Mr. Richardson, in the present publication, has made a very useful commencement of a most important work, which, we trust, may be followed up by other labourers in the same field.

Such a system for the cartographic illustration of agricultural statistics would be invaluable in India where the machinery actually exists for preparing the materials, and where all that is needed is due encouragement and support, a guiding head, and above all continuity in the effort to secure one aim and object. But this last is wanting.

#### Geological Maps of New South Wales.

THE Government of New South Wales have published excellent geological maps of the districts of Hartley, Bowenfels, Wallerawang, and Rydall, which illustrate the extent and thickness of the mineral deposits in one of the most promising mining districts of Australia. The maps are carefully coloured and well executed, on a scale of 2 inches to a mile. These districts were geologically surveyed in 1875 by Mr. C. S. Wilkinson, the Government Geologist, who discovered and reported upon several seams of coal and iron ores. The maps are further illustrated by a vertical section.

THE March *Bolletino* of the Italian Geographical Society contains letters from Dr. Matteucci and Signor Romolo Gessi, dated Khartoum 11th and 21st January respectively. The former anticipates a war between Abyssinia and Shoa and predicts the discomfiture of King Menelik, as his enemies are armed with Remington rifles. Kabariga, King of Unyoro, is reported as desirous of entering into a treaty with the Khedive through Colonel Gordon, a fact of some importance to travellers to Uganda, who will have to pass through the first-named country, formerly so full of obstructions.

The travellers were then on the point of starting and expected to meet some of the Antinori expedition at Kaffa (whither they purposed journeying by way of Sennar, Fazoglu or Fazukl, and Fadasi) about March.

In the same number we find a letter from Signor D'Albertis, announcing his arrival at Thursday Island in Torres Straits on the 4th January, after eight months' cruise up the Fly River in New Guinea, and promising further details at an early date.

## Log Book.

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**Professor Nordenskiöld's Arctic Expedition.**—Signor Bove writes under date 5th May from Carlskrona regarding Professor Nordenskiöld's Arctic Expedition. He observes that he erred in describing the 'Lena' as of about 500 tons capacity, inasmuch as she is only 100 tons. The vessel is being actively prepared for her voyage, and the scene on board is at present a very busy one. The total complement of people on board is thirty, all told; the commander (Palander) having had a difficult job in the matter of selection, owing to the number of volunteers. The doctor's name is E. Almquist, and he enjoys a great reputation in Sweden for chirurgical and scientific acquirements. Every officer and every scientific officer will have a separate cabin to himself, an arrangement which has given great satisfaction. A Russian officer has been deputed to accompany the expedition, and Professor Nordenskiöld writes to the effect that he has engaged an excellent hunter. Signor Bove says that arrangements have been altered as regards the method of exploration, and two extra sledges (in addition to two already supplied) have been put on board with the view of relying more on this means of locomotion.

**Search for Franklin Relics.**—In the article on "Eskimo reports respecting Sir John Franklin's Expedition," published in our April number, (p. 84), we announced that Messrs. Morrison & Brown, of New York, contemplated despatching Mr. Barry to the Arctic Regions in search for relics of Sir John Franklin. With this object in view, Mr. Barry left New York in the 'Eothen,' for Hudson's Bay, on the 19th of June last.

**The Elburz Range.**—In the proceedings of the Berlin Society we find an interesting review by Baron Von Richthofen of a lengthy paper by Dr. Emil Tietze on the structure of the Elburz range in Persia. He observes that hitherto the Elburz range has been a puzzle, and the notion that it formed part of the Persian system of ranges running north-west and south-east, and that its curvatures round the southern end of the Caspian resulted from, or were connected with, the formation of that depression, had not found universal acceptance. This theory has, however, been confirmed by Dr. Tietze's researches. He describes the range as the portion of the northern face of the Iranian plateau between the defiles of the Sefidrud and the Charsan pass in the west and the Bujnurd or Kuchan district in the east. Its length is between 400 and 450 miles, and its breadth about 70 miles; there are passes 7000 feet in height, peaks and ridges between 9000 and 14,000 feet, and Demavend attains a height of about 20,000 feet. The range consists of a series of chains more or less parallel to one another, which lose all importance as main water-partings or culminating ridges, but which are connected by saddles or cross ranges, which form the partings of minor individual streams. As in the Tian Shan and south-eastern China, so in the Elburz, the line of drainage runs, as a rule, between the parallel chains, but occasionally the stream deviates to the right or left, and cuts right through the range to pursue its course in a new valley.

The Elburz range consists of nearly every deposit between the azoic and tertiary strata. An axis of old crystalline rock is, however, wanting. In the western half the chains, as well as the strata and the main axis of the range run between N.W.—S.E., and W.N.W.—E.S.E. In the eastern half, the strata still follows this direction; while the main crest bends first from west to east and then from S.W. to N.E. The direction (?) of the strata denotes a condition of things existing ages previous to the convulsion of nature, which led to the deviation of the main axis of the range.

**Mr. Baber in Western China.**—Mr. Baber's report on the route followed by Mr. Grosvenor's mission between Tali-fu and Momien (between March 26th and May 3rd 1876), has at last been published. It is illustrated by a route map of the road between Yunnan-fu and Momien, in 4 sheets, on the scale of three miles to the inch, the route being laid down by dead reckoning and checked, though not corrected by latitude observations taken with an eight-inch sextant. Altitudes were taken with an aneroid. The report is written in a bright, jocular and thoroughly "non-official" style which makes it most pleasant reading. The tendency of the report will be to damp the hopes of any large trade springing up between Yunnan and British Burma. In Tali, at present, the goods and traders for the most part come from Canton, and Mr. Baber remarks that, loth as Englishmen are to admit it, the simple and evident approach to Eastern Yunnan is from the gulf of Tonquin (as Baron von Richthofen has long contended). But he thinks Shun-ning or some such town in the west of Yunnan may be approached by ascending the valleys instead of crossing all the mountain ranges as must be done if the Momien route be selected. Whether much trade is to be expected appears problematical. Regarding the poppy cultivation, Mr. Baber acknowledges himself to have been astounded at its extent in Yunnan; he estimates that the poppy fields constitute a third of the whole cultivation of that province. He further makes a remark which Mr. Justice Fry, and the Society for the Abolition of the Opium traffic will do well to note, *i. e.* if they desire to give the strongest possible impetus to its growth in Yunnan, let them by all means discourage its production in India. Some of Mr. Baber's identifications of places mentioned by Marco Polo are very interesting.

It may not be out of place to mention here that a descriptive itinerary of a route between Chun-king (on the Yangtse) and Yunnan-fu will be found in the *Bulletins* of the French Geographical Society for December and March last. The journey was made in December 1870 and January 1871, by M. Rocher, but we are not favoured with any explanation of the circumstances under which it was made.

**Colonel Prejevalsky.**—The Russian journals announce the arrival of Colonel Prejevalsky and his travelling companion, M. Ecklon, at St. Petersburg. The colonel proposes to continue his explorations next year.

**The Inter-Oceanic Canal across the Isthmus of Darien—Signature of the Concession.**—On the 23rd of March last a concession was signed at Bogota, the capital of the United States of Colombia, by M. E. Salgar, Minister of the

Interior, and M. Lucien N. B. Wyse, granting to the latter, on behalf of the Inter-Oceanic Canal Company, the exclusive right of constructing a maritime canal between the Atlantic and Pacific Oceans. The concession is for ninety-nine years, and includes the right, if the company wish it, of constructing a railroad parallel with the canal. The actual line of the canal is to be determined by an international commission of engineers, two of which are to be Colombians. The plan is to be submitted to the Government in 1881, and the work completed in twelve years; but six years extra will be granted, if necessary. The canal is to be large enough to afford passage for vessels 475 feet long, 52 feet wide, and 26 feet draught. The Company are to deposit 30,000*l.* as guarantee, in return for which they are granted a large tract of land. There are minor conditions relating to the details of the agreement.

The ports at the two ends of the canal are to be declared neutral for ever, as well as the waters of the canal, which are to be open to merchant vessels of the whole world. As regards ships of war reservations are made. Everything passing through the canal and deposited in the warehouses, as long as it is not for the use of the country, will be exempt from all imperial or municipal taxes. All canal dues will accrue to the Company for the period of the concession (ninety-nine years), and after that time the entire property, works, and plant will pass over to Government.

These are the principal terms of the convention, which will be vigorously pushed on when ratified by Congress.

**The new Volcano in Patagonia.**—The Patagonian volcano, referred to in our last number as having been discovered by the United States' ship of war 'Omaha,' had already been reported by Señor Moreno, of Buenos Ayres, nine months previously. It is the volcano of Chalten, a magnificent peak rising above this part of the Andes, and Señor Moreno placed it in 49° 8' S. latitude, and 73° 10' W. longitude. The Tehuelches of this part of Patagonia report that the Chalten volcano is almost always sending forth smoke and cinders.

## Correspondence.

### THE KARAKORAM MOUNTAINS.

*To the Editor of the "GEOGRAPHICAL MAGAZINE."*

SIR,—As Mr. Shaw is so good as to admit that my previous letters have put the question between us in a nutshell, perhaps I may succeed in making the kernel acceptable to him on this occasion. He allows that if the facts were as I conceive them to be, that my nomenclature would be correct. His objections are (1), that the culminating summits are not coincident with the water-parting; and (2), that the Karakoram pass is restricted to the water-parting and does not cross the summits. These objections are easily answered, as it is not necessary for my purpose that there should be the coincidence mentioned; and the name of the pass, if otherwise applicable to the entire mountain mass, cannot be refused to the whole of the road or route through it within the limits of the mass. Indeed, my orographic nomenclature relates not merely to the water-parting or other summits, but to the whole mass, within the limits

of its terminal extremities and bases, as distinctly defined by hydrographic conditions.

Thus I define the Karakoram mountains to be the mass that forms the water-parting between the basins of Lake Lob and the Indus. Its extremities are found where the water-parting of the Indus ceases to be continuous with that of Lake Lob; and they coincide with the extremity of the Gangri mountains on the east and with that of the Hindu Kush on the west, those mountains serving to separate the Indus basin from the basins of the Oxus and the Tibetan Lakes respectively. The bases of the Karakoram mountains are the streams of the Upper Yarkand and Karakash rivers on the north, and a part of the Upper Indus on the south. Some may prefer to regard the range between the lower Shyok and the Indus as a separate system; but the same argument would divide the Sewalik's from the Himalaya, although it is generally convenient to connect them. Mr. Shaw desires me to substitute three names at least for the mass which I call the Karakoram mountains; but he has probably overlooked the advantage of indicating the relations between the orographic and hydrographic features of a mountain system, which is secured by my nomenclature. I am in hopes that Mr. Shaw will be persuaded by this mode of stating the case; and forgive me if I have been pertinacious in maintaining the integrity of a system which aims at facilitating the study of the mountains of India.

In conclusion I will endeavour to explain further my objections to the description of Zanskar as a part of Tibet, and reply to the arguments by which Mr. Shaw supports his view.

Correct territorial names in civilised states are those imposed or adopted by the supreme rulers of the territory for the time being. The substitution of unauthorised names often occurs in literature erroneously. It is also an error in political geography to use a name which belongs properly to history and historical geography for the name used in actual administration, and it is equally erroneous to ignore the changes which occur from time to time in the limits to which a name is applicable.

When usage sanctions a departure by foreigners from the authorised local name, the foreign name becomes subject to the same rules as the native name. Thus Tibet, being the name by which the great Chinese dependency on the north of India is known to the English, when the Chinese lost that part of it, including Zanskar and Ladak, became contracted within the limits retained by the Chinese, as France has become contracted since the last war.

Mr. Shaw refers to Western Turkistan. Turkistan is merely a literary expression, the limits of which are only subject to the exact definition belonging to a political division in the case of Russian Turkistan, which is a government with a name and limits defined by Russian law. Beyond those limits Turkistan may be said to include certain Khanates and extensive pastoral regions occupied by independent nomads, besides considerable tracts and cities in the Chinese Empire with Turkish populations.

It is thus shown that Turkistan is not a name of the same class as Tibet, and thus this comparison is not one of "like things with like."

Mr. Shaw is even more unfortunate with reference to Bengal, the Punjab, and Hindustan. What does he consider to be the limits of Bengal? They are certainly not the same now as they were under the Mogul Subah of that name. The Punjab is not the same now as it was before the mutiny. Hindustan is a name of the same loose class as Turkistan, and of similar variable application. But Mr. Shaw's argument requires that the territories that once came under one or the other of these denominations, should always continue so.

If the political illustrations fail, Mr. Shaw expects to rely with certainty on the physical aspects of the case, but I am unable to follow him. When we use

exact political terms to designate physical features, it is at least well to bear in mind the political use of the term. Taken in its widest sense the Tibetan plateau extends in latitude from the summits of the Southern Himalaya to the summits of the Kuenlun, and in longitude from the summits of the Yunling mountains to those of Hindu Kush. But bearing in mind the political limitation of Tibet, I am the more ready to observe the physical distinctions between the Chinese or Tibetan portion of the plateau and the portion which belongs chiefly to the Rajah of Kashmir, and which is commonly recognized as the Western Himalaya. Between the plateau of the Western Himalaya and that of Tibet, there are remarkable differences. In the first the total breadth is much contracted; the broad lacustrine basins and plains are wanting; mountains and valleys are more sharply moulded. When a traveller visits Zanskar or Ladak, it would be confusing to let it be supposed that he had seen Tibet, or the plateau of Tibet; while the scene of his exploits would be described accurately and without liability to misconception by the name of the Western Himalaya.

TRELAWNY SAUNDERS.

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THE SEA LEVEL.—No. II.

SIR,—In addition to the causes assigned for the lowering of the sea level in the paper you did me the honour to publish in the *Geographical Magazine* for February 1877, other causes for that phenomenon are brought to light by recent discoveries.

In the year 1873, Mr. Crookes recorded some experiments on the action of heat and light on gravitating masses. These experiments culminated in the invention of the radiometer. This instrument has been shown in lectures, and shop windows, by a metallic cross, with two or four arms, balanced on a pivot in a glass globe, from which the air is exhausted. When a ray of light impinges on the discs, the cross revolves. When the ray of light is taken away the revolution gradually ceases.

A law of force in light is thus established. At the end of last year, and in the beginning of this, M. Cailletet, at Paris, and M. Raoul Pictet, of Geneva, "*presque au même moment*" (Pictet), succeeded in liquefying and solidifying the permanent gases, under conditions of cold and pressure.

These discoveries all harmonise with natural laws, revealing to us the cause of rotation, revolution, and the separation of the elements.

Going back to the time before creation, we accept a nebulous mass, containing in it the bases of our air, water, and elemental matter—gravitating in a cold chaotic condition in or through impalpable matter.

When the first light impinged on this mass of heterogeneous but sensible matter, it acted as light acts on the radiometer. The gravitating motion was converted into rotation on its axis, and revolution round its centre of attraction. Under these motions the mass assumed the spherical shape, and must have been sensible in all its surface area to the influence of light. As the aerial and aqueous gases are drawn from the body of the earth now by the attraction of light and heat, so it must have happened with the elemental bases of the nebulous mass; the aerial gases were converted into atmosphere, the aqueous gasses into water.

Air and water are then fairly accounted for.

Under this system of drawing out the gases, it followed that molecules of matter became unsupported, and naturally gravitated to their own centre.

We have then a condition in the revolving and rotating mass, similar to the conditions at Geneva and Paris. The nebula was cold; the new-made air and water pressed upon its surface, the consolidating molecules pressed upon themselves, more gases were forced out, more air and more water were made, and with the in-

crease of these elements more molecules of matter were consolidating. The same actions are going on now, under the laws of evaporation, condensation, and gravitation.

The nebular condition is adopted, not because anything positive is known of it, but because it has been adopted for the Beginning before, because we know of no other condition of primary chaotic matter, and because recent science has pointed out that a primary nebulous condition is almost a demonstrated fact. There can be no doubt that if the primary conditions were so, and if the laws of nature never have been broken, the actions that are now going on in our elements, under the influence of sun light, must have gone on in the Beginning under the same influence. The gases are evaporated from the whole body, the aerial gases become atmosphere, the aqueous gases become condensed, and gravitate as dew, rain, hail, snow, sometimes as inorganic or organic matter and the denser molecules consolidate.

Under no circumstances could these actions be rapid; but, having once began, they could not cease while the elements and the light continued. The consolidating surface may soon have offered an unequal undulating surface for the increasing waters to rest upon. This bed was continually subsiding by its own natural gravitation. Under this action the gases were continually pressed outward in a cold condition, till the subsidence or consolidation being nearly completed, the surface earth found its present condition. We see, feel, and know that this condition is due to natural laws; we do not know that these laws have ever been broken; we do not know if the consolidation is yet complete. Earthquakes, subsidencies, and ocean waves occur. The source of these phenomena must be in the deposits or in the continued consolidating molecules of the interior earth.

My former paper showed that the sea level had sunk some 6 or 5 miles, in consequence of the gradual wearing away of its own bed by its own forces. I now propose to assign two causes for the lowering of the sea level. 1st. The general and irregular subsidence of the interior. 2nd. The denudation of the water bed.

Yours, &c.,

H. P. MALET.

Proceedings of Geographical Societies.

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THE ROYAL GEOGRAPHICAL SOCIETY.

Anniversary Meeting 27th May, 1878.

THE Anniversary Meeting was held in the hall of the University of London, under the presidency of Sir RUTHERFORD ALCOCK, K.C.B.

The Report of the Council, which was read by Mr. CLEMENTS MARKHAM, stated that during the past year 187 Fellows had been elected, and that the finances were in a most satisfactory state, the total net income for the year being 7950*l.* Arrangements had again been made for the delivery of three lectures during the next session, respectively, by Prof. P. M. Duncan, Capt. F. J. Evans, and Mr. W. S. Thisleton Dyer.

THE PRESIDENT then proceeded with the presentation of the awards, the Royal (Founder's) Medal to Baron F. VON. RICHTHOFEN, and the Victoria (Patron's) Medal to Capt. H. TROTTER, R.E., (see our May number, p. 125).

In the absence of Baron Richthofen, the Founder's Medal was delivered to Count MUNSTER, who said that it was the second time that he had had the honour to receive this great distinction for one of his countrymen.



Baron von Richthofen, who deeply regretted that he could not himself receive this Medal, wished to thank the Society sincerely for this token of sympathy and approbation, and declared in his letter that it would give him renewed courage and will to promote geographical research. These tokens of acknowledgment given to men of other nations were certainly, Count Münster added, the best means to encourage scientific inquiry and travel, and he would now only express the hope that England and Germany might always try to be foremost to promote civilisation and geographical knowledge.

The Patron's Medal was next presented to Captain TROTTER, who, in acknowledging the honour, said that some of the pleasantest moments of the traveller in distant lands were spent in thoughts of home and of the welcome he might expect if he had the good fortune to return. It was not, however, given to all to realize that welcome, and his comrade, the late Dr. Stoliczka, who was his constant companion in all his wanderings in Central Asia, died a martyr to duty when within a few days of the end of their journey. It was a source of gratification to him, he went on to say, to find himself supported on this occasion by Sir Douglas Forsyth, who had so ably conducted the embassy to Kashgar, and to whose zeal in the cause of geography he was indebted for the opportunities which had led to the discoveries alluded to by the President.

The Medals awarded to the successful competitors from public schools were next presented. In announcing their names (see our May number, p. 125), Mr. FRANCIS GALTON said that this being the tenth year of the examinations, he was glad to state that the work of the pupils examined showed that there had been a great improvement in the teaching in some of the public schools. Liverpool still kept its high place, and had now taken twelve of the Society's Medals. It was also announced that the subject for the next (1879) examination, both in physical and political geography, would be "The Barbary States and the Sahara."

Sir RUTHERFORD next proceeded to deliver his Annual Address. He congratulated the Society on the steady progress made in the past year, and for the valuable and permanent records of geographical progress and research contained in the *Proceedings* and the *Journal*, under the able editorship of Mr. Bates. Another subject of congratulation, also, was the marked and rapid increase in the number of Geographical Societies, both in Europe and America, there now being thirty-eight, some of them numbering their members by thousands, thus showing the popularity of the subject, and the general sense entertained among civilised nations of its utility, and the importance of a systematic prosecution of geographical research in regions still imperfectly known. Nor was this interest limited to individuals and Geographical Societies, for many governments within the last year had granted considerable sums in aid of exploration. After referring to the losses sustained by the Society in the death of numerous members during the year, the President reviewed the progress made in geographical research. He next invited attention to the nomination of an African Exploration Fund Committee, for the purpose of promoting the efforts to open up the interior of Africa to civilisation and commerce. The Report of the Committee was now ready, and he was glad to announce, in anticipation of further details, that the Committee recommended the despatch of a carefully-organized expedition to explore the country lying between the caravan road now in course of construction from Dar-es-Salaam (a few miles south of Zanzibar) and the northern end of Lake Nyassa, and should the expedition reach that goal, and adequate funds be available, it was contemplated to push on exploration to the southern end of Lake Tanganyika, a further distance of 190 miles. In conclusion, it only remained for him, on his retirement from the office of President, to congratulate the Society on the

choice which had fallen upon the Earl of Dufferin, as his successor—one equally distinguished as a statesman and a scholar, and no less generally known as an accomplished man of the world, in whose keeping he felt assured the character and usefulness of the Society would not only be safe but receive fresh lustre.

#### *Meeting of 3rd June, 1878.*

A meeting was held on the above date, in the Theatre of the University of London, Sir RUTHERFORD ALCOCK, Vice-president, in the chair, when Mr. STANLEY read a paper entitled

#### A GEOGRAPHICAL SKETCH OF THE NILE AND LIVINGSTONE (CONGO) BASINS.

After a few introductory remarks by the CHAIRMAN, Mr. STANLEY proceeded to say that as Central Africa rose exhumed from its oblivion of 6000 years, they found to their wonder and delight that it possessed stupendous mountains, grand rivers, and lakes of great extent; that it was as prolific, rich in valuable vegetation and metals, as other continents. He intended to bring into prominence the three great results of his journey across the Dark Continent. The first of these was the circumnavigation of the Victoria Nyanza, resulting in the determination of its altitudes and the delineation of its coast line; the discovery of its great affluent, the Kagera, "the mother of the river," and its great affluent, the Shimeeyu. The next was the discovery of the Muta Nzige, "the Lake of the Dead Locusts," one great indentation of which the explorer has now named "Beatrice Gulf." When starting for this splendid body of water Mr. Stanley presumed that he was *en route* for the Albert Nyanza, and it was not until he had compared his altitudes with those of Colonel Mason Bey and Sir Samuel Baker, that he discovered that Beatrice Gulf was an arm of some great inland sea as yet unknown on maps of Africa. From these and a single glance at the map it was evident that the great lake, with a boundless horizon to the south, which Sir S. Baker saw, terminated some half a dozen miles south of the spot from which that traveller took his observation. The third great point of the lecture was Mr. Stanley's announcement of the absence of all outlet to the Tanganyika. In illustration of these various points he produced a number of facts. On Oct. 20 1875 he boiled three thermometers, and ascertained Ripon Falls to be 3369, but when these thermometers were tested and verified at Kew, the verifications increased the altitude of Ripon Falls to 4093, making a difference of 624 feet. Captain George, from Mr. Stanley's data, furnished to the *Daily Telegraph* from Africa, calculated the height of Victoria Nyanza to be 3800 feet, but he had not then received the Kew corrections. Sir Samuel Baker gives the height of the Victoria Nile, below Ripon Falls, at Karuma, as 3766 feet, according to Dunkin 3794 feet, with Kew corrections 4054, which allowed only 39 feet for the Ripon Falls, and many miles of rapids. The altitudes of all would read thus: Speke, 1858, 3740; Speke, 1862, 3308; Stanley, according to Captain George, (thermometer not yet verified), 3800; Stanley, according to his own calculations, 3369, result after Kew corrections, 4093; Baker, on the Victoria Nile below Ripon Falls, thermometer unverified, 3766 and 3794; result with Kew corrections, 4054. The thermometric readings agree tolerably well. Baker's, below Ripon Falls, is 205' 4"; Stanley's, above Ripon Falls, at lake level, is 205.9. He boiled the thermometer on Lake Victoria 27 times. The mean of nine careful calculations, with Kew corrections, gave Lake Victoria an altitude of 4168 feet above the sea. Alluding to the Victoria Nile, he said that, given a breadth of 400 yards, a depth of 10 feet, and a current of three knots, they had 60,000 cubic feet of water falling out of the lake every second, which in 24 hours would be 20,908,800 tons, and in a year of 365

days, over 7631 millions of tons, or about 5 tons of the sweetest drinking water per annum for every inhabitant of this globe. He recorded his admiration of Captain Speke, his predecessor in the region of Lake Victoria. Whether it is the enormous grey Nyanza, to which he attached the name of her Majesty the Queen, or that other, distinguished by the name of Albert, there was but little left for the actual circumnavigators to change. In latitude  $0^{\circ} 5' 0''$  N. he obtained a glimpse of an immense mass rising in the country of Gambaragara which he had called Mount Gordon Bennett, the height of which he estimates at 15,000 feet. It was only a day or two previous that he had obtained a view from a height of 6000 feet of a similar formation to the south, though not so elevated—which he had named Mount Lawson, in the district of Kibanga, in Ankori. Colonel Mason declared that the south-east angle of Lake Albert was  $1^{\circ} 11' 03''$  N.; but this position was only four miles south of Vacovia, above which, at an altitude of 1400 feet, Sir Samuel Baker gave, in very precise terms, a different version altogether. It was a hopeless task to attempt to reconcile two statements so diametrically opposed to each other. While the grey Nyanza expanded with equal breadth and length, the Tanganyika was like a deep crevasse, with a length of 329 miles and only a breadth of 28, deep sunk in the bosom of mountains, varying from 1000 to 3000 feet above its dark blue waves. The water area of the Livingstone (Congo) was larger than any other river in the world, unless they included the St. Lawrence. It covered 35,000 square miles. The great basin which lay between the western maritime region and the Central Lake region, and through which the Livingstone had channelled a broad channel of from one to eight miles in width, appeared to him to have formed the bed of a vast lake, extending from the Livingstone and Zambesi watershed south to the Nile-Shari, and Benué and Livingstone watershed north, with a breadth of 700 geographical miles, forming a vast inland sea of 630,000 square miles, nearly four times larger than the present area covered by the Caspian. Mr. Stanley concluded by thanking the President and Council of the Royal Geographical Society for the very high and signal honours they had bestowed on him for the few years he had sacrificed towards the solution of some of the secrets of African geography. Words of gratitude were soon uttered, but the feelings which prompted them in him would endure while he lived.

*Meeting of June 14th, 1878.*

AFRICAN EXPLORATION FUND.

A Meeting of the Subscribers to this Fund was called to consider the Report of the Committee; Sir RUTHERFORD ALCOCK, President of the Committee, presiding.

The Committee in their report first gave a brief history of this movement, and next considered the position which the Royal Geographical Society ought to occupy with regard to the whole subject of African exploration and its future direction. The report points out that the Society cannot compete with Governments and with missionary societies in the scale of its explorations, having neither the powers of the first nor the pecuniary resources of the second, while by its constitution it is restricted in its objects to scientific and geographical research. The German Society, on the other hand, can take commerce within its range, and obtain a Government grant in aid, and the Belgian Society undertakes also philanthropic work. These objects, appealing to stronger feelings and more universally recognised interests than those of pure science or geography, receive greater support. Thus in Portugal a grant of 20,000*l.*, for explorations in Western Africa beyond the confines of the Portuguese possessions, has been made by the Cortes. In France 100,000*fr.* has recently been voted for a Central African Expedition; and in Belgium an income of nearly equal amount has been contributed by

subscribers to the international scheme for the exploration of Africa (towards which the Committee have given 250*l.* from their fund; while the sum received for the African Exploration Fund, including 1,000*l.* granted by the Council of the Royal Geographical Society, amounts to only a little over 2,000*l.* Passing to the question of the sacrifices to be made by those who undertake this perilous work of discovery, the report points out that were all the inhabitants of Africa equally hostile and intractable it might well be doubted whether any more lives should be imperilled in efforts for the redemption of the country and of the whole race from barbarism and slavery. But there is abundant evidence that only certain tribes and regions are dangerous to approach; while vast tracts, capable of supporting an agricultural and industrious population, if cultivated, are only waiting the hand of civilised man and a Christian spirit to establish, with willing aid from native tribes, peaceable communities over the greater portion of Central Africa. Enough is known to justify the supposition that from eighty to one hundred millions would not be an over estimate of the population cruelly oppressed and kept in hopeless barbarism by the tyranny and violence of comparatively small numbers of predatory and bloodthirsty tribes. If these could be held in check but for a short period, while peaceable influences had time to work among the better-disposed of the populations, there is every reason to believe that a sufficient number of these would soon be collected into communities and villages, able successfully to defend themselves and their possessions under European guidance. It is this prospect which has induced so many to risk not only health and fortune, but the perils of martyrdom; and with an object so important and worthy in view it is not likely that there will be any lack of volunteers ready to take the place of those who fall in the first advance. The instructions given to the Belgian Mission are eminently pacific—as the committee think they ought to be in every case in which an exploratory expedition is despatched—and are to the effect that in all operations the head of the party must remember that he is to have recourse to force only in self-defence, and at the last extremity. To this general principle must be added the instruction to pay for all they require—labour, food, stations, and, if need be, a right of way peaceably conceded. The Committee approve these rules, and are of opinion that nothing more is needed than the faithful adherence to such rules of action to justify the continued prosecution of exploratory work. Having considered the practicability of exploring the country between Mombas, Formosa Bay, or some point on that part of the coast and Victoria Nyanza, passing by Mount Kenia, to which the chief objections are the great cost (estimated at about 2500*l.* in two years) and the hostility of certain tribes in the district, the committee consider two alternative plans. The first, suggested by Mr. Stanley, is to examine the valley of the Rufiji from its delta to its sources in the highlands bounding the eastern side of Tanganyika; and the second is to explore the country beyond a caravan road now being made by English engineers under the sanction of the Sultan of Zanzibar, from Dar-es-Salaam (a few miles south of Zanzibar) towards the northern end of Lake Nyassa. According to the account given by Mr. Cotterill of the country through which this route will take a party, the region offers great attraction in the grandeur of its physical features, and is likely to yield discoveries of great geographical interest, independently of its practical importance in connection with the question of the best trade route to the lakes. Should the expedition reach Lake Nyassa, a distance of 350 miles from Dar-es-Salam, the position would serve as a starting-point for a more important exploration to the southern end of Lake Tanganyika, a further distance of 100 miles. The return journey might be made as far as possible along the valley of the Rufiji. To open up the interior of Africa, the committee believe

that work of a steady and progressive character is required. It must not be too ambitious at first, nor beyond the real exigencies of trade and civilising efforts, to which geographical exploration is the pioneer. The Committee recommend, under the circumstances, the despatch of a small expedition, under the command of Mr. Keith Johnston, with whom another European is to be associated, to start from England in October next.

Mr. FRANCIS GALTON moved that the report be received, which was seconded by Captain CAMERON, R.N.

A brief discussion then followed, Sir RUTHERFORD ALCOCK explaining in conclusion the reasons the Committee had for recommending the Dar-es-Salam route. He thought that the best way of gaining the support of the public for the further prosecution of African exploration was to show that something was being accomplished, and if the present expedition were successfully carried out he thought it would facilitate African travel immensely. He proposed the following resolution:—"That, in the opinion of this meeting, the route recommended by the Exploration Committee is, under all the circumstances, the best to be adopted."

Sir HENRY RAWLINSON seconded the motion, and the resolution was carried unanimously.

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#### BERLIN GEOGRAPHICAL SOCIETY.

*March 2nd, 1878.*—Herr VON RICHTHOFEN, President, in the chair. Herr FREIHEN VON THIELMANN communicated a description of his ascent of Cotopaxi, for which he left Quito on the 12th January last, and arrived at the highest point of the mountain (5943 metres) at 9.45 a.m. on the morning of the 15th.

Herr R. KIEPERT read a paper on Colonel Prejevalsky's journey to Lob-Nor, which he has republished in the *Globus*.

Professor G. KARSTEN, from Kiel, presented the Society with the Annual Reports for 1874, 1875, and 1876, of the Committee for the Scientific Examination of the German Ocean. He explained that in 1871 and 1872 two expeditions were sent into the Baltic and German Ocean respectively for the purpose of making a complete physical examination of those seas, and so paving the way for a further investigation which was to be how to develop the economic wealth of the sea. To this end twenty observing stations were established, thirteen along the shore of the Eastern Ocean from Hela to Sonderborg and seven between Sylt and Borkum along the shore of the North Sea. These observations are intended to play the same part in reference to the Sea that meteorological observations do in regard to the atmosphere. At present special attention is being devoted to the herring, which forms an important item of food. One fact of importance has been brought to light in the course of these inquiries that the value of the Eastern Sea fishery is equal to the yield of a fertile tract of country from 80 to 192 German geographical square miles in extent.

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#### FRENCH GEOGRAPHICAL SOCIETY.

*March 20th, 1878.*—M. DE QUATREFAGES presiding. The PRESIDENT announced that Messrs. De Brazza and Ballay were expected at the West Coast of Africa about March. Announcement was also made of the completion of an Atlas of forty plans of Paris of all imaginable dates, with a prefatory memoir compiled by M. Engelhard. The Atlas will be exhibited at the forthcoming Exhibition. A letter from H.M. the King of the Belgians was read relative to the death of Messrs. Crespel and Maes, the Belgian African explorers, and the President announced that two officers had already come forward to take their places. Lieutenant Wyse wrote reporting his further explorations in the Isthmus of Darien, and M. LEVASSEUR read a paper on the distribution of population over the face of

the globe. Taking the number of human beings on the face of the earth as about 1000 million, the average density is about 77 souls to every 1000 hectares, or very nearly 20 to the square mile. It is a peculiar fact, the lecturer pointed out, that in the old world the preponderance of population had gravitated towards the eastern and western extremities, viz. China on the one side and England, Germany, Belgium, and France on the other, while immense tracts between lay almost uninhabited. M. Levasseur enlarged on the process of settlements and migrations going on in the United States and the density of population there, this part of the lecture being illustrated by tinted maps.

The new Indo-Chinese Society presented some Arabic texts, and the Society of Bibliophiles, of Rouen, presented the fourth volume of *The Geography of the Seine-Inferieure Department*, devoted solely to the Neuchatel arrondissement.

*April 3rd, 1878.*—M. DE QUATREFAGES in the chair. M. P. CAVE, lieutenant of the French navy, gave an account of a cruise round New Caledonia made by him. He started from Numea, which, for its security and dimensions, is the finest harbour of the colony, skirted the reefs on its western side, and which, by means of the openings in them afford access and harbourage to craft. There is a cobalt mine and some extensive copper mines in the island, the latter close to Balade Harbour, where Captain Cook first landed.

*General Meeting of April 7th, 1878.*—The Baron DE LA RONCIERE LE NOURY, Vice-Admiral, President, in the chair. M. DUTREUIL DE RHINS, commanding the gunboat 'Scorpion,' in the service of the King of Annam, read a paper on the Annamese coast and the province of Hue. He estimates the superficial area of Annam at 97,000 square miles, and the length of the coast, without reckoning indentations, at about 1000 kilometres. Its population amounts to about two and a half millions, which gives about twenty-three inhabitants to the square kilometre. The shape of the country resembles a broad S, and it is separated from the western part of Indo-China, by a long range of mountains of varying height, the spurs of which in some cases run down to the sea. The speaker gave a description of the port of Turan, called by the Annamites Kuang-nam, and of the province of Hue, which, though of no great extent and in no sense as yet developed, contains unworked mines, forest products, and large cultivable tracts suitable for the growth of sugar, tobacco, cotton, coffee, &c. The climate offers a notable contrast to that of Lower Cochin China, and is by no means unhealthy, except at some points along the coast.

Dr. CREVAUX then gave an account of his recent travels in French Guiana, under the direction of the Minister of Instruction, to penetrate into the interior of the country as far as the chain of Tumuc-Humac. During this journey M. Crevaux explored twice as much ground as that sketched out in his programme. After having traversed the northern slope of the Tumuc-Humac chain he returned by the southern slope. The river Maroni conducted him to the foot of the mountains, which he explored from north to south, and the river Yary led him to the Amazon river. The crossing of the Tumuc-Humac chain was a most fatiguing undertaking, and M. Crevaux's supplies very nearly failed. Two of his companions, Messrs. Emonet and Krenner, missionaries, were obliged to give up the journey after a month's experience thereof, and M. Crevaux had to continue his arduous exploration with one negro. He has traversed in all about 1500 miles, of which about 675 are over perfectly new ground.

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June 5th, 1878.—M. VIVIEN DE SAINT MARTIN in the chair. M. Savorgnan de Brazza writes to the Society under date Dume 25th July 1877, enclosing a letter from Dr. Ballay, who reported that he had ascended the Ogowe as far as the Pubava Falls, where it is between 60 and 70 feet across only. The falls themselves are about 130 feet in height and in two parts.

M. Duveyrier read a letter from M. Masqueray giving an account of some researches of his among the Abadia, a sect dwelling in the South of Arabia. Signor Guido Cora gave some particulars respecting the country about the Upper Nile now being explored by the Italian Expedition. M. l'Abbe Durand read a paper on Kashmir and Tibet.

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#### PARIS SOCIETY OF COMMERCIAL GEOGRAPHY.

May 31st, 1877.—Count MEYNER D'ESTREY in the chair. M. ARDIN D'ELTEIL, vice-consul at Sierra Leone, read a paper on the rivers belonging to France on the western coast of Africa between Sierra Leone and the Gambia. Arrangements were then made for the organisation of a Congress of Commercial Geography to be held at the Trocadero during the current Exhibition.

In the 3rd Section or Committee of the Society M. le General Robin read a paper on a proposal of M. Monnie's for colonising the valley of the Rio Colorado in South America. After a discussion the commission agreed to approve the scheme, as far as exploration was concerned, but not to recommend colonisation, as beyond the scope of the Society.

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#### LYONS GEOGRAPHICAL SOCIETY.

April 7th, 1878.—M. LOUIS DESGRAND, President, in the chair. M. De Semellé being unable to be present, M. FRANCOIS DELONCLE read in his stead a paper on the expedition of the former to Central Africa. A detailed account of M. de Semellé's scheme will be found at page 48 of our number for February last. To the particulars, therefore, M. Deloncle added that there were grounds for supposing that M. de Semellé would probably discover between 3° and 5° N. lat. a lake or series of lakes bearing the name of Tem, according to Admiral Fleuriot de Langle; Temten, according to Vogel; Demdem, according to the Arabs; and Sarabœ or Sarbewel, according to the Portuguese E. Lopez (1586). This lake, M. Deloncle thinks will be found to be the source of the Shari. It is calculated that M. de Semellé's expedition may last three years and cost 183,000 francs (7320l.)

M. DELONCLE then gave an account of the travels of a Franciscan monk through Africa during the fourteenth century. This monk's name is unknown, but he was born at Seville in 1305, and travelled over various parts of the globe. He visited Europe and Asia, including China, then journeyed into Egypt, explored the African coast of the Mediterranean, Marocco, Senegal, the Sudan, Guinea, the Cape de Verde islands, St. Thomas and Fernando Po, the region of the Shari and Lake Chad, the sources and course of the Nile, Darfur, Abyssinia, and Nubia. He describes the countries visited by him with great conscientiousness and gives the names of places where he stopped, as well as the history of such countries as he could ascertain. M. Deloncle concluded his paper with remarking that the researches of M. Marcos Ximenez de la Espada, member of the Madrid Geographical Society, and his own examination of this curious work above mentioned, would invest old records of travels and especially mediæval ones with a value which has somewhat undeservedly been denied to them hitherto. He exhorted his hearers to encourage researches into the archives of the principal cities of Europe with the object of unearthing fresh records of a similar character.

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#### IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

April 5th (17th), 1878.—M. P. DE SEMENOV, Vice-President, in the chair.

M. SREZNEVSKY, the Secretary, announced the return of Messrs. Potanin, Rafoilov, and Berezovsky from Mongolia. The expedition charged with the duty of examining the water-parting between the Ob and Yenisei left St. Petersburg on the 12th March. It consists of Baron Aminov, engineer, the chief of the expedition, and Messrs. Lipine and Porzel, to which party will be added an officer and some surveyors chosen by the Governor-Generals of Eastern and Western Siberia. Yeniseisk has been selected as the starting place of the operations from whence the expedition will make for the Ket, a tributary of the Ob, immediately after the melting of the river ice. The region to be explored is about 150 versts long. M. Smirzov, of the Kazan University, proposed to start on the 15th (27th) April for the basin of the Petchora, where he intends to make magnetic observations during the spring.

Two other projects have been approved by the Society, one of an ethnographical character in Russia in Europe, and the second of a purely geographical scope in Mongolia. Details were promised later on.

The publication of several works was announced. The second part of the third volume of the *Memoirs of the Section of Physical Geography*, including a paper by M. Oswal Heer, professor at Zurich on the flora of the jurassic strata of the Irkutsk Government and Amur country, with an introduction by M. Schmidt, the eighth volume of the *Memoirs of the Ethnographic Section*, which is devoted to customary law, and comprises researches into the manners and customs of the inhabitants of Samara, the Lapps, Samoyedes, Khirgizes, Yakuts, and others.

In conclusion, the Secretary drew attention to a remarkable work presented to the Society by M. Hovert, who has catalogued all the works, pamphlets, documents, &c., of the St. Petersburg archives having reference to the geography of Russia. This exhaustive catalogue has been deposited in the Society's library for convenience of reference.

May 3rd, 1878.—M. P. de SEMENOV, Vice-President, in the chair.

The SECRETARY read his monthly chronicle of events. He touched upon Colonel Prejevalsky's approaching return to St. Petersburg (see our last number, p. 162), and mentioned that he had made natural history collections during his stay at Zaissan. Intelligence had been received of the arrival of the Baron Aminov, at Yeniseisk. M. S. Smirnov, who, with M. Middendorf, is studying the agriculture of Russian Turkestan, wrote and gave information regarding their movements, and M. J. Smirnov, Professor at the Kazan University, reported the commencement of his magnetic observations in the Petchora country, which will complete the series of observations of a similar character which he has been making for the last seven years in various parts of Russia. M. Poliakov proposes to continue his researches commenced in 1867, into the remains of the stone age. His previous labours have been in the Irkut valley, in the province of Olonetz, in the upper part of the Volga and in the Ob valley, and this season he will visit the government of Vladimir and Esthonia, where various pre-historic remains have been recently unearthed, including interesting proof of the contemporaneous existence of a fresh-water seal and the mammoth.

M. Tiaguine, of the Pilot service, chief of the station founded in Novaya Zemlya, by the Society for the Saving of Life at Sea, has been furnished, by the Society, with adequate means for taking scientific observations, during his sojourn in that Arctic Station. Announcement was made that Sub-Lieutenant Oscar Nordquist

had arranged with Professor Nordenskiöld to accompany the latter in his Arctic voyage to the Siberian Polar Sea, in the ship 'Vega,' and had been furnished by the Society with instructions to keep a journal and carry on scientific observations. M. Mouskelof proposes to make a geological examination of the southern part of the Tian Shan mountains, the northern part of which he had already explored in 1875.

M. POTANIN gave an account of his travels in Mongolia. He observed that the eastern part of the Altai was first reconnoitred in 1869, by the Boundary Demarcation Commission, and that further information was acquired by Messrs. Matussovsky and Sosnovsky. The existence of a lofty chain of mountains as far as the meridian of Kobdo was known; beyond that point, mountains of lesser height were supposed to extend, and (according to Klaproth) to unite with the Tian Shan. In order to solve this point the expedition made an excursion southward as far as Hami; it ascertained that the Altai range extends eastward of Kobdo, and that it is separated from the Tian Shan by the Gobi depression. According to native information, the Altai extends as far eastward as the longitude of Orok-Nor, and is bounded on the south by the Gobi. The eastern part of the Mongolian range presents three features of note: the main mass of the mountains has the character of a continuous plateau without culminating summits; its passes, the lowest of which is 8000 feet, are separated by deep ravines; and the western part is of a different character. The Altai separates from each other the three plateaux of Zaissan, Jabkhin, Khirgiz, Nor, and the Gobi. The Tian Shan consists of two parallel chains. The Hanghoi range, when the expedition visited it, on the south, is separated from the Altai by the great Jabkhin valley. Eastward no mountains were to be seen, but certain data led them to think that the Altai and Hanghoi are probably joined. Detailed topographical information was given by M. Potanin, regarding that portion of the great Altai range north and south-east of Uliassutai. He remarked that it is only in its north-western portion that it is at all well watered, all the other parts being arid; larch and fir forests are found in the western valleys, and in three places on the northern slope, and the cedar is said to exist on the Hanghoi or Kangai range, which extends to the south of the Tes river. M. Potanin also gave details of the population of the different tracts in this region.

We have no hesitation in saying that M. Potanin's map will form a very important contribution to the geography of Mongolia.

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#### HALLE GEOGRAPHICAL SOCIETY.

May 8th, 1878.—Dr. KIRCHHOFF, President, in the chair. The PRESIDENT spoke of the recent organisation of the German African Society, and of the intended journey of Herr Schütt, an engineer, into Muata-Yanvo's kingdom (already partly known to us through Dr. Pogge's travels), and from thence northward into the region lying between Stanley and Cameron's routes, whither it is hoped that it may be found possible to despatch an expedition from the north through the countries traversed by Nachtigal and Rohlf. Reference was then made by the President to the fiftieth anniversary of the foundation of the Berlin Geographical Society, and the proposed union of several German societies was reserved for future consideration and discussion.

Professor Dr. HERTZBERG read a paper on the old and new conditions of the Balkan peninsula. He pointed out how the upheaval of the shores of the Ægean Sea and the alluvial deposits of the rivers had reclaimed considerable tracts and altered the configuration of the country. Miletus, once an important port, is now a miserable inland village; and the pass of Thermopylæ, which formerly was defended by a handful of men against a host, owing to the narrowness of the

pass between the steep face of the mountains and the maritime swamps, has now widened to the extent of a mile seawards. Earthquakes, too, have helped to make the face of the country very different from what it was. The vegetation and fauna of the country have also undergone change: whole groves of orange trees now extend as far as Epirus; the lion has disappeared from Thessaly, and the cat has been introduced. Of the superior indigenous breeds of Thessalian horses there is now no trace. Regarding the ethnological changes, the author pointed out that the Islamite and Greek religions had made many converts of people, and even races, whose origin was far different from what their religion would have denoted. The term "Greek" is often applied at this day to people who are nothing but Græcised Bulgarians. Topographical investigations have done much to dissipate false notions of the country. The Acroceraunian mountains, once regarded as a long dividing range between Epirus and Illyria, have shrunk to the dimensions of a short mountain range. The Balkan, with its eighteen passes, can obviously form no important line of ethnological demarcation. The openings in the mountains north-east and north of Macedonia, which made her so exposed on that quarter, explain much in her history.

A discussion ensued, in which Professor VON FRITSCH and JELLINGHAUS related their own experiences in the countries referred to.

We regret that in our May number Dr. Nachtigal's paper, read before the Halle Society in April, should have been erroneously described as having been read at the January meeting. The mistake occurred through the omission of any date on the "slip" of the meeting.

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#### ITALIAN GEOGRAPHICAL SOCIETY.

April 22nd, 1878.—SIGNOR MALVANO, Vice-President, in the chair. The MARCHESE DORIA read a paper on the work of the Italian Naturalists in New Guinea, and prefixed to it a brief account of former and subsequent notable voyages to that island. The Marchese expressed a hope that Signor D'Albertis would be awarded the Gold Medal of the Society, and he observed that the collections of Beccari and D'Albertis combined with those made at the instance of M. Bruijn by M. Laglaize, a Frenchman, among the Karon people on the north coast, together amounts to 800 specimens of mammalia, 10,000 birds, 3000 reptiles, 2000 fish, 80,000 insects, &c. All these have passed through the Marchese Doria's hands and are now in the Civic Museum of Genoa. These are exclusive of the last collections made on the Fly river by Signor D'Albertis.

#### NOTICE.

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Letters and Articles intended for insertion should be written on one side of the paper only, and must be accompanied by the name and address of the writer; not for publication, but as a mark of good faith.

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THE  
GEOGRAPHICAL MAGAZINE.

AUGUST, 1878.

THE SWEDISH ARCTIC EXPEDITION.

THE Swedish Arctic Expedition sailed from Gothenburg on the 3rd of July 1878 under most happy auspices, and with every prospect of securing a large measure of success.

In their northern explorations the Swedes have gone to work on a wise and systematic plan. Their views are similar to those which were so long advocated by the late Admiral Sherard Osborn, and the Council of the English Geographical Society, and which led to the despatch of the late most successful English Arctic Expedition. They have carefully avoided all clap-trap about reaching the Pole; they have diligently profited by former experience; and they hold that every advance beyond the furthest point hitherto reached secures success for an expedition. They maintain that, as their expeditions always include a scientific staff which diligently observes and collects in all branches of enquiry, they cannot fail, because they must return with useful results, and so add to the sum of human knowledge.

Although we have given more or less full accounts of some of their former expeditions in previous numbers of this Magazine, we believe that it will be for the convenience of our readers if we take this opportunity, on the occasion of the departure of the Expedition of 1878, of passing briefly in review the previous achievements of the Swedes in the Arctic field of geographical research.

The first beginning of Swedish Arctic adventure was in 1837, when Professor Sven Loven undertook a voyage to western Spitzbergen in the schooner 'Enigheten,' commanded by the whaling captain P. Michelsen of Hammerfest. He returned in August of the same year with valuable collections of fossils and of the marine fauna of Spitzbergen. In the following year the French Government sent the corvette 'La Recherche' to Spitzbergen under command of Captain Favre, who visited Bel Sound and Magdalena Bay, and several Swedish men of science were on board.

Then there was an interval of twenty years, and it was not until 1857 that Dr. Otto Torell inaugurated his Polar voyages by a preliminary trip to Iceland. He was accompanied by Dr. N. Olson Gadde of Lund, the object being to study the Iceland glaciers and the *fauna* of the Icelandic fjords, with a view to determining the question of the Scandinavian glacial period. In the next year Dr. Torell equipped the Norwegian yacht 'Frithiof' for a scientific expedition to Spitz-

bergen. He sailed from Hammerfest on the 3rd of June 1858, accompanied by Dr. Nordenskiöld and Dr. Quennerstedt. On the 29th they reached Bel Sound, and their scientific labours, which were very successful, took them to Ice Fjord, Amsterdam Island, Clover Cliff and Magdalena Bay. They returned to Hammerfest on the 28th of August with large collections and many valuable observations.

The summer of 1859 was devoted by Dr. Torell to a voyage to Greenland. On this occasion he obtained marine animals by dredging at a depth of 500 metres, made a collection of geological specimens, and undertook a short excursion on the inland ice.

The second Swedish Expedition to Spitzbergen left Tromsö on the 7th of May 1861. The funds were supplied partly by the Government and partly by the munificence of Prince Oscar, the present King of Sweden, and others. Dr. Torell was again in command, and his companions were Dr. Nordenskiöld and Dr. Blomstrand as geologists; Drs. F. A. Smith, Malmgren, A. von Goës, and G. von Yhlen as zoologists and botanists; Drs. Duner and Chydenius as chemists and astronomers. The two vessels, called 'Æolus' and 'Magdalena' were commanded by naval officers, Lieuts. Lilliehöök and Kuylentjerna. Carl Petersen, the veteran who accompanied Penny Kane and McClintock, embarked as dog driver. After touching at Bear Island, the expedition explored Hinlopen Strait, the Seven Islands, and North-east Land as far as Cape Platen, returning to Tromsö on the 27th of September. Several deep-sea soundings were obtained, one at a depth of 2700 metres; large scientific collections were made; many points were astronomically fixed; and important materials were secured for a more accurate knowledge of the marine currents. It was found quite impracticable to travel with dogs over the ice to the north of the Seven Islands.

In 1863 Dr. Quennerstedt undertook a voyage with Captain Castberg in a sealing brig, accompanied by Lieut. H. van Kervel and the Count Ehrensvoerd of Gothenburg. The voyage extended from February to June 1863, and the party made a valuable collection in the seas round Jan Mayen Island.

In 1864 the third Swedish Expedition to Spitzbergen was fitted out. It consisted of the schooner 'Axel Thorsden,' and the scientific staff was composed of Drs. Nordenskiöld, Duner and Malmgren. Funds were granted by the Swedish diet, and supplemented by the liberality of Count Platen of Stockholm. They sailed from Tromsö on the 14th of June and returned



on the 13th of September. The principal object was to continue a triangulation which had been commenced in 1861, with a view to measuring an arc of the meridian at Spitzbergen. After an unsuccessful attempt to penetrate the ice to the eastward, Bel Sound and Horn Sound were visited, and the west coast as far as Prince Charles Foreland; diligent care being taken to make collections at every available point.

The fourth Swedish Expedition to Spitzbergen sailed in 1868 under Captain the Baron von Otter and Professor Nordenskiöld, the Government placing at their disposal the steamer 'Sophia,' completely equipped and provisioned; and funds were subscribed at Gothenburg by the Count Ehrenschildt and others. Drs. Smith, Malmgren and Holmgren went as zoologists; Drs. Fries and Berggren as botanists; Dr. Nauchkoff as mineralogist; Drs. Nyström and Lemström, of Helsingfors, as surgeons; and Lieut. Palander. The objects were to study the natural history and geography of Spitzbergen, and to ascertain how far north it was possible to take the steamer during the autumn. After touching at Bear Island, the ice prevented them from achieving their original object of reaching Gilies Land by the eastern side of Spitzbergen. A valuable collection of fossil plants was made on the shores of Ice Fjord, and deep-sea soundings were taken. Baron von Otter then attempted to reach the east coast of Greenland, but was stopped on the 80th meridian. Returning to Amsterdam Island the 'Sophia' made a renewed attempt to reach Gilies Land by the north, and visited the Seven Islands, and Hinlopen Strait. On the 19th of September one more attempt was made to penetrate due north, and the parallel of  $81^{\circ} 42'$  N. was reached in the meridian of  $17^{\circ}$ , the highest latitude. On the 4th of October the 'Sophia' was surrounded by floating ice and in great danger, and on the 20th she returned to Tromsö.

In 1870 Professor Nordenskiöld made a voyage to Greenland, the object being that of obtaining a supply of dogs, with a view to making an attempt to penetrate north of Spitzbergen in a subsequent year with dog sledges. He was accompanied by Dr. Berggren as botanist; Dr. Oberg, as zoologist; and Dr. Nordström as geologist. The people of Gothenburg supplied the funds. The party landed at Godhavn on the 2nd of July, and made boat excursions on the Greenland coast between the parallels of  $68^{\circ}$  and  $71^{\circ}$  N. during the ten following weeks. Large natural history and ethnological collections were made, and the positions of twenty places were astronomically fixed. During July, Nordenskiöld and Berggren made their memorable sledge journey from the Auleitsvik Fjord over the inland ice. Professor Nordenskiöld offered a reward for the discovery of meteoric stones, and the Eskimos reported their existence at Ovifok on the coast of Disco. There were three enormous blocks and some smaller stones which the explorers brought home with them. In the following year, 1871, the Swedish Government sent the gun-boat 'Ingegird,' under Baron von Otter, and the brig 'Gladan,' under Captain M. von Krusenstjerna, to bring away the great meteorites from Ovifok; as well as to make scientific researches in Baffin's Bay and Davis Strait. Dr. Nyström was the zoologist, and Lieuts. von Holten and Brusewitz were appointed as seconds in command. The Swedish Academy also sent Dr. Fries as botanist; Dr. Lindahl as zoologist;

and Dr. Nauchkoff as geologist; while the Danish mineralogist Steenstrup also joined the expedition. On the 16th of June the two vessels reached Godhavn, and were employed during the next fortnight in shipping the meteorites at Ovifok. Parties explored the shores of the Waigat and of the bay of Disco, and the 'Ingegird' afterwards went as far as Upernivik. Much valuable deep-sea sounding and dredging work was accomplished, and the expedition, with the three precious meteorites, returned to Sweden. One was given to the Swedish Academy of Sciences, the second to Nordenskiöld, and the third to the Danish Government as proprietor of the territory where they were found.

On the 4th of July 1872, an expedition sailed for Spitzbergen from Gothenburg, with the intention of wintering. The funds were mainly supplied, as for the two former expeditions, by the merchants of Gothenburg, chief among whom, as a munificent supporter of these useful voyages, was Mr. Oscar Dickson. The Government contributed two vessels. The postal steamer 'Polhem,' built for service in the Baltic ice during the winter, was one of the selected vessels, and Lieut. Palander was appointed to command her, with Dr. Envall as surgeon and photographer, and sixteen seamen of the royal navy. The scientific staff consisted of Professor Nordenskiöld, the Italian naval officer Eugenio Parent, Dr. Wijkander as astronomer and meteorologist, and Dr. Kjellman as botanist. The 'Polhem' was accompanied by the brig 'Gladan' under Lieuts. Krusenstjerna and Von Holten, with twenty-three men; and the merchant steamer 'Oncle Adam' under Captain Clase with twelve men. The plan was to build a house and observatories on one of the Seven Islands, which done the 'Gladan' and 'Oncle Adam' were to return to Sweden. In the following spring a party was to have set out due north, in sledges drawn by reindeer, these animals having been preferred to dogs, chiefly because they would be better adapted for food. But it was found impossible to penetrate the heavy ice, and the wintering station was established in Mossel Bay, on the north coast of Spitzbergen. Unfortunately the ice pressing on the shore prevented the two store ships from returning, all three ships had to winter, and the provisions intended for twenty-eight had to suffice for sixty-seven men. Another disaster was the escape of the reindeer which were never recovered. In the spring, as the heavy nature of the ice made it impossible to proceed northwards, Nordenskiöld resolved to explore the eastern part of the north-east land. On this sledging journey, conducted on the system of McClintock, the Swedes were absent from the ship for two months. They took no lime juice and had no scurvy, which is one out of many proofs that the absence of lime juice on the sledges was not the cause of the outbreak of scurvy in the late English expedition. Complete sets of scientific observations were taken, and most valuable collections were made; and on the 6th of August 1873 the 'Polhem' arrived safely at Tromsö.

One other expedition to Spitzbergen may be mentioned because, although the main object was commercial, its members did much good scientific work. Some Swedish merchants, having determined to work the phosphate beds discovered by Nordenskiöld at Sanriehook in Ice Fjord, employed Dr. Nathorst as

geologist, and Dr. Wilander as chemist, to report upon them. They arrived in Spitzbergen on the 17th of July 1870. Besides the researches which were the chief aim of the voyage, these two young *savans* made several excursions, one to Gipshook where they made a collection of fossil plants. On the 29th of August they left Spitzbergen on their return. The reports of Nathhorst and Wilander led to the formation of a Company to work the phosphates of Sanriehook, which sent two ships, with workmen, to Ice Fjord in the summer of 1872. Dr. Oberg, one of the members of the Greenland expedition in 1870, was engaged as geologist and chemist. The enterprise was abandoned in the end of the summer of 1872, but Oberg returned with a fine palæontological collection, chiefly from the triassic beds of Cape Thorsden, and the jurassic formation at Cape Boheman.

The Swedes have now been steadily and perseveringly prosecuting Arctic research for fourteen years, from 1858 to 1872, having sent no less than seven expeditions to Spitzbergen, and two to Greenland. Failure was unknown to them, because their objects were practical and attainable. Those objects were to secure scientific results, and to add to the sum of human knowledge; and some measure of success has rewarded every effort they have made. The Swedish museums contain the richest Arctic scientific collections in the world.

After his return from Spitzbergen in 1873 the indefatigable Nordenskiöld turned his attention to that most ancient field of Arctic research—the north-east, adding the practical object of opening the ports on the Siberian rivers to European commerce, to the main scientific aims of his undertakings. He was now a veteran explorer, having served in six Arctic expeditions, made two important spring sledging journeys, and experienced the rigours of a winter north of the 80th parallel; while his scientific attainments are of the highest order. He prepared for an entry upon this new field by an exhaustive study of all that is known of the north coast of Siberia, the rivers, and the sea to the northward; as well as of the work of all former adventurers in that direction. His first attempt was made in 1875, the cost of the expedition being defrayed by that munificent and enlightened promoter of Arctic discovery, Mr. Oscar Dickson, of Gothenburg. On the 8th of June, 1875, Professor Nordenskiöld sailed from Tromsö in the 'Proven,' accompanied by Drs. Kjellman and Lundström as botanists; Drs. Theel and Stuxberg as zoologists; and twelve Norwegian fishermen. The result of this voyage was most important. It established the fact that the Yenisei river can be reached by navigating the Sea of Kara at a certain period in the summer, and it thus opened a new continent to the commerce and civilising influence of Europe. After coasting Novaya Zemlya from Matotchkin Schar to the southward, the 'Proven' passed through the Jugar Strait, crossed the Sea of Kara, and, meeting ice in 75° 45' N., steered southwards to the Siberian coast, and reached a point on the eastern side of the mouth of the Yenisei, which was named Dickson Harbour. On the return voyage the course was N.W. to Novaya Zemlya, near Cape Middendorff, and then homewards through the Matotchkin Schar. It was suggested on the return of the 'Proven' that her success was due to the unusual state of the ice in the season of 1875. It

was determined to refute this theory by sending another expedition to the Yenisei in 1876, which, if successful, would prove that the navigation is practicable every year.

The expedition of 1876 was commanded by Professor Nordenskiöld, and fitted out at the expense of Mr. Oscar Dickson, of Gothenburg; and the wealthy Russian promoter of exploration, M. Alexander Siberiakoff. On this occasion a scientific party was sent by land to examine the valley of the Yenisei to report upon its navigability, and to join the ship at the mouth of the river. Nordenskiöld entrusted the command of this party to Professor Theel, of Upsala, under whom were two botanists, Dr. Brenner, of Helsingfors, and Dr. Arnoll, of Upsala; Dr. Trybom, of Upsala, as zoologist, and Dr. Sahlberg, of Helsingfors. The main expedition under Nordenskiöld himself sailed from Gothenburg in a steamer called the 'Ymer' of 400 tons. With him were Drs. Kjellman and Stuxberg, Captain Ericson, two junior officers, and eleven men. She had provisions for fourteen months, and fuel to enable her to steam at full speed for forty days.

The 'Ymer' sailed from Tromsö on the 25th of July 1876, and, passing through the Matotchkin Schar, entered the Sea of Kara on the 31st of July. But it was found to be covered with ice floes, and the 'Ymer' was stopped near the eastern entrance of the strait to wait for a favourable change. On the 5th of August the 'Ymer' shaped a course to the southward, much impeded by ice; but on the 12th the sea was clearer, and they reached the west coast of the Yalmal Peninsula. From that time the ice rapidly cleared away, and the 'Ymer' rounded the White Island without difficulty, crossed the Gulf of Ob, and arrived at the mouth of the Yenisei. The channel is divided into two by an island 30 miles long, which is not marked on the Russian charts, and Nordenskiöld named it Siberiakoff Island, in honour of one of the munificent promoters of the voyage. Nordenskiöld ascended the Yenisei to Mesenkin to meet the land party led by Dr. Theel, but it did not make its appearance, so the return voyage was commenced on the 1st of September. After touching at Port Dickson a course was shaped, as on the preceding voyage, direct for Cape Middendorff, and the sea was found to be perfectly clear of ice. The east coast of Novaya Zemlya was reached in 75° 30' N., and Matotchkin Schar was passed without any interruption of the voyage. Regular soundings were taken throughout, and most precious collections were made in all branches of natural history. On the 22nd of September 1876 the expedition returned to Tromsö.\*

The land expedition under Dr. Theel left Stockholm on the 29th of April 1876, and arrived at Yeniseisk on the 18th of June. Although Dr. Theel did not succeed in meeting the 'Ymer,' he and his companions examined the course of the great river, made valuable observations, and arranged for the transport of merchandise to Yeniseisk, which had been landed by Nordenskiöld. They returned to Stockholm on the

\* *Expéditions Suédoises de 1876 au Yénisséi. I. Programme des Expéditions; Lettre de M. le Prof. Nordenskiöld à MM. Oscar Dickson et Alexandre Siberiakoff. II. Rapport de M. Nordenskiöld sur l'Expédition (voie de mer). III. Rapport de M. Theel sur l'Expédition (voie de terre), Traduit de Suédois par F. Schulthess (Upsal. 1877). 8vo. pp. 64.*

9th of December 1876, and Dr. Theel submitted a most valuable report on the hydrography of the Yenisei, and on the physical geography, botany, and zoology of its basin.

The success of his two expeditions to the Yenisei led Professor Nordenskiöld to conceive the idea of extending geographical research round Cape Chelyuskin, the most northern point of Siberia and along the shores of Arctic Asia towards Behring Strait. The whole of the immense expanse of ocean to the north of Siberia, east of Cape Chelyuskin, stretching over 90 degrees of longitude, excepting short voyages in boats along parts of the coast, has never yet been ploughed by any keel. Nordenskiöld, therefore, proposed to investigate the geography, hydrography, and natural history of the North Polar Sea from the mouth of the Yenisei, if possible, as far as Behring Strait.

The experience of his voyages in 1875 and 1876 leads to the conclusion that Dickson's Harbour may be reached by the middle of August. From thence the discoveries will commence, for there is scarcely any reliable information regarding the hydrography, between the mouth of the Yenisei and Cape Chelyuskin. But there is reason to hope that a well-equipped steamer will be able to penetrate far beyond the point reached by the small Russian exploring boats. Only three boat voyages have ever been attempted in this part of the Kara Sea, all under the leadership of the *Mates Manin* and *Sterlegoff*. The first was in a sloop 70 feet long, which was built at Tobolsk and transported to the Yenisei. In 1738 *Manin* penetrated in her as far as 72° 53' N. off the mouth of that river. In the next year a new attempt was made, but without getting any further; but in 1750 the Russians succeeded in navigating as far as 75° 15' N., when they returned on the 2nd of September, owing to the lateness of the season. There are also two statements regarding the state of the ice on this coast. On August 25th, 1843, *Middendorff* reached the coast at *Taimur Bay*, 75° 40' N., travelling by land, and reported the sea to be 'free of ice as far as the eye could reach from the chain of heights along the coast.' The land from *Taimur* to Cape Chelyuskin was mapped by means of sledge journeys led by *Mate Chelyuskin* in 1742, who discovered the northernmost point of Asia in May of that year, the sea being then, of course, covered with ice. On September 1st, 1736, *Prontschischen*, with a coasting vessel from the east, very nearly reached the north point of Asia in 77° 34' N.; and in recent years Norwegian walrus hunters, during late autumn, have repeatedly sailed far to the eastward from the north point of *Novaya Zemlya* in 77° N. without meeting any ice. Professor Nordenskiöld, after a careful consideration of all the evidence, believes that during September he will find open water all along the coast to Cape Chelyuskin. The enormous masses of warm water from the rivers *Ob*, *Irtish*, and *Yenisei*, pouring into the ocean after being heated during the month of August, must drive the ice off the coast and leave a navigable channel. The influence which the rotation of the earth exercises on streams, in high latitudes, which run in the direction of the meridian, gives them an easterly bend, so that the volume of water from the *Ob* and *Yenisei* would be confined, as in a river bed, until it reaches Cape Chelyuskin, and would then flow off to the eastward.

As regards the navigability of the ocean to the eastward of Cape Chelyuskin, in the direction of the *Lena* river, our knowledge is mainly founded on the observations of the expeditions sent by the Russian Government to survey the northern part of Asia, before the middle of the last century. In his Memorial on the subject, Professor Nordenskiöld pays a just tribute of praise to the gallantry and skill of these Russian explorers, who did so much with such small means. They started from *Yakutsk* on the banks of the *Lena*, upwards of 900 miles from its mouth, where their vessels were built. The first expedition was despatched in 1735 under the command of *Lieut. Prontschicheff*. He sailed down the *Lena* to its mouth, and on the 7th of September was off the mouth of the *Olonek*, where he wintered. Next year he made good progress as far as 77° 29' N., whence he was compelled to return by compact masses of ice, in the middle of September, and he died of scurvy, together with his young wife who had accompanied him, during the return voyage. A second expedition under *Lieut. Lapter* left the *Lena* in 1739, and on September 2nd was within sixty miles of Cape Chelyuskin, whence they returned owing to the masses of drift ice, wintering in *Chatanga Bay*. With this ended the voyages to the westward off the *Lena*. No one had succeeded in forcing his way in a vessel from the *Lena* to the *Yenisei*. But the vessels were wholly unsuited to the work, while *Prontschicheff* and *Lapter*, during September, in 1736 and 1739, had penetrated to within a few miles of Cape Chelyuskin. Professor Nordenskiöld deduces from these voyages the conclusion that in the above years no serious obstacles would have been met with in rounding Cape Chelyuskin by a properly equipped steamer.

From the *Lena* to Behring Straits there are much more numerous and complete observations. The most remarkable voyage in this direction was made by the *Cossack Deschner*, and a record of it was only accidentally preserved owing to a law suit. We gave some account of this remarkable circumstance in a former number, and it will be sufficient here to say that *Deschner* left the *Kolyma* river, with a fleet of seven small vessels, on the 1st of July, 1648, that three of these reached *Tschutskoynos* through open water, and that *Deschner* continued the voyage along the east coast of *Kamkatka* and reached *Anadyr* in October. The year following *Staduschin* sailed for seven days eastward from the *Kolyma* in an open sea. Several voyages were made northwards from the *Siberian* rivers, after the founding of *Nijni Kolymsk* by *Michael Staduschin* in 1644, in consequence of the reports among the natives that there were large inhabited islands, rich in walrus tusks and mammoth ivory, away north in the *Siberian Polar* sea. These reports were finally verified by the discovery of the *New Siberia Islands* and *Wrangel Land*. The expeditions failed, not because of the ice, but because the ill-built vessels, sewn together with willows and caulked with moss, were quite unseaworthy. The explorers preferred to reach the islands by sledging over the ice, and they were often visited by hunters for mammoth ivory. The *New Siberian Islands* were afterwards surveyed by *Hadenström*, 1809-1811, and *Lieut. Anjou* in 1823. The report is that the sea between the *Siberian* coast and the islands is pretty free from ice every summer.

Several attempts have been made to navigate the sea from the Lena eastward to the Kolyma. In 1735 Lieut. Lassinius left the most easterly mouth of the Lena on the 21st of August, and wintered at a spot some 50 miles to the eastward, where he and most of his men died of scurvy. In 1736 Lapter made a similar attempt, but was stopped by drift ice in August, and returned at the very time when he ought to have been commencing his voyage. He undertook another voyage in 1739, when he reached the mouth of the Indigirka and wintered there. Next year he continued his voyage to beyond the Kolyma, where he was stopped by drift ice on the 26th of September, and wintered at Nijni Kolymsk. It must be remembered that the river boats in which these attempts were made, were quite unfit for sea navigation, and it is only surprising that the explorers should have ventured to leave the mouths of the rivers in them.

It remains to glance at the attempts that have been made to penetrate westward from Behring Straits. Behring himself only got as far as 172° W. along the north coast of Asia. Captain Cook reached the 180th degree of longitude on the 29th of August, 1778. In 1855 the American Captain Rodgers reached to 176° E., the longitude of Cape Jækæn in open water. In 1867 Captain Long, in a whaler, got as far as 170° E.; and in 1876 a Russian expedition was sent out to endeavour to reach Wrangel Land from Behring Straits, but was stopped by the ice.

The general report, according to information collected by M. Siberiakoff, is that the ice is driven from the coast during the summer by southerly winds and that it returns when northerly winds set in. Professor Nordenskiöld is of opinion, from the evidence before him, that the New Siberian Islands and Wrangel Land only form links in an extensive group of islands running parallel with the north coast of Siberia. This chain, on the one hand, keeps the ice of the intermediate channel from drifting away altogether and favours the formation of ice during the winter; and on the other, it protects the coast from the polar ice formed to the north of the islands. He, therefore, reckons on a tolerably open sea during the autumn.

From the mouth of the Yenesei to the point reached by Captain Long in 170° E., the ocean north of Siberia has never been navigated by a proper sea-going vessel, and the frail boats which have entered it never ventured far from the coast. An open sea with a fresh breeze was more destructive to them than a sea covered with drift ice. Nordenskiöld, therefore, considers it probable that a well-equipped steamer might force a passage this way in a few days, and thus not only solve a geographical problem of several centuries standing, but also survey a hitherto almost unknown sea of enormous extent, and bring back scientific results of great value.\*

The success of the late English Arctic Expedition, and the invaluable scientific results derived from it, have quite recently shown the importance and utility of such enterprises. By the north-east route the Swedes will secure equally valuable results. At present

\* This review of all that is now known of the navigation of the Siberian Polar Sea is mainly taken from Professor Nordenskiöld's lucid statement to the King of Sweden.—*Memorial concerning the Arctic Expedition of 1878*, by A. E. Nordenskiöld (Translation). (Göteborg 1877). 8vo., pp. 30.

we have no knowledge of the vegetable and animal life (consisting of survivals from the glacial period) in the sea which washes the north coast of Siberia; yet a complete and certain knowledge of what animal types are of glacial and what of Atlantic origin is of the greatest importance, not only for zoology and for a knowledge of the geographical distribution of animals, but also as regards the geology of Scandinavia. There is still much that is enigmatical with respect to a number of circumstances connected with the mammoth period of Siberia, which perhaps was contemporaneous with our glacial period, and new light will doubtless be thrown upon this interesting point. Our knowledge of the animal and vegetable types which lived at the same time as the mammoth is exceedingly incomplete, and this question calls for further investigation. An abundant harvest of results will certainly be reaped in the geological field. But equally important will be the meteorological and tidal observations, and those in terrestrial magnetism; nor will the study of the existing fauna and flora, and of the ethnology of the region to be explored, prove less valuable. The scientific results of the expedition will certainly prove most important.

This great geographical enterprise is due to the munificent public spirit of Mr. Oscar Dickson, of Gothenburg, to whom Arctic research already owes so much. Out of the 20,000*l.* which the expedition has cost, he contributed 12,000*l.*, while 3000*l.* were voted by the Swedish Government, 2500*l.* were given by the King of Sweden, and a like sum by M. Alexander Siberiakoff. Mr. Dickson bought the 'Vega,' a steam whaler, built at Bremen, for 8000*l.* She is of teak, and well adapted for the service. She was fitted out at Carlsrona, and proceeded thence to Copenhagen to take in provisions; the preserved meats being supplied by Wikström, of Stockholm, and Beauvais, of Copenhagen. The 'Vega' then went to Gothenburg, from which port she took her final departure. Some account of her outfit, and of the objects of the voyage, by Captain Palander, will be found in our number for November 1877, p. 297.

The names of the officers and scientific staff of the 'Vega' are:—

Professor NORDENSKIÖLD— <i>Leader of the Expedition.</i>	
Captain PALANDER— <i>Commander of the 'Vega.'</i>	
Dr. F. KJELLMAN, of Upsala,	} <i>Scientific Staff.</i>
Dr. A. STUXBERG,	
Dr. E. ALMGVIST,	
Lieut. ANDREAS HOVGAARD— <i>Danish Navy.</i>	
Lieut. E. BRUSEWITZ— <i>Swedish Navy.</i>	
Lieut. GIACOMO BOVR— <i>Italian Navy.</i>	
Lieut. NORDGVIST— <i>A Finnish Officer and Geologist.</i>	

The crew consists of eighteen seamen, selected from 200 eager volunteers, and three hunters (*fangst-män*) to be taken on board at Tromsø.

The 'Vega' is to be accompanied as far as the River Lena by a small steamer called the 'Lena' of 100 tons, commanded by Captain Johannesen. She belongs to M. Siberiakoff, and is destined for use on the River Lena where his property is situated; but during the voyage she will be useful in many ways as a tender to the 'Vega.' Another steamer also goes out with a cargo as far as the Yenesei, called the 'Fraser,' and she will tow the 'Express,' a sailing vessel, also laden with merchandise. This is a mercantile adventure of M. Siberiakoff; and its

success will doubtless lead to a regular trade with the Yenisei. M. Sidoroff, for instance, who owns large graphite mines near that river, is only waiting for assured success to commence the despatch of vessels on his own account. The 'Vega' will fill up with coal at Port Dickson from the 'Fraser.'

The expedition is provisioned and equipped by the light of the best modern experience, and is supplied with every appliance to secure good ventilation, and the health of officers and men. It is likely that, especially if the progress of the ship is checked by ice, there will be much sledge travelling. For instance, in the event of the 'Vega' being unable to round Cape Chelyuskin in the first season, and being obliged to winter anywhere between that point and the mouth of the Yenisei, sledging parties will explore that most northern promontory of Asia during the following spring. The islands to the north of Siberia will also be explored by means of sledges. Professor Norden-skiöld has himself had experience as a sledge traveller, and he is intimately acquainted with all the details of sledge equipment. While taking every useful precaution against scurvy, he knows from experience—which is the only safe guide—that the absence of lime juice on sledges is not the cause of an outbreak, and that the conclusions of the English Scurvy Committee were absurd, and opposed to all the reliable evidence that was taken. We believe, indeed, that he and Captain Palander, as well as the surgeon of the 'Polhem,' drew up a statement of their experiences on this point, which, however, did not appear in the one-sided Scurvy Blue Book. The Swedish explorers will not take ignorant and presumptuous theorists as their guides, but will rely on their own tried experience and on that of the English Arctic sledge travellers. Besides lime juice, the 'Vega' is supplied with sour-crust and the antiscorbutic berries of Norway, preserved in casks.

The moment the 'Vega' passes beyond Port Dickson, she crosses the threshold of the unknown region, and the success of the expedition is certain. The extent of that success depends on circumstances over which man can have no control; but most assuredly all that bravery, gallant endeavour, determination and intelligent skill can effect, will be done by the Swedish explorers; and no branch of scientific enquiry will be overlooked by them. The steady and persevering way in which, year by year, they have stuck manfully to their work must give the utmost confidence in their present exertions, and if any men can do so, they will command success.

The 'Vega' sailed from Gothenburg on the 4th of July 1878; and Professor Nordenskiöld followed a few days afterwards, travelling by way of Trondjem, and joining her at Tromsø. The Swedes have now fairly started to do their share, and a large and important share it is, in the solution of the greatest geographical problem of the age—the exploration of the vast unknown region round the Pole. They take with them the warm sympathy and good wishes of the geographers of all nations; and we sincerely trust that they will return to their homes, crowned with the laurels which they will have so well and gallantly earned. All success and prosperity to the Swedish Arctic Expedition!

## THE VILAYET OF THE ISLANDS OF THE WHITE SEA.\*

(Continued from p. 171 of our last number.)

V.

### I.—TOPOGRAPHICAL AND GENERAL NOTES.

THIS vilayet falls into five sanjaks, with twelve kazas and twenty-two nahies, as follows:—

#### 1. *The Sanjak of Bigha, with the Kazas Bigha, Lapsaki, Aivajik, Eznié, Tenedos, and Lemnos.*

The capital is Chanak Kalä, or Kaläi Sultanié, the seat of the General Governor, of the military commandant of the fortresses and fort artillery troops in the straits and the islands of the White Sea, of a postal and international telegraph office, a quarantine station, a lighthouse agency, and the printing office of the vilayet. Chanak Kalä, which has upwards of 6000 inhabitants, half Muhammadan half non-Muhammadan, is a transit port for wood, gall apples, wool, and wheat, which articles are brought from the interior; it also exports large quantities of pottery ware, and carries on some shipbuilding (vessels of up to 60 tons). Four or five tug boats are stationed in the harbour, and are employed in towing sailing ships through the straits. Vice-Consuls of Austro-Hungary, France, England, Russia, Italy, Spain, Holland, Belgium, Denmark, America, and Greece are located at Chanak Kalä. Not far from Kum Kalä the graves of Achilles, Patroclus, and Ajax are shown.

The chief places in the kazas are, on the mainland, Bigha, Lampsaki (anc. Lampsacus), in a fine wine-growing district, Aivajik, and Eznié; other places of note are Bunarbashi, on the site of Troy; Eski-Stambul, on the ruins of Alexandria-Troas and Yenishehr.

The most important islands of this sanjak are:—Tenedos (Bozje-Adassi), a small mountainous island, which carries on traffic in muscatel wine and oil. The chief town, Tinedo, lies with its port on the north-east point, protected by a citadel and fort. Tenedos has remained in the hands of the Turks since 1657, and was their most important naval station at the time of the so-called Greek war of independence. An Austrian and a French vice-consulate are stationed at Tenedos. The citadel contains besides accommodation for the garrison, a grain magazine, two wells, and a large powder depôt, with 500 to 600 full casks, which were stored here in 1807-8, when the Russians mastered the place. The town, which lies below the citadel, and which has about 800 houses and booths, was destroyed by fire in July 1874.

Lemnos (Stalimene, Limni-Adassi) is essentially of volcanic origin, whence its numerous volcanic products, the therapeutic *terra sigillata*, or terra Lemnia, Meer-schaum, &c., and its hot wells: the volcano of Mosychlos which has been dormant for more than 2000 years, passes for the old dwelling of the Kephästos. Lemnos is almost entirely mountainous and thinly wooded, but well adapted for grain and wine. The island produces about 12 million kilos. of sea salt every year. On the site of the old town of

\* *The Vilayet of the Islands of the White Sea.* By A. Ritter zur Helle von Samo. (Translated in Abstract).

Myrnia, on its west coast, stands the present Limni, with a good port, a castle, and about 1000 inhabitants. (For a description of Lemnos see Conze's *Reise auf den Inseln des Thrazischen Meeres*: 1860.) Choisseul Gouffier estimated the number of inhabitants in Lemnos at 30,000.

Samothraki (Semadrek, Semendrek) consists for the most part of a mountain mass running westward (the Saoki of the ancients), the highest point of which, the peak now called Phengar, rises higher above the sea than any point on the surrounding coasts or islands. According to Homer, Neptune beheld the fight between the Greeks and Trojans from this mountain. On the north coast of Samothraki the town of the same name once stood, and extensive ruins (Paläopolis) still remain. Pliny called the island "the most deficient in harbours." It has only one village called Chora, about six miles distant from the sea, and has about 2500 inhabitants. Archæological explorations and excavations have been frequently made on Samothraki in recent years; in 1863, by M. Champoiseau, then French Consul in Adrianople; in 1866, by MM. Deville and Cocard, members of the French school of Athens; and in the spring of 1873 by Herr G. Lang, commander of the Austrian Frigate 'Zrinyi.'

Imbros (Imrus) has, according to Choisseul Gouffier, 3000 inhabitants in four villages; rich coal beds and fisheries.

The island of Thasos (vulg. Tashos), which is under Egyptian rule, has richly-wooded mountains, from which gold and marble were obtained in ancient times: the wine of the island was also famous. The chief town of the same name, of which extensive ruins still remain, lay in the north coast on the site of the present landing place. From the landing place of Liman or Panagia four hours' ride takes one to Theologo, the largest town of the island in the midst of its southern half: on the way thither Potamia is passed. The two highest summits of the island are Ypsarion and Elias.

The island has about 800 houses, with 2000 people, in 9 villages. Grain, wheat, and wine are cultivated; timber for ship-building, oil, honey and wax are exported. The people of Thasos did not take part in the Greek revolution (See Hassenbach *De Insula Thaso*, 1838; and Conze's *Reise* 1860).

## 2.—Sanjak, Midillü (Metilino) with the Kaza Molyvo.

Mytilene (Heimerte, Lasia, Pelasgia, Aegira, Aethiope, Pentapolis, Macaria, Issa, Metilino, Lesbos, Midillü-Adassi) has the capital Mytilene or Kastro.

The town had two ports, one on the north side and one on the south side, both protected by long stone breakwaters, and these were united by a canal which passed straight through the town. This canal has now quite disappeared, the northern port has been abandoned, and the southern is only approachable by small vessels. The Acropolis, on a hill, which falls steeply to the sea north-east of the town, is still recognisable, as is the outline of the theatre on the slope of a hill which rises west of the town. Towards the northern harbour lies the Turkish quarters with the government houses: between this quarter and the citadel are dwellings of both religionists. The castle stands on the site of the old Acropolis, and

commands the harbour of the town. In Mytilene there are vice-consulates of Austro-Hungary, Russia, France, England, Italy and Holland.

The island was famed in ancient times for its many towns. Pliny enumerates eight. Scylax and Pomponius Mela only five; hence the name *pentapolis*. In the history of the island it appears to have been independent for the last time in the middle of the 14th century, under the Genoese family of Gatteluzzi, till it fell, in 1462, under the rule of the Turks. Mytilene was devastated in 1755 by earthquake, and in the beginning of the 19th century by a conflagration. In 1821 the island was a station of the Turkish fleet. It is crossed by several mountain ranges, among which are Lepetymnos (Gelia) on the north, and Olympos (now Hagios Ilias) on the south. Between lie wide fertile plains, with fine woods, fields and vineyards; wheat, oil, wine, and southern fruits are the chief products of the island. The mountains also yield fine marble. The bays of Jero, in the south-east, and Kalloni on the south, penetrate far into the interior, and present the appearance of large lakes. Besides Mytilene or Kastro there are two dilapidated strongholds in the island, those of Molyvo and Sigrî.

(For particular accounts of Mytilene see Bonton's *Mémoire sur Mételin*, 1856; Newton's *Travels in the Levant*, I., 1865; Conze's *Reise auf den Inseln*, 1865; and the Appendix to Dr. Scherzer's *Smyrna*, 1873.)

## 3.—The Sanjak Sakyss (Chios), with the Kazas Ipsara and Kosimada (Spalmadores).

The island of Chios (Sakyss, Ophiusa, Pityusa, Makris) has four harbours, the best of which is that of Delphino (Kato Phana), on the south coast. It is covered with mountains, among which Mount Elias is the highest, and has very fertile soil and excellent climate. It was famed in ancient times for its wine and figs, and still carries on a very considerable trade in wine, honey, wax, oil, cotton, silk, cheese, fruits, and excellent mastic. The mastic (Sakys) has given Chios its Turkish name, Sakys-adassi. As a rule, the export of mastic gum varies between 50,000 and 60,000 okka annually. The trading fleet of Chios numbers about 400-500 vessels: in the wharfs on the north side of the Turkish quarter of the town of Chios, three-masted vessels of 40,000 kilos burden are built. The women of Chios are noted for their beauty and cheerfulness, the men for their guileless character: an old proverb of the Archipelago says, "A wise Chiote is as rare as a green horse."

The capital, anciently called Chios, now known as Kastro, lies on the east coast of the island, and has about 13,000 inhabitants. It is inhabited for the most part by Greeks and Franks, but at the north-west end is the Turkish town, the old fortress, enclosed by Genoese walls (about 500 houses, with four mosques, and two gates), with a battery at the entrance to the port, and about 150 old guns of various calibre.

Before the Greek war of independence the island of Chios had about 600 villages and sixty-six churches. Among the nine convents of Chios the most important is that of Nea-Moni, in the centre of the island, situated in a lovely plain: it had more than 400 monks before the insurrection, but that number has dwindled down to about sixty or eighty: the



lands of this convent include about a sixth of the whole island. Vice-consuls of Austro-Hungary, France, England, Belgium, Germany, Italy, Portugal, Sweden and Norway, Holland, and Greece are resident in Chios. A political memoir by Prince Gortshakoff (1867) gives the island 75,000 inhabitants, 586 churches, and 450 trading vessels, with 5000 sailors. According to the report by the Governor of the island (1875) it has 70,000 inhabitants, of whom 2000 to 3800 are Muhammadans.

Ipsara (Osara, Psyra) a small, rocky island, had, it is said, more than 90,000 inhabitants before the Greek war of independence, and formed at that time a chief station of the Greek naval power, with Hydra and Spezzia, but was conquered in 1824 by the Turks.

#### 4.—*The Sanjak Istanköi (Kos) with the Kaza Kalymnos.*

The island of Kos (Stanchio, Ko, Caris, Meropis, Meropiá, Istanköi) was famed in ancient times for its excellent wine, and from its splendid Temple of Asclepius, which was raised in the vicinity of Kos, and contained the painting of the Anadyomene of Apelles; it is the birthplace of physician Hippocrates, of the poet Philetas, and of the painter Apelles. Kos was subjected to the Turks after the fall of Rhodes. It was the central point of the Turkish operations against Samos in the Greek war of independence, though the islanders took no part in the contest. The capital, Kos, lies on the north coast at the foot of the hill; it has a castle with sixty old guns. Vice-consuls of Austro-Hungary, Holland, Russia, England, and Greece are residents.

Kalymnos (Kalmios, Claros, Kalinna) has two ports on its south coast. Injirily Adassi (the fig island, Nisyros) has a bay on its northern side but no harbour.

Astropalea (Astrobalia, Pyrrha, Pylea, Theon-Trapeza) has a good harbour, fertile soil, and little cultivation.

Leros (Lerios, Leria) has three good ports, the best of which is on the east coast of Terraco Bay, at the entrance of which lies the small island of Lepida. The former citadel was destroyed by the Venetian Toscolo in 1648.

Patmos (Patinos, Palmosa, Patmo) "where the apostle John wrote his Revelation in the year '95," is fertile and has convenient harbours, among which that of the town of Patmo, opposite Naxos, is said to be the best in the archipelago. Besides the great convent founded in 1088, there is a school which is much frequented by the people of the archipelago.

Nicaria (Icaria) has no harbour; only landing places for small boats. The inhabitants of this island live by the timber traffic with Chios of Scalanova; they also sell sheep and wine, honey and wax, and are very expert fishers.

#### 5.—*The Sanjak Rhodus, with the Kazas Synü, Meis, and Karpathos.*

At the time of the Emperor Vespasian the island of Rhodes (ancient Opiuma, Delchimis, Aethrea, Trinacria, Corymbia, Pacessa, Maracia, and Atabyria) had lost the independent position which it enjoyed as the Doric Republic, under Alexander, and at the beginning of the Roman Government. When it had

raised the distrust of the Romans they took from it first its possessions in Caria and Lydia and then its freedom, and it was made the central point of a Roman province of the united coastal islands. In the middle ages, indeed, Rhodes again attained some importance. In 651 it was conquered by the Khalif Moawijah; the crusades brought it again into the hands of the Christians; and after the loss of Palestine it was made over, in 1309, to the Knights of St. John. The order was compelled to leave the island in 1525, when it could no longer resist the attack of Sultan Suleiman, and transplanted itself to Malta.

The *Univers* enumerates 44 villages in Rhodes, besides its capital and Lindos. Last century the population is said to have been 80,000. Michaud and Poujoulat quote a census of 16,000. Savary (*Lettres sur le Grece*) enumerates besides Rhodes and Lindos, five Muhammadan villages, and 46 inhabited by Greeks; in all 75,000 families, of which 4,700 were Muhammadan, 2,500 Greeks, and 300 Jewish. The Governor of Rhodes gave me (1874) the total of 28,000 inhabitants, including 6000 Turks, 2000 Jews, and 20,090 Christians.

The island is at present in a very neglected condition: there is not a single carriage road, the woods have been destroyed, and the productiveness of the soil seems to have diminished. The harvest of figs, olives, and fruits is comparatively small: grapes alone maintain their old repute. About 400,000 lbs. of raisins are exported annually, besides silk and sesame.

The capital, Rhodes, is amphitheatrically built, and has a harbour. In ancient times it was famous for its Colossus, and for the school founded here in 224 B.C. by Aeschines. The fortifications are in ruins, as is also the Cathedral of the Knights of St. John, which was destroyed by the earthquake of 1863, after it had been converted into a mosque. The old Knights Street and the remains of the great priory alone recall the residence of the order. Like Pera for Constantinople, Neochori, on the north-west, is the fortress of Rhodes. South-west of the town, 8 to 10 miles distant, lie the ruins of old Rhodes.

Rhodes is in direct telegraphic communication with Candia and by Mermerjé with Smyrna, Syria, and Egypt. Vice-consuls of Austria, England, France, Russia, Holland, and Greece, are resident in Rhodes; and there is further a Dutch Vice-consulate in the dependent island of Karpathos. For fuller particulars about Rhodes the reader is referred to Coronelli's *Isola di Rhodi*, Venezia 1688:—Rost's *Hist. Arch. Fragment* 1824; C. Maunert's *Geogr. des Griechen*, Band III., Nürnberg 1802; Col. Rottier, *Description des Monuments de Rhodus*, Bruxelles 1820; Cf. Meursius, *Rhodus*; Dapper's *Description de l'Archipel*; M. de Marcellas' *Souvenirs de l'Orient*; *Revue des deux Mondes* 1844, p. 809; Savary's *Lettres sur la Grece*; Michaud et Poujoulat, *Corr. d'Orient*; Demosth. *Orat. de Rhodiorem libertate coll. Didot*, xvi., p. 100; Hammer's *Die Insel Rhodus*, Brunswick 1861.

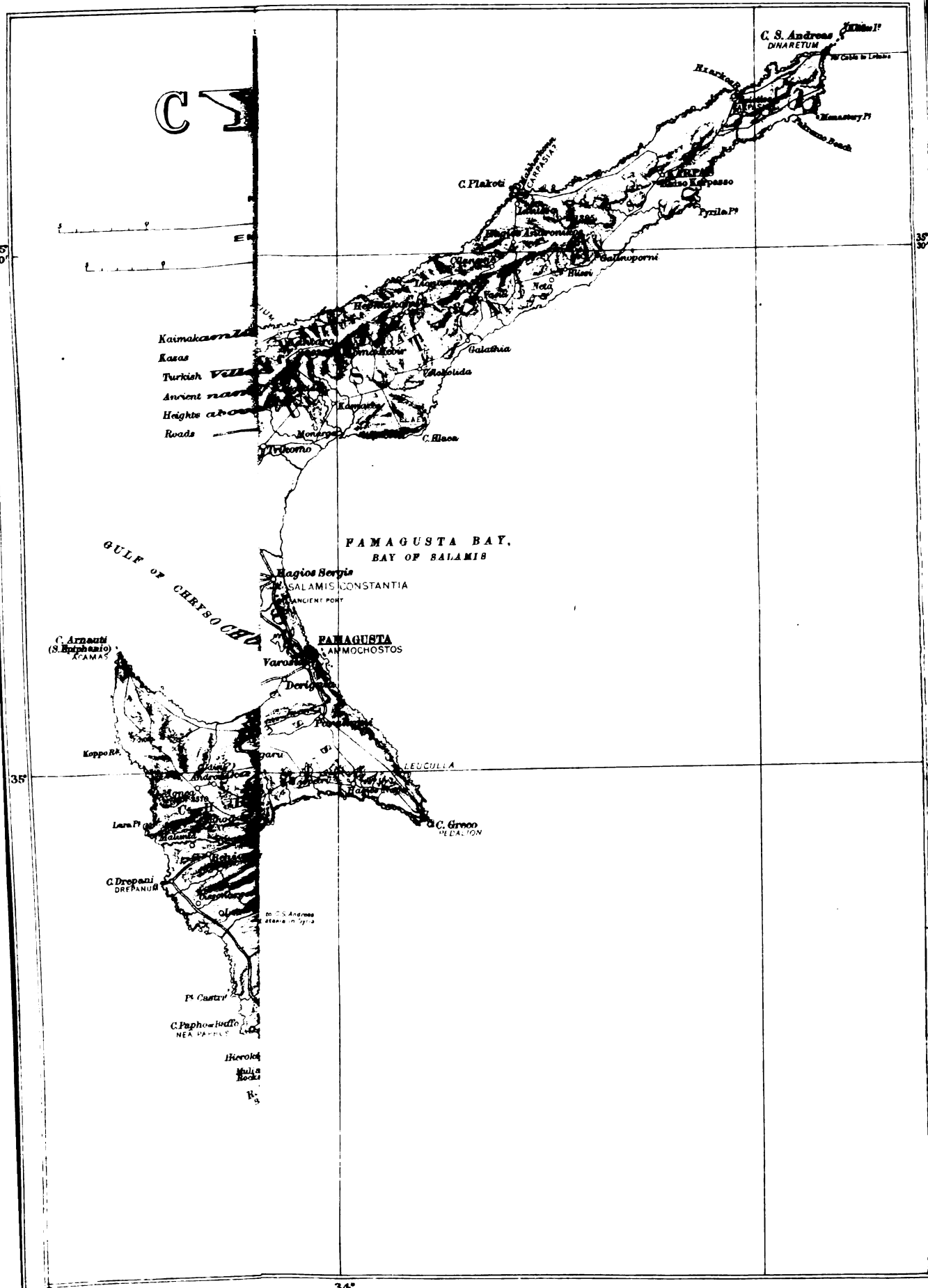
#### II.—NOTES ON THE FINANCES, PUBLIC INSTRUCTION, NAVIGATION, PRODUCTIONS OF THE SOIL, TRADE, CATTLE REARING, FISHERIES, &c.

*Finance*.—The resources of the vilayet are derived from a property tax (verghi), a military tax (Bedelie



34°

CY



Katimakaria  
 Karas  
 Turkish Villages  
 Ancient roads  
 Heights above  
 Roads

FAMAGUSTA BAY,  
 BAY OF SALAMIS

GULF OF CHRYSOCHOU

FAMAGUSTA  
 ANMOCHOSTOS

C. Drepani  
 DREPANUS

C. Paphos  
 NEA PAPHOS

Hierolef  
 Mulla  
 Rocks

C. S. Andreas  
 DINARETUM

C. Plakoti

Gallusporon

C. Blaco

SALAMIS CONSTANTIA  
 ANCIENT PORT

VAROSIA

LEUCULLIA

C. Grevco  
 G. D. A. TON

P. Castri

i Askierié, tithes (Aschar), customs dues (Gümrük), and other dues on salt, stamps, drinks, tobacco, &c. The official returns of the revenue (Váridat) and of the expenditure (Mas-sarifát) of the government of the vilayet for the year 1292 (1875) give the following totals:—Revenue in piastres, 23,517,176; expenditure, 5,824,544.

*Public Instruction.*—The advancement of education has received very considerable attention in recent years throughout the Turkish Empire. Every village is supposed to have an elementary school (Sübian mikteb) for boys and girls, and every provincial and district town a middle school (Rüşdié mikteb), in which Persian and Arabic are taught as well as Turkish. A report on the Rüşdié schools opened in the vilayet in 1876 gave their number as twelve—one in Kalä-Sultanie (with 75 scholars), one in Lapsaki (28), one in Eznié (25), one in Bigha (30), one in Aivajik (20), one in Baba-Kalässi (15), one in Tenedos (22), one in Lemnos (40), one in Mytilene (51), one in Chios (35), one in Istanchio (20), and one in Rhodes (37). The number of Sübian schools in 1876 was 138.

Along with each of the larger mosques there is also a theological school (Medresse), partly for the theological partly for the juridical instruction of youths, who fill up the priestly ranks.

*Navigation, production and trade.*—Between the four corner points of Constantinople, Syra, Smyrna, and Larnaka (in Cyprus) there are, within the limits of the vilayet of the Islands of the White Sea, only Chanak Kalä (Dardanelles), Mytilene, Chios, and Rhodes, as points of any considerable account in trade and navigation. Smyrna, which has gradually raised itself to the position of the centre of traffic for the territory of the coasts and islands of the White Sea, belongs to the vilayet of Aidin, and commands the trade of the whole region from Pergamos, Ushak, and Kintakia, on the north, to Konia and the Taurus on the south, as well as far into the interior of the continent. The history of the trade of Smyrna and the description of its present condition have already been fully treated of by Consul Scherzer in a work published at Smyrna, 1873.

Official returns give the following figures of the movement of vessels through the Dardanelles in 1875-76. Coming from Constantinople, 471 post steamers (Turkish, French, Austrian, Italian, and Russian), 1011 trading steamers (811 English), and 5131 sailing vessels: total, 6613 ships. Going through the Straits to Constantinople: 1667 steamers (803 English), 2895 sailing vessels: total, 4562 ships.

The cadastral survey of the vilayet of the islands, begun in 1874 in the Sanjak of Bigha, gives the following results of cultivated and uncultivated land in that portion of the province, by donums\* (900=1 German sq. m. and 21.26 Eng. sq. m.) Uncultivated 763,686, cultivated, 1,587,274: total, 2,350,960.

\* A donum of arable land costs, according to its position, from 1 to 3 Turkish lira, or from 9 to 27 florins. Far from the coast or from settlements the price falls to 25-100 piastres (2½ to 9½ fl.)

## CYPRUS.

In our last number we published the first part of an article on the "Vilayet of the White (Ægæan) Sea," which contains a statement (p. 168) giving the political divisions and population of the island of Cyprus. We now proceed to supplement this by a brief description of our newly-acquired possession. The island is situated between the parallels of 34° 30' and 35° 45' N. lat., and 32° 15' and 34° 40' E. long., and is the easternmost island of the Mediterranean, lying off the coast of Syria. The greater part of the island is an irregular parallelogram, about 90 miles in length, with an average breadth of about 40 miles. A narrow range of mountains closely skirts the north coast, from Cape Kormaciti (Crommyon Prom.) eastward, and is prolonged beyond the main body of the island for 40 miles, forming a remarkable horn projecting towards the north-east, as if it were a continuation of the Mount Amanus of the mainland, from which it is only 75 miles distant. A channel of about 60 miles in width separates the island from the coast of Cilicia, or Asia Minor, and may be regarded as a prolongation of the Gulf of Scanderoon. A narrow plain in some parts divides the northern range from the sea, and forms several small bays and anchorages, among which is the port of Kerynia.

Towards the interior the northern range bounds the great and fertile plain of Messaria which stretches across the island from the Bay of Famagusta to the Bay of Morpha. The plain contains the capital of the island with other towns and villages and divides the northern range from the mountainous and hilly region that characterises the southern part of the island.

The southern mountains culminate in Oros Troados or Mount Olympus at a height of 6590 feet above the sea: towards the west they spread over a breadth of 40 miles and abound with picturesque and wooded scenery, which cannot fail to prove a great attraction under a well-regulated government.

The soil of Cyprus is of a rich and fertile character, and is capable of raising to perfection all kinds of agricultural products; and the level nature of the country greatly facilitates transport.

The principal town and capital is Lefkosia (Nikosia), and is situated in the centre of the island, surrounded by mountains. It is the seat of the Turkish Governor, and of the Greek Archbishop, who is Metropolitan of the whole island, and an Armenian Bishop. Lefkosia is about 3 miles in circumference, and at one time contained many fine buildings, which are now in a dilapidated condition. Its chief industrial products are cotton prints and morocco leather, and there is some trade in raw cotton and wine.

The most important places on the coast are *Famagusta*, on the east, formerly famous for its copper mines. During the Venetian occupation it was strongly fortified, and many beautiful buildings erected; but it is now much decayed, most of its buildings being in ruins. *Larnaka* lies at the eastern foot of the southern range, near the south coast, 24 miles south of Lefkosia, and is the seat of the European consulate. It is from 2 to 3 feet above the level of the sea, and is exposed to the E. and S.E. winds, but is protected from the westerly winds by Cape Citi. From its geographical position it is capable of great commercial extension, On

account of earthquakes the houses are mostly built of clay, of one story, and the apartments being paved with white marble render their interior very comfortable. Its principal exports are cotton, wine, salt, corn, opium, turpentine, silk, and fruit. *Limasol*, a distance of about 42 miles S.W. of Larnaka, is on the coast near the centre of the range, but like most of the towns is a heap of ruins: fruit trees are said to flourish here. *Baffo*, once famous as the place where Aphrodyte (Venus) rose from the froth of the sea, is near the western end, and during the time of the Roman occupation was the principal town of the western division of Cyprus. It contains now little or nothing of its former importance, and like other towns is in a ruinous condition.

The coast of the island was surveyed in 1849 by Captain Thomas Graves, H.M.S. 'Volage.' The Admiralty *Mediterranean Pilot*, based chiefly on the information derived from this survey observes (p. 256 of the 2nd volume): "Cyprus possesses no harbours, and only few anchorages in open and exposed bays, situated on the southern and eastern coasts." There are three lighthouses all on the southern coast, Capes Gatto, and Citi and Larnaka, all established in 1864.

The summer heat is very great, but fortunately at this season the *imbatto* or sea-breeze is regular, commencing about 8 A.M. and lasting till about 3 or 6 P.M.: then there is an interval of calm till the land-breeze makes about 1 or 2 o'clock in the morning, and continues till about sun rise. The *imbatto* is mostly felt on the north-west of the island and the land-breeze on the south-west. About the middle of September these breezes cease, and this is the period of greatest heat, which lasts until the middle or end of October, when the rainy season usually commences and continues till about April. The north winds which come from the lofty mountains of Asia Minor are very cold in summer, and cause great injury to the cotton plants, and are most prevalent in the months of December and January. The principal cause of failure in the crops of Cyprus is drought, for often no rain will fall from April till the end of October. In 1869 the drought was so terrible that nearly all the crops perished.

The testimony of most travellers and residents in the island agree in the opinion that fevers are prevalent during the warm months, but are seldom or ever fatal. Exposure to night dews and incautious indulgence in such fruits as cucumbers, water-melons, and raw fruit, often contribute to bring these fevers, which rarely attack Europeans or the more opulent classes of inhabitants, who are more careful in diet.

Herodotus remarks of Cyprus that the Greeks, Libyans, and Phoenicians colonized it. The island appears to have been first tributary to Egypt, and when that kingdom was overthrown by Cambyses it passed into the dominion of Persia, and subsequently into that of Macedon. After the death of Alexander, Ptolemy Logus made it a province of Egypt, from which country it was taken by the Romans. After the fall of Rome it remained under the sovereignty of the Eastern Empire, and its Greek governors were called Dukes till 1191, when Richard I. (Cœur de Lion) conquered it, and, having killed Isaac Comnenus,

assumed the title of King of Cyprus. Two years after he made it over to Guy de Lusignan, and it was governed for a time by the Lusignan family. The Genoese subsequently held it for 90 years, till shortly after James the Bastard's death, his widow abdicated (1485), leaving it to the Venetians. It was taken by the Turks in 1571, under Sultan Selim II., after the famous siege of Famagusta, and has since been held by them.

Cyprus is very rich in Phœnician, Assyrian, and Greek archæological remains, some of which are of great beauty. A very interesting work on the subject of his excavations during a residence of ten years in the island was published last year by General Cesnola, American Consul for Cyprus. Of Famagusta he remarks that the place is as impregnable and intact as when first raised by the Lusignans out of the solid stone ruins of Salamis (Dr. Unger thinks the fortifications contemptible—it may be observed). The old bronze guns of the republic of Venice are still to be seen on the bastion—their original place. The ruins, General Cesnola observes, are quite touching. Only two out of three hundred churches said to have existed in Famagusta are left standing. The military governor resides with his troops (a company of the artillery) in a small fort overlooking the sea and flanked by a large round tower, called by the natives "Torre del Moro," which is said to have been the head quarters of the Venetian, Lord-Lieutenant of Cyprus, Cristoforo Moro (the "Othello" of Shakespeare). The fortress contains some of the worst criminals of the Turkish Empire.

General Cesnola's book is profusely illustrated with specimens of the archæological remains discovered by him, and is accompanied by special monographs on the rich treasure found at Curium and other archæological points of special interest.

The principal exports are given below. The figures relate to the report for the year 1871.

Locust beans .....	£42,450	Wine .....	£12,800
Salt .....	27,000	Wool .....	10,868
Wheat .....	22,500	Skins .....	8,166
Cotton .....	22,062	Barley .....	8,000

The total value of the exports in the same year amounted to 203,428*l.* while the imports, of which American cotton goods was the most important, amounted to 147,500*l.*

The total tonnage in the roads of Larnaka in the year 1871 was (sailing vessels and steamers) 113,886, of which Austro-Hungary claims the largest share, with 59 vessels of an aggregate tonnage of 65,642 (nearly all steamers). Turkey came next with 866 small sailing vessels, of an aggregate tonnage of 29,363, while England was a bad fourth, with 11 vessels of an aggregate tonnage of 6343.

The produce of wheat in an average year is 1,500,000 kilograms, of which about one-third is exported in sailing vessels, the export beginning in June. The price varies between 18 and 30 piastres per kilo.

Barley is exported in a less degree. The local consumption of wine is about one-third of the total produce, the rest being exported from Limasol in sailing vessels. The best is called Commenderia, which occasionally fetches high prices. Droughts and locusts are oft-recurring calamities in Cyprus, which cause famines to follow close on years of plenty. The forests

consist of cedar, pine, cypress, oak and beech, which yield useful timber for building and other purposes.

Dr. Unger, the author of *Die Insel Cypern* (Vienna, 1865), one of the most trustworthy books of reference on the subject of this island, is of opinion that the notoriously unfavourable remarks of Clarke, who travelled in Cyprus 60 years ago, could apply with any truth only to the southern and eastern parts of the interior of the island; and these were probably in some degree exaggerated, owing to the extraordinary discomforts and difficulty attending any attempt to penetrate into the interior.

### SKETCHES OF PERSIA.\*

IN the spring of 1874 it was announced in the Russian journals that, under the auspices of the Russian Geographical Society, a trading caravan, equipped by Colonel Glukhowski, was about to proceed *via* Persia to Afghanistan, and that a M. Ogorodnikof, on the part of that Society, was to be attached to it, in order to study and to report upon the general condition and resources of the countries traversed; Colonel Glukhowski, at whose request the Russian Geographical Society deputed M. Ogorodnikof to accompany the caravan, undertaking to defray M. Ogorodnikof's travelling expenses, and to afford him every comfort and assistance.

Captain the Hon. G. C. Napier was at that time commissioned by the India Government to proceed to Persia, with the object of settling some Perso-Afghan differences arising from the Seistan arbitration; and when the caravan was despatched he was working his way up from Bushire to Khorassan.

M. Ogorodnikof met Captain Napier at Shahrood, and strangely enough, neither of these two Europeans could speak more than a word or two of any language known to them in common. Captain Napier asked of the Russian: "Speak you English?" "Very bad," he replied. "Parlez vous Français?" "Mauvais." "Sprechen sie Deutsch?" "No." We here come across a curious misapprehension, or perhaps a mis-statement, of a piece, by the way, with the information said to have been given by Captain Napier himself, of an attack made on his party by some Baluchee robbers, in consequence of which he was obliged to go to Teheran to re-equip. What could have prompted M. Ogorodnikof to say that Captain Napier told him that he had read of him (Ogorodnikof) in Sir Frederick Goldsmid's works, and to have replied that he had indeed made General Goldsmid's acquaintance at Shahrood? At p. 379, of vol. ii., of *Eastern Persia*, Major Euan Smith mentions only "two upper-class Moujiks" who visited Sir Frederick. These two persons were certainly not Moujiks, nor yet was either of them M. Ogorodnikof, who was not there at all.

Captain Napier's travels in Persia being contemporaneous with the journey undertaken by M. Ogorodnikof, was regarded by the latter as a suspicious circumstance. He concluded that the India Government took him for a secret political agent, and had therefore commissioned the British Officer—a son of

the Commander-in-Chief in India—to keep a watch upon his movements, and, if possible, to put impediments in his way. It was announced as a fact in the Russian papers of the period, that Captain Napier was sent to lavish money freely on the Turcomans, in order to win them over to British interests, and that he supplied them abundantly with rifles to resist General Lomakin's detachments.

The greater part of the book is composed of the promptings of M. Baumgarten, the Agent of the Russian Trans-Caspian Company, and of the Moscow Merchant Morozof, who, during a long residence at Shahrood, has gained a very great knowledge of the country. This person also reports on various matters to the Russian Consulate, at Astrabad; to our author he was in every way indispensable, and his work is mainly an epitome of M. Baumgarten's Persian experience. The latter is said to be generally esteemed and liked, "but whether with sincerity he cannot himself determine." That he is feared is an undoubted fact, for the Mollahs are on friendly terms with him, on account of his great cleverness and goodness of heart; while the authorities, considering him to be a secret agent of the Russian Government and dangerous to themselves, openly side with him, "receiving the crumbs (perhaps more correctly speaking the *drops*) of his munificence;" thus, at his request, the *Daroga*, who farms the Bazaar, will readily cause any common resident to be bastinadoed.

From his isolated post M. Baumgarten communicates with Astrabad and Gez by means of carriers, who perform the journey in two-days-and-a-half, for a remuneration of two *tomans* weekly. Special messengers are employed in communications with the consulate. In the winter he communicates with Russia only once a month; by way of Julfa letters take three months coming in that season. In February and March the communications are twice a month; the carrier comes into requisition upon the opening of the navigation on the Caspian.

Among the individuals employed by M. Baumgarten in commercial transactions, and "for other purposes," is a certain very wily Mollah *Ghulon Risa*; this man is an adherent of the *Babi* sect, and the Russian agent has a strong hold upon him and others like him through a knowledge of certain secrets.

We ourselves know a great deal about the East, yet with all our knowledge of the nature of Orientals, and of the vices with which they are tainted, we have not displayed the happy Russian knack of catching people by the ear of their venial foibles and of thereby misleading them. The Russian resident in Khorassan holds a great many Persians by the sectarian or *Babi* ear, and derives from that fact much profit of a certain kind; but he holds a great many more, both high and low, by another ear, *i.e.* the fondness for Russian spirituous liquors, with which he has inoculated them. He has gauged this fondness for Russian *Vodka* with every Russian liquid measure, from the *Vedro*, or pail, to the *Shtoff*, or small bottle; and the peasant, the Mollah, the *Reiss*, and the "Prince photographer," now "gulp" with "gusto," albeit still with a little assumed modesty and reserve, and it appears from the work under review that the crowd which usually surrounded the Russians in Persia was attracted by the odour of Russian *Vodka* and *Nalivka*, (cordial).

\* *Sketches of Persia*. By P. Ogorodnikof. (St. Petersburg.)



M. Ogorodnikof, as well as Colonel Glukhowski's consignment of goods, got only as far as Mash-had, and it would appear from the former gentleman's work that the expedition was simply a commercial venture, in which the Russian Geographical Society was in no way concerned, and that Colonel Glukhowski cared still less about M. Ogorodnikof's pursuits on the journey, since he had, as he expressed himself, "staked my pocket on this speculation."

The value of the merchandise despatched was 14,000 roubles, and consisted of 120 bales and boxes. The carriage from Gez to Shahrood was paid for at the rate of 7 krans per weight of six poods = 469 krans.

With regard to the venture, we are not told whether it was a successful one; and, indeed, M. Ogorodnikof brings his narrative to a close at the point of his departure from Shahrood for Mash-had. It was much doubted, however, both by M. Ogorodnikof and by M. Baumgarten, the Russian agent at Shahrood, that the results would be remunerative, the piece goods, cotton prints, silks, &c., being pronounced unsuitable to Asiatic tastes. Moreover, M. Baumgarten boded no good from the stamp and character of the man—a certain Groshef—who conducted the enterprise. He was of the common type of Russian shopmen, and it is more than hinted by the author of these sketches that his integrity was not to be strictly relied upon. The advent of this Groshef with the bales gave occasion to unseemly wrangles. M. Ogorodnikof complains that the promises made in regard to the payment of his expenses and to facilitations were but partially fulfilled, and Groshef's ignorance and his surreptitious mode of conduct were not calculated to propitiate his Highness "the prop of the empire" and the other authorities in the country.

It is opined by our Russian author that the Russo-Persian trade *viâ* Astrakhan, Gez, and Mashadesser, on the Caspian, is capable of development in the same measure as the trade with the khanates from Krasnovodsk, which was originated by Colonel Glukhowski in 1869.

Borrowing from the Russo-Persian Trade Returns for 1873, we find the staples of that trade are:—

PRINCIPAL EXPORTS TO PERSIA.

	Roubles.
Cotton fabrics ... ..	276,191
Iron, unwrought and manufactured ... ..	105,354
Woollen fabrics ... ..	174,794
Earthenware, china, glass and crystal ... ..	67,453
Silk fabrics ... ..	47,225
Stearine candles ... ..	32,062
Writing and wrapping paper .. ..	31,128

PRINCIPAL IMPORTS FROM PERSIA.

Cotton ... ..	505,513
Dried fruit ... ..	262,329
Pelreys ... ..	103,918

The annual value of the Russo-Persian trade is only roubles 7,000,000, the imports from Persia alone amounting to R.5,000,000. This shows a balance of trade in favour of Persia, and indeed if this were otherwise the Committee of Ministers in 1870 would not have decided on the "toleration until further notice" of free transit of foreign merchandise through trans-Caucasia, even to Baku and to the Persian coast of the Caspian. At the same time there is

a great deal of smuggling, the Persians contriving to pass their more costly commodities, such as precious stones, opium, and carpets as contraband through the Custom House at Astrakhan.

Marseilles sugar is perceptibly driving Russian sugar out of the market, the quality and price being such as to enable the commonality to buy, and it is preferred too, because it melts easily, for the Persians being given to drinking very hot tea, prefer the saccharine substance which dissolves quickly. In the year 1870 no less than 5860 cases of French sugar were imported into Persia, *viâ* trans-Caucasia and the Mazanderan coast. It would also appear that French and English cottons and cloths are greatly preferred by the Persians, which, as well as the sugar, obtain a ready sale for cash, the Russian goods which are more readily disposed of on like terms, being iron, *mitkal* (calico shirting), and stearine candles.

It is to be borne in mind by those who would venture to trade profitably with Persia that their consignments should be placed on the markets early in the spring, a little before the opening of the navigation in the Caspian; and in the autumn, so soon as that navigation ceases, *i.e.*, when the stores of European merchandise are exhausted in the Persian warehouses.

In commercial respects Shahrood is regarded as a very promising place; it is supplied with transit goods (*viâ* trans-Caucasia), and with Russian products to the value of R. 1,200,000. In metals, candles, cottons, silks, cochineal, paper, "Sunduks," &c., Russia supplies poods 2800. Shahrood commands the only convenient route from Russia into Khorassan, and therefore to Herat and Afghanistan, and is independent of all communication with Teheran and Yezd.

M. Ogorodnikof says that his attention was directed to the practical objects of the expedition; to the topography, mineralogy, natural history, ethnography, and social and political conditions of Persia, practical objects concerning which Colonel Glukhowski, the originator of the expedition, is reported to have said that he did not care a straw, whence it followed that our author suffered dire indignations through the behaviour of the Colonel's agent Groshef attributing the success of his studies to the assistance given to him by M. Baumgarten. Through the instrumentality of this person M. Ogorodnikof obtained a complete collection of local, W. European, and Russian products, samples of various articles in common use in Khorassan, a variety of MSS. on Turcoman poesy, on the persecuted sect of the *Babi*, which is striving to spread a propaganda of reconciliation with Christianity, besides numerous other native works on religion, medicine and general instruction. M. Ogorodnikof also made a numismatic collection, chiefly silver coins, among which were forty rare specimens.

In reference to the social and political status of Khorassan (the "Bosom of Persia"), it is to be gathered from M. Baumgarten, whose opinions are very extensively quoted by M. Ogorodnikof, that the sooner the country is placed under a protectorate the better, for that Persia of to-day is what it was centuries ago.

Let us see the aspect which Khorassan of the present day presents on Russian authority. This province occupies 3850 square versts of higher Persia; it is closed in by the Elburz on the north, by the extensive

salt desert Dasht-i-Kavir on the south, and on the east it adjoins Afghan Khorassan, a sundered portion of itself. The province is composed of waterless deserts, of steppes and barren mountain ranges, with a few towns and villages set in oases, and with cultivation in the valleys. Here is the full glare of the sun and a clear sky, rain seldom falling; no rivers whatever, only a rill here and there to enliven nature; the climate particularly dry; the days excessively hot in the spring and summer; the nights suffocatingly sultry, though occasionally cool in the valleys and cold on the mountains; the winter generally mild. The population may be put down at half a million since the famine, inclusive of nomads. The centres of Kurd population in Khorassan are Kuchan, Budjnur, Bam, Deragez, and Chinoran. The Kurds occupied with industries are called "Sher Nishin," the rest, or the majority leading more vagabond lives, being styled "Sora Nishin." These latter camp out with their herds in the mountains or valleys, according to the season of the year, on grounds allotted to them by the Shah; they live occasionally by plunder, and are in a chronic state of hostility with the Turcomans. These two ever-warring communities live in a great measure by the proceeds of slavery which their mutual conflicts engender. The Kurd sells his Turcoman slave for 100 or 200 tomans in cash, or in horses or camels; while the Turcoman realises only from 60 to 80 tomans for his Kurd captive. This may perhaps be explained by the fact that the Kurd dealer commands the better market, and in Persia his brother bondsman can more easily escape, the Kurds composing the bulk of the Persian army and holding the industrious classes in great contempt. The Il-Khan or Controller of the Kurds of Khorassan has unlimited powers and is responsible for his trust to the Shah alone.

It is the opinion of M. Baumgarten that the Persians do not evince any gratitude to Russia for the emancipation of Persian slaves in Khiva in 1873, that they hold the Russians even in contempt while they cringe to them from fear and apprehension of being one day swallowed up by their potent neighbour who has secured such a brilliant position in Central Asia. Individually the Persian governors seek to propitiate Russians in their country as possible informers against them to the Shah, in respect to their rapacity and misdeeds.

On the whole, however, Russian influence is not on the increase in Persia, seeing that besides Vitkevitch in 1857, and Khanikof in 1858, no Russian officer has penetrated to Afganistan or Herat or laboured in Persia to strengthen the Russian influence. Yet says M. Ogorodnikof, strong suspicions are entertained by the English of Russian designs on India, suspicions which in his opinion may sooner or later be justified. By force of destiny, the Russian arms are ever drawing into closer proximity with India. Have not General Scobelev's detachments penetrated to the left bank of the Kizyl-Su striking the direct route to Wakhan whence Badakshan is so easily accessible? And from Badakshan is there not a well beaten road into India through Dir to Peshawer and to Cashmere? Of the two roads to India, viz., the one through Persia and from the Oxus across the Hindu Kush by Cabul and Peshawer, and the other from Kokand through Eastern Turkestan the Bamian and Cabul—the latter is the best, the shortest, and the most convenient!

Is there not also (asks M. Ogorodnikof emphatically) a M. Pashino (who can boast of some experiences in British India), to guide the invading Russian forces to the North-west Provinces of the British Indian possessions?

#### SAGHALIN FROM A JAPANESE SOURCE.

DURING the last few years the cession of Saghalin by Japan to Russia has given that remote and little-known island a greater importance in Europe than it seems as yet to deserve. Even now it is but very little known, either at home or to those Europeans who have passed many years in the far East. This cession caused considerable excitement in Japan, and is still one of the staple accusations against the Government on the part of a portion of the native press, and of those malcontents who, from time to time, disturb the tranquillity of the country. Very little attention, however, seems to have been directed by this circumstance to the acquisition of a knowledge of the condition of the island and its inhabitants.

It was formerly usual to send, at uncertain intervals, an official of the Shôguns' Government to inspect and report upon it. These reports, as far as I am aware, have never been published; but a certain Mamia Rinzo, one of the officers sent in this manner, at the beginning of the present century, left a work containing an account of his visit and observations in manuscript, which was published in 1855, about half a century after the date of the visit which it records. The author seems to have carefully observed and noted down all that he saw, and although parts of the work are excessively crude, it contains, on the whole, a fuller and more trustworthy account of Saghalin than any Japanese work which I have been able to find. Rinzo spent over two years in travelling over the island and a portion of the adjacent mainland, and the result for us is a work in four medium-sized Japanese volumes, profusely illustrated with rude but expressive woodcuts.

I propose in this article to condense rapidly the main facts contained in the work, premising, however, that although four volumes may sound startling to the English reader, it is by no means so formidable an amount in Japanese. A complete English translation of the *Kita Yezo Dsusetzu* (or illustrated description of Saghalin), as this work is called, would not much exceed in length an average article in one of our quarterly reviews. We will now leave the author to speak for himself.

*Name of the Island.*—The name *Karafuto*, by which it is generally known in Japan, is clearly not the real name of the island, because some of the inhabitants had never heard of it; and those who used it could assign no reason, merely observing that it was so called by the people of Yezo island. The name *Shirunmohiri*, again, which is used by the people of Santan, cannot be its correct name, because it is merely a contraction of the words for "people living on an island." The letters for *Derekan*, again, which were employed to express the name of the island by some people on the mainland, cannot be accepted, because this is probably a name of their own invention, like *Karafuto* by the Japanese. On a French map it is called Saghalin—a name which is,

no doubt, derived from the name of the source of the River Mango,\* which enters the sea opposite the island, and was called by the natives *Saghaliz Oula*, or the Saghalin river. In a French geography the island is called *Erente-bôse*. *Erente* means to block up or obstruct, and *bôse* an island; and the name is derived from the fact that the island is so placed that it seems to obstruct the current of the river. Finally, by a decree of the Japanese Government, the island was named *Kita*, or Northern, *Yezo*. For many reasons this is the most suitable name: it is only a short distance north of *Yezo*; its inhabitants, like those of that island, are people with peculiar customs; their occupations and mode of life vary but little; and neither has any Government.

*Its Physical Geography.*—The southern part of the island is very hilly, but there are only two mountains which can be called high. These hills, as well as the plains and wide moors which lie between them, are covered with forests. As, however, there is not much moisture, the fallen leaves are of no benefit to the ground, but become mere dust, which catch fire when the natives camp out and omit to extinguish their fires. The fire frequently spreads to the trees, and it is no rare occurrence for all the trees in a space of forty or fifty miles to be consumed in such conflagrations. On account also of the looseness of the soil, whole forests are sometimes blown down in a single storm. In the most northern part of the island there are no elevations, the whole country being composed of immense arid plains and wide moors.

There are numerous rivers in the island, but, with the exception of two, the *Shi* and *Tomô* rivers, they are all small, and, for the most part, fordable. There are only two lakes of any importance—the *Taraika* lake, which is about twenty-five miles in circumference and is only about half a mile from the coast; and the *Tonaicha* lake, which has a circumference of thirty miles, and is also near the coast.

The strait which divides the island from the mainland varies in breadth from twenty miles in the broadest to five or six in the narrowest parts. The tide rushes through it with the force of a river. It is completely frozen over in winter, and the natives cross and re-cross on foot or in sledges, drawn by dogs. Under ordinary circumstances, there are seven different places from which the natives cross to the mainland. The distance from each place, as well as the difficulty and danger to be encountered, varies greatly.

*Its Productions.*—Trees are numerous everywhere, but with very few exceptions they seem to be unfit for use in building. Bamboos are entirely absent. Evidence of the existence of the five principal metals were seen here and there, but they did not seem to be sought after by the inhabitants. Sulphur is produced nowhere in the island, and there are no volcanoes or hot springs. No peculiar grasses were seen, and those kinds which grow there are very coarse. Two peculiar animals called the *Tonakai* and the *Rikinkamoi* are found here. The former is like the deer. Its face and eyes resemble those of the horse, and although it is armed with horns which have formidable branches, it is very docile. It lives in the mountains in the southern part of the island; the people of one tribe hunt it for the sake of the skin and flesh, while the

*Orokko* tribe use it as a beast of burden, as it can be easily domesticated. The *Rikinkamoi* is like the roe in shape, and is about the size of a dog. It is used for food. Eels are very numerous in the valleys, but as the natives dislike them on account of their peculiar appearance they are not used for food. Whales, seal, carp, shell-fish and salmon are also numerous.

About a third of the whole island is inhabited by people of the same race as the *Ainos* of *Yezo*. The remaining inhabitants belong to two tribes called *Orokko* and *Sumerenkuru*. These three divisions will be separately dealt with.

*The Inhabitants of the Southern part.*—Although these are chiefly *Ainos*, they differ considerably from their fellows in *Yezo*. They shave off much of their hair and allow the remainder to hang down their backs. The women tattoo like those of *Yezo*, but the practice is not as universal as in the latter place, nor is the colour of the marks as deep. The clothing of both sexes is made from the bark of trees, which is first soaked in water and bleached, then twisted into threads and woven into a rough kind of cloth. They wear also cotton dresses, but this stuff is bought from the natives of the mainland, or from Japanese traders. The skins of fish and beasts are also used for clothing in the same manner as by the natives of *Manchuria*. The ornaments (which it may be mentioned are not used by the males at all) are entirely of brass, and are procured from the mainland. Their food consists chiefly of various roots, which are eaten with the oil of certain animals; but they also eat animal flesh and fish. The roots collected by the females in spring, summer, and autumn are dried in the sun, and then stored up for winter consumption. The oil is used not so much as a condiment as to destroy the effect of certain poisons which they say are contained in the roots. The oil which they use is procured from one of the other tribes in exchange for axes and knives.

The number of these people is about 3000, and although, on account of the difficulty of communication, as well as the unsettled habits of the *Orokko* tribe, it was difficult to ascertain the population of the island, it may be taken approximately at about 10,000.

Some of the people in the southern part live in caves in the winter, but this is not a general custom. These caves are generally dug out of the side of a mountain; poles are erected outside and a roof, made of the bark of trees, covered with branches and leaves, is placed on them. The chief articles in daily use are iron pots and bowls imported from Japan. Earthenware utensils are made by themselves. Their boats and sledges are also made by themselves, and are not of a very good construction. Dogs, however, form their chief occupation. Almost every house supports five or six of these animals, and besides these there are a large number of ownerless ones. The greatest care is taken in rearing them, and they seem to be very much attached to their masters. They are used chiefly for drawing sledges and boats, but they assist also in hunting. A skilful native can drive eight or nine attached to a sledge, but the utmost attention is necessary to prevent the sledge from turning over and throwing the driver out on the snow. If such an accident occurs, the dogs rush away with the sledge, until they are brought up by

\* The Amur is, no doubt, here referred to.

the sledge becoming caught by the corner of a rock or by the root of a tree. The natives consider the choosing of the leading dog a most important affair, because, if he is bad, the others become lazy and useless. In hunting, these dogs kill the more powerful animals, and drive out the others from the recesses of the mountains. The dogs which are of no use are killed for the sake of the skin and flesh, which is eaten, but the skin only of those who die is used.

The animals which the natives catch are generally eaten, and the skins form an article of trade between them and the people of the mainland. They use traps for the otter, fox, bear, and some other animals. For the bear a trap containing a poisoned arrow is generally used, and if this is not sufficient the animal is attacked with spears.

The people of the mainland cross over to the island constantly to trade. They bring cotton, balls, pipes, tobacco, and pins, and exchange them for the skins, axes, and knives brought by the natives. This intercourse is carried on in a very friendly manner, although quarrels sometimes arise from the neglect of the latter to carry out their bargains. The natives trade also in human beings with the people of the mainland. They seize all those who are friendless and weak and poor, and sell them for the articles above mentioned. The natives of Yezo also make raids in the island, and seizing those who cannot offer sufficient resistance, sell them on the mainland.

The women are treated with much more respect here than in Yezo island. They are not forced to work hard, and the men procure the dresses and ornaments for them. They have a very peculiar funeral ceremony. When a chief dies, they open his stomach and take out the intestines. They then erect a small stand outside the house, and lay the corpse on it. The latter is washed every day by certain females, set apart for that purpose, and allowed to dry in the sun, so that it may not decay. This is done for a whole year, when, if no part of the body is decayed, the women are rewarded. If, however, the corpse shows any sign of decay, the women are forthwith killed. This latter custom, however, is said to be practised no longer. In either case, the body is put in a large coffin, which is profusely adorned with carvings, and which is then laid on the surface of the ground.\* The bodies of deceased females are interred, and a wooden memorial tablet is erected over the spot. The custom of burning down a person's house after he dies, which is practised in Yezo, is unknown here; but the houses of those who die violent deaths are burned down. The bear is an object of worship, as among the Ainos of Yezo. The animal is fed for two or three years; the claws and teeth are removed as it grows older, so that it may do no harm; and then at the period of the feast of the bear it is killed with an arrow, while in Yezo it is crushed under a large tree. This festival is the same all over the island.

*The Orokko Tribe.*—This tribe inhabits a track on the east coast, and differs very much from that living in the southern part of the island. The language is not the same; the people do not cut off or shave

their hair, but tie it up in a bundle. Our knowledge of this people is but very slight; but the countenances of the men are most unprepossessing. The clothing is made chiefly of seal or fish skin; cotton which has come from the mainland is also used. It is considered immodest for a woman to show any part of her body. The clothing reaches to the ankle, and the skirts are adorned with copper ornaments. Their food and drink is the same as that used in the southern parts. They have no fixed residences, but wander about wherever they can find fishing and hunting or plants fit for food. Their temporary huts are covered with the bark of trees, or with a sort of oiled paper, or fish skin. Their occupations are similar to those already described, except that they use the *Tonakai* as a beast of burden instead of the dog. Owing to the difficulty of communication with them, full account cannot be given of their customs. They do not prevent relatives from marrying, but no one is permitted to marry into another tribe. They seem to expose their dead in a coffin in the wayside. They are of a very quarrelsome disposition, and assassination is common. In the latter case the relatives and friends of the deceased do not slay the murderer, but having inquired into the crime they take a compensation from him. This is also the custom among the Sumerenkuru tribe. Nothing further worth noticing was seen in the people of this tribe. The author did not reside long amongst the people, and so he did not learn much about them.

*The Sumerenkuru Tribe.*—The people of this tribe inhabit the north-west coast of the island, and are subject to Manchuria. Their modes of adorning their persons are similar to those of the Orokko tribe, but they possess a more engaging appearance than the latter. Those females who cannot use the needle deftly, even though they may be pretty, are despised by the other sex, and their marriage is distant; hence the women are very industrious in acquiring this art. In their treatment of guests the people of this tribe differ greatly from the other inhabitants of the island. They are particularly careful in arranging them according to their relative rank, those of the highest class sitting in the middle of the house, and the others to their right and left. They differ but slightly in their food and chief occupations from the other inhabitants of the island; but a few of their customs are peculiar to themselves. They have no objection to one of their own tribe marrying into another tribe; and the marriage ceremony seems to be similar to that of the Ainos of Yezo. When two persons desire to marry the male sends valuable presents to the father of the girl and begs that she may be given to him as his wife. Marriage within the same family is on no account permitted. Quarrels between the admirers of a woman are very numerous and frequently end in bloodshed. Sometimes a man secretly induces a girl to run away with him from her father's house, and then sends his most valuable possessions as a peace offering, at the same time acknowledging his offence. Permission to marry is then obtained.

They burn the bodies of their dead, and, having taken away the bones, bury them in a coffin by the side of a small shrine, which they erect near their houses. A brass plate is then put into this shrine, and offerings are made at certain periods. At the end of three or four years the whole is broken up and

\* Somewhat similar modes of desiccating the dead were practised by the ancient Peruvians, some South Australian tribes, the Looshais, and some African tribes.

thrown away. They also offer up the heads of fish on the seashore to propitiate the ocean deity, in the same manner as the Ainos of Yezo.

This brings the text to a conclusion, but in an appendix the author gives the result of inquiries which he made into the origin of the sovereignty claimed by the Manchus over this tribe. There was a time when it paid no tribute to Manchuria, but from a certain time (unknown) ships began to come there regularly to trade. The sailors were very violent, and constant quarrels occurred. The Manchus hearing of this crossed over from the mainland to inquire about it, but most of the natives, taking them for their enemies, the sailors, fled to the interior. The visitors found, however, certain men who had remained behind, and proceeded to appoint them as overseers of various districts. A treaty also was made according to which one marten's skin was to be paid each year as tribute to Manchuria, the latter giving in return a roll of brocade. It was also agreed that the people of the Sumerenkuru tribe were to have special facilities for trade with the mainland.

The following incident closes the work:—Some years previous to this six Russians "of the Kiren tribe" came to live on the coast, and the natives had to suffer much evil and violence at their hands. They violated the native women, and the tribe was in a state of constant turmoil. They remained for three or four years, until finally the natives and some of the people from the mainland banded together and murdered them all, "so that," the author adds, "not a single Russian now comes to this place."

It may not be uninteresting to compare the above account with that given in Colonel Veniukof's work on the Border-lands of Russia in Asia, which was published in 1873, and with which I am acquainted only in a German translation. The following is a brief summary of the article on Saghalin in this work:—

Up to 1849-52 it was generally believed that Saghalin was joined to the mainland by a neck of land or a sand-bank; but in these years Captain Newelski proved by his surveys that this was not the case, and that it was distinctly an island. In 1807 Lieutenant Chluostow took possession of it in the name of Russia; but this act was subsequently disowned by his Government, when Golownin was in captivity in Japan. The Japanese established themselves there in 1780, but the natives never stood to them in the relation of subjects, so that the island, *de jure*, belonged to no one, although it was marked in European maps as a Chinese possession. The only connection which the latter ever had with the place was on the rare occasions when traders came from the Amur to purchase skins. In 1853 stations were established there by the Russians, but were withdrawn on the outbreak of hostilities in Turkey. They were re-established, however, soon after, without any opposition from the Japanese, who on their side also established stations for the protection of their trade.

Saghalin is 892 versts long, and from 136 to 25 versts in breadth (according to the Japanese author it is more than 200 *ri* in length, and from 16 to 17 *ri* in breadth; 1 *ri* = roughly  $2\frac{1}{2}$  miles). There is not a single bay which can be used as a natural harbour,

the two largest bays being too wide and too much exposed to the wind. A range of hills runs through the whole length of the island, reaching here and there a height of 2000 feet or more, but, contrary to what might be expected in such a severe climate, they never reach the line of perpetual snow. The two chief rivers of the island are the Poronai and Tzuni, the former flowing southward, the latter in a northerly direction; but neither are longer than 160 or 170 versts.

There are no volcanoes on the island, although it forms a continuation of the Japanese volcanic range. It contains rich beds of coal, which give it not only future but also a present importance. Among the other natural riches of Saghalin, forests, animals of the chase, and fish take a first place. The forests contain chiefly fir, larch, and in a lesser quantity pine; also oak, birch, and elm. The natives support themselves chiefly by fishing, which is also a source of much profit to the Japanese concerned in it. The whale-fishery is carried on entirely by people who come from other places for that purpose; the seal-fishery by the natives. On account of its climatic conditions, the organic nature of the place cannot be either rich or numerous. The neighbouring Okhotsk Sea and cold districts of Eastern Asia exercise a baneful influence over all. In the middle of May snow still remains on the mountains, even in the south. The average temperature at Kussunai is about 34° F., an average which in Norway is only found north of the Arctic Circle. The highest mean temperature in July is about 62° F., and in January 14° F. The severity of the climate is extraordinarily increased by snow in winter, and by the dampness caused by fogs and overflow in summer.

The population of Saghalin consists of Russians, Japanese, Chinese, Giljaks, Ainos, Orokkos, and a few Europeans and Americans; in all about 13,000 or 14,000 souls.

The Russians, who number about three thousand, are almost entirely soldiers belonging to the Eastern Siberian army; the remainder are peasants and traders. They live in ten settlements.

The Japanese live on the coast in the southern part. Formerly their chief object on settling here, or rather in coming in the summer, was fishing and trade with the Ainos; but subsequently they had a political purpose to serve; they wished to strengthen their influence on the island against Russia. With this object they followed the steps of the Russians in colonising; and as soon as they noticed that the Russians had settled anywhere, they appeared there immediately with their own colonists. Hence there are corresponding Japanese settlements round all the Russian settlements south of the 48th degree of latitude. All the Japanese in Saghalin are under the jurisdiction of officials who are themselves subject to the Prince of Matsumai. The revenues derived from the fisheries amount to 800,000 roubles.

The Chinese were first brought to Saghalin from Hongkong in 1868, by Americans, who worked the mines at Ssertunai. They were all unmarried and had no intention of settling in Saghalin.

The Giljaks live in the northern half of the island, as far as 50 $\frac{1}{4}$ ° N. lat. They carry on fishing, hunting, and also some trade. They go in boats to the southern part, and buy skins from the Ainos, which

they sell again to Siberian traders. They live scattered about on the banks of the rivers, at a greater or less distance from the sea. According to their religion they are Shamans; no culture exists among them, and they have no writing. Their number is probably not more than two or three thousand souls.\*

The Ainos, who number more than 3000 souls, inhabit the island south of 50° N. lat. They hunt and fish and are completely dependent on their creditors, the Japanese. They have a somewhat more civilised appearance than the Giljaks, on account of their habit of eating rice, wearing Japanese clothes, and their long intercourse with the Japanese. But there is no very great difference. The religion, character, legends, and customs, all show their patriarchal state. The Aino villages consist generally of three or four houses, which remind one by their mode of construction of Japanese houses.

A small number of Orokkos live in the mountains in the centre of Saghalin. They are chiefly hunters, and when unsuccessful in the chase, or when the season is unfavourable, they take to fishing. It is not known what their number is, but it is probably not more than 400.

The population of the island is as follows:—

3000 Russians	3000 Giljaks
3000 Japanese	3000 Ainos
100 Chinese	400 Orokkos
Total, 12,500	

J. W. MCCARTHY.

### MORENO'S TRAVELS IN PATAGONIA.

THE following interesting account of the further travels of Senor Moreno in Patagonia, is taken from the Buenos Ayres *Standard*, of 30th May last:—

At Bahia Blanca, where it rains much less than in Buenos Ayres, a dry climate and sterile soil commence, increase gradually on the Rio Negro and Chupat and across the arid table-lands to which I have already alluded, and attain their maximum, according to the Indians, between the forty-seventh and forty-eighth degrees of latitude.

At Santa Cruz the continent commences to get narrow, the distance from the Cordillera to the sea to diminish, and rains are more frequent, though of short duration. The valley stretching westward from the River Chico to Lake San Martin, and which is watered by the Shehuen, exhibits tracts of luxuriant verdure that contrast strangely with the barren table-lands that surround it. In January and February I found the climate extremely agreeable.

The fertile zone, where rain falls, commences at 50° S. lat.; the daily rains in Western Patagonia pass over the Andes and fertilize it, without rendering it uninhabitable, as on the opposite side. The stunted vegetation of the table-lands changes suddenly as it approaches this zone, but as yet does not resemble that of the Andine zone. The traveller who has just traversed the Pampa is agreeably impressed by the change from a wild desert whose sole inhabitants are the timid guanaco and the ostrich, the choicest prey of the "pumas" (lions).

\* These are probably the "Sumerenkuru" of the Japanese author.

South of the lakes, stretching to the Cordillera, the glacial deposits are covered by extensive plains of grass and clover, the Indians' favourite ground for chasing the wild horse. These plains are bounded on the south by the lava from the Andes, which runs 30 leagues to the east, and has formed gigantic basalt heights, gradually diminishing, amongst which some extinct volcanoes are found. Several small streams (in some of which gold is found) flow from these heights into Lake Argentino, where fish abound, as also wild geese, white swans, red flamingoes, ducks, &c. The basaltic plain which is 20 leagues in length and traversed by precipices, terminates suddenly at the seaboard. The River Gallegos, which falls into the Atlantic, has its source in these plains.

From the source of the Gallegos the country changes, undulating hills stretching to the south and immense forests to the west. These parts are suited for rearing sheep, and Admiral Fitzroy said they reminded him of the Pampas of La Plata. Further south is Lake Blanca, only a few miles from Skyring Water. This lake (which barely deserves the name, from its trifling depth) takes its appellation from the colour which the argillaceous soil imparts to its waters. The same may be said of Tar or Dirty Lake, east of Lake San Martin.

At Lake Blanca the plains are lovely, and the Indians of Papon's tribe live here during the greater part of the year. The Chilean Government also pastures cattle about here, and when I passed some Chileans were building wooden huts to settle down. Further south beds of excellent coal stretch to the sea, which covers them at high tide. These coal-beds give great importance to this region, which stretches to the straits in a plain that will one day feed the flocks of the future Argentine province of Magellan. This plain is bounded on the west by Otway Water and the impenetrable woods of Brunswick Peninsula, under which lie the coal veins now worked at Sandy Point.

In the northern part of the region I have roughly described, and on the Atlantic coast, at the Santa Cruz river, there is a table-land decreasing from 3000 feet in height to less than 900, and becoming less barren as it nears the ocean.

The deep valley of the Santa Cruz, which, probably, like that of Coy Inlet and River Gallegos, was formerly an inter-oceanic strait, has but few fertile tracts. The river's course lies through a volcanic formation, to Pavon Island: on the southern side of the bay there are patches of verdure, but potable water is scarce. The best pasturage from Chupat to this place is found on the lowest (about 350 feet high) of the succession of table-lands which form the foot of the Andes in these regions: there are lakes of soft and salt water, the latter rich in chloride of sodium.

Further south are the Leon Colonies, rising from the coast to the fourth table-land, a height of 800 to 1000 feet, the principal elevation being Mount Leon, at the foot of which the 'Jeanne Amelie' was captured. The pasturage is good, though hard, and would improve if cattle were fed on it; good water is scarce, unless you sink 60 feet for it. This high table-land stretches from Santa Cruz to Gregory range in the Straits. The view from it is illimitable, and only to the S.W. can the distant ranges near the Andes be faintly discerned.

Although the pasturage is not so good as on our pampas, the aspect is not that of a barren steppe, as



in the north: the arbustus is less frequently met with, and some lakes are seen, the water being salty by reason of the soil containing sulphate of soda or chloride of sodium. On the borders of Lake Perdrices (Partridges) there are fresh-water pools, and a town might be founded here, to facilitate communication with the Straits. The climate, however, is extremely cold, owing to the elevation above sea level and the want of trees. In April the thermometer is sometimes 5° C. below zero, but this is an exceptional temperature.

The country improves as we go south, and some ravines similar to those near the Sierras of Tandil are met with. Passing the Tres Chorillos, rivulets of fresh water fall into a salt lake near which the Indians sometimes pitch their tents. And so on between verdant slopes and salt lakes (the latter having nearly always fresh springs near them) we arrive at Coy Inlet, the extreme limit of the salt plains, and which Darwin places at San Julian, two degrees further north. Coy Inlet is picturesque; it was the bed of an old river, or perhaps the sea ran through from east to west. The winding bed of a stream is near; it is just now (the season of thaw) dry, which proves that its source is not in the snow-clad hills. For a breadth of two leagues there is good pasture, which the Indians avail themselves of at a point called Majen Aiken. From Coy Inlet to Gallegos river the pasturage is still better.

Along the River Gallegos the Indians prefer to dwell, particularly at Guerraiken. I came on them there, but as there happened to be a grand orgie going on I could only have short chats with some few of them. These regions have a great future in store for them, and it is a great pity that the Tehuelches, formerly so sober, are fast approaching extinction through drink, sold to them by Christians.

It is generally believed that, in order to populate Patagonia, the Indian must be exterminated. If the savage does not till the land, it is because he despises a sedentary life, preferring the illimitable attractions of the desert, to be found in a nomad life: he knows not what ambition is, and is content with food and something wherewith to clothe himself. When the Tehuelches learn our civilisation before our vices, we shall find them on estancias on the Gallegos, working the same as our gauchos.

The River Gallegos has a mean velocity of from 4 to 5 miles an hour, and is fed by the snows which fall in winter on the volcanic table-lands. It has two sources, which unite after a short distance, and two small tributaries to the south. The valley could be utilised for agriculture: on both banks mounds of lava are met with towards the south, forming black rocks, with broken fragments like columns, wearing an appearance like an ancient city in ruins. Fire and ice have left their stamps on this region. All these peaks, many of them marked on the maps, from this to Cape Virgin, are extinguished volcanoes, at one time submarine, their maximum height being 1000 feet. My observations, through the boiling point test, show the mean height of the region to be 860 feet.

The peaks of lava under the ancient bed of the sea inclined as the tertiary table-lands rose, and some of them appear 200 feet above the surface in fantastic shapes, as at Mount Aimon, Volcan, Asses' Ears, &c. These eruptions extend W.N.W. to 40° N., and are, I believe, independent of the Andine volcanoes—the theory that this lava came from the Andes being quite

puerile. Between Gallegos and the banks of San Gregorio, where these peaks are found, they have risen more irregularly than in other parts of Patagonia, while the ice has left more decided marks. The road winds capriciously now through low valleys watered by pools and rivulets, then through sterile tracts, and anon over elevations covered with grass, and here and there an erratic rock. At the confines of the Meseta (table-land) the face of the country changes. To the right the blue and white line of the snow-clad mountains stands out in relief from the dark and tempestuous western sky. To the left the summit of San Gregorio: then the narrows of the straits, like silver ribbons; and further off, of a faint rose colour, enveloped in fog and lurid fires, characteristic of the savage inhabitants, lie the Fuegian plains. In front, on the Straits, at the high peninsula called Brunswick, the landscape is even more verdant and undulating than the Pampas of Buenos Ayres, with here and there mineral veins and small woods of the "Calafate" (Berberis), which produces a delicious fruit; there are also pools of fresh and salt water—in fact, the whole has the aspect of an English park. The road winds southward close to a low range of glacial hills on the west (probably where some prehistoric glacier rested), and is crossed by the Dinamarca, a rapid stream bounding on through aquatic plants, watering a large tract of fertile land covered with *humus*, and finally falling into the Straits. There are also numerous rivulets. The grass is so high about here that the traveller often falls into old wells, especially near the road. Amongst them is one called "Queen Victoria's Well," so called from a Tehuelche Indian woman, who was called "Queen Victoria" by her tribe, falling into it.

This beautiful region, where life is easier than in any other part of Patagonia, is the result of one of the most terrible changes of the earth. The glacial period here displays all its terrors; due to the gigantic glaciers that in past ages advanced to the Atlantic, tearing enormous fragments of even 1000 cubic metres from the mountains, borne onwards on floating ice, leaving vegetable deposits that will enrich the pioneer of the future. The changes in Patagonia from the commencement of the Tertiary epoch show the prodigious force of nature. In the Eocene epoch the earth rose from the ocean, feeding monstrous terrestrial fossils, like the Dinoceras of North America, and which, hitherto unknown here, it has been my lot to find in Patagonia. Then it sank for unknown ages, which geology cannot count. Again it rose producing those enormous trees whose petrified trunks are found near the Cordillera, and curious animals like the Nesodon, Anoplotherium, &c., while the sea sheltered seals, sharks, dolphins, and mollusca, some of them of gigantic size, like the Patagonian oyster. Then this layer sinks again to the depths of the sea, 800 feet more or less, and under it masses of basalt were deposited. After the sea of fire came the sea of ice, adding 250 feet of detritus to the crust. Then Patagonia threw off its icy shroud, rising in some places 3000 feet above sea level; and it still continues to rise. On the coasts of Buenos Ayres I have seen living shells similar to those found in the Straits at 100 feet elevation.

I must no longer enlarge on these interesting phenomena, but proceed to show how valuable these

southern lands are to Argentines. Cape Negro is a beautiful tract, on which there is a Chilian estancia. For ten miles the coast is covered with erratic rocks and trunks of trees, the green woods skirting it making the scene delightful to the traveller's eye. Far south the summits of Mounts Sarmiento and Darwin are seen. Sandy Point is fifteen miles from Cape Negro, across the stream Tres Puentes, on whose banks there is a saw mill; there is a fertile plain between the Tres Puentes and the Rio de Oro (Golden River) in whose sand grains of the precious metal are found.

The Brunswick peninsula, on which is Sandy Point, is covered with rich vegetation, making the geologist forget what it was when covered with ice. The soil is very fertile. There is a colony of Chilians and Swiss at "Agua Fresca," south of Sandy Point, besides others on the Rio de los Ciervos. Coal is found in the peninsula, recalling the rich vegetation that covered Patagonia at the beginning of the Tertiary or end of the Secondary epoch.

I have now only to refer to the climate of these Austral regions. In the western part rain and storm are continual, and glaciers extend to the sea: it would be hard to populate it, but on the east side the climate is more favourable, and those sudden and terrible atmospheric changes that cause so many shipwrecks are unknown. I can assert from my own observations and what I have learned that the climate from the River Santa Cruz to Cape Horn may fairly be compared to that of Great Britain, from the English Channel to the North of Scotland. On the high lands it is dry, with night dews, but little rain. In winter snow falls, but in spring, summer and autumn the climate is delightful, with some few days of intense heat.

At the Straits it rains oftener, about a third of the rainfall in Buenos Ayres, but the snow keeps the soil moist. The winds are very variable, those from the Poles prevailing. January, February, and March are dry; snow begins to fall in the middle of April. In winter the mean temperature at Sandy Point is 3° C. above zero: in September and October storms; November and December dry again. All this makes the country healthy, and epidemics are unknown.

The vegetable productions are numerous. Potatoes yield 30 to 50 for one, and flourish splendidly at Santa Cruz. Wheat can also be grown there and at Rio Chico, but not at Sandy Point; but oats, barley, and above all vegetables, grow to a prodigious size at the latter place. Tierra del Fuego, at Isla Grande, has a climate like the Falklands, where sheep flourish so well. Southwards at the English settlement of Oostravia, 20 leagues north of Cape Horn, cattle thrive and some vegetables also: the aborigines live almost naked, and humming birds and parrots are seen, so the climate cannot be very inclement.

Here we are at the Andes chain, which has, as everybody knows, two subsidiary chains, one on the east or Argentine side, the other in Chile. The central chain, which appears of more modern formation, has the loftiest peaks, which decrease in height towards the south, where there are passes, such as those at Rancho, Villarica, Bariloche, and Pedro Rosales, opposite Lake Nahuel-Huapi; that visited by Musters, opposite Teckel; that of the River Aisen, in 45°; and that at 50° 40', more or less, a little south of Mount Stokes, and which can be seen, covered with snow, from the extremity of Lake

Argentino, where the most ancient formation of the eastern pre-Cordillera disappears. The Andes chain divides at this point, and this wonderful mass of dizzy peaks, almost vertical precipices, domes and towers, covered with the eternal snows that reflect the colour of the heavens, changes its direction imperceptibly to the S.W., and disappears at 53° S. lat. Between the 51st and 53rd degrees the last spurs of the great chain separate and scatter in a labyrinth of deep and narrow channels, which fully accounts for the sufferings of the British sailors who transferred to maps the lines drawn here by the Creator. Little Hope Bay, Last Hope Bay, and Mountain Channel, at the foot of Sarmiento Cordillera, are almost at the extremity of the real Cordillera, and Mount Burney alone, the last high peak of the chain, is in King William's Land. The last outlying spurs of the Andes are a little further south, terminating near Cape Providence, where, according to Agassiz the Andes proper begin. About here the backbone of America disappears in impenetrable forests.

The Cordillera on the Chilian side rises in the Atacama desert, and forms a chain of granite rocks and islands, separated from the continent by winding channels which are a submarine continuation of the great longitudinal valley. In the Adelaide, Santa Ines, and Clarence islands lovely hills with immense glaciers on their sides are seen. At the S.W. point of Tierra del Fuego the chain changes its direction and forms a barrier against the Antarctic waves. At its two extremities are Mounts Sarmiento and Darwin respectively, the granite formation reaching in some places 3000, in others 7000 feet in height. This chain, which appears to be distinct from the Andes proper, terminates at Mount Darwin; the latter, according to Agassiz and Skyring, terminates in King William's Land; and King considers they end in the neighbouring isles. Darwin declares they end at Mount Darwin.

The other high lands of these southern regions, east of this chain, are of clay and slate formation, with quartz veins, as in King William's Land and nearly the whole of the Brunswick peninsula. This formation is also seen in Dawson Island, extending to the south of Tierra del Fuego, excepting its north-eastern part. This clay and slate formation is visible over all the west of the Argentine Republic. The western isles of Tierra del Fuego are of granite and changing formation; the highest peak is 1743 feet, in Hermit Island, near Cape Horn.

There is a great future in store for these Argentine regions. Patagonia, from Bahia Blanca, has an excellent climate and everything necessary for a great producing country, while the Straits offer paramount advantages for settlements; and if their coasts were populated, the disasters from shipwreck might be greatly diminished. In 1875 the Chilian settlers at Magellanes saved 146 persons. If the Argentines had a port near the Cape this number could easily be trebled. The gallant Argentine sailor, Captain Piedrabuena, has saved numerous lives here within the last twenty years. It would be an honour if the Argentine Government established the first life-boat station on States Island. For the present, however, an agricultural colony would be sufficient.

## ASIATIC TURKEY.

UNDER the above heading, an interesting letter from Mr. Grattan Geary, Editor of the *Times of India*, appeared in the *Times* of the 25th of July last. It contains a most valuable description, from personal observation, of the actual condition of the Sultan's Asiatic dominions, and the following extracts will doubtless be of interest to most of our readers.

"Setting out from India in the middle of last March," says Mr. Geary, "I made my way up the Persian Gulf in one of the British India steamers to Bussorah, and thence up the Shatt-el-Arab and the Tigris to Bagdad. Crossing Mesopotamia, I visited the sacred cities of Kerbela and Nejef, west of the Euphrates. Then, returning to Bagdad by Hillah and Babylon, I set out northward along the eastern edge of the valley of the Tigris for Mosul, whence my route lay westward through northern Mesopotamia to Belejik, where I once more crossed the Euphrates. Thence by Aleppo I got to the Plain of Antioch, and, crossing the Beilan mountain, I reached Alexandretta on the Mediterranean, the proposed starting point of the projected Euphrates' Valley Railway. . . .

"The Shah of Persia is, nominally at least, the sovereign of the north-eastern littoral of the Persian Gulf throughout nearly its whole extent. Of late years, the Turks, who have conquered nearly the whole of the interior of Arabia, have extended their rule over the Arabian or south-western coast of the gulf. But the gulf itself owes its present tranquility to British power. . . .

From motives presumably of delicacy none of the protected islands or Sheiks have been asked to contribute a farthing of tribute in return for the security and peace which they enjoy under the protecting shadow of the British flag. We have neglected to acquire any legal right to their fidelity or allegiance. The Turks when absorbing strip after strip of the gulf littoral showed themselves perfectly aware of this. They denied point blank that we had any right to object to their annexations, as we had never exercised the rights of sovereignty over the Sheiks in whose fate we interested ourselves.

"But though the Turkish power has been established over a considerable extent of the Arabian coast line of the gulf, it is on passing the bar of the Shatt-el-Arab that we enter the real portal of the Ottoman Empire in these parts. This magnificent river is formed by the united waters of the Euphrates and the Tigris, which meet and mingle at Kurnah, the southern extremity of Mesopotamia, whence they roll down a mighty volume 140 miles to the head of the gulf. At its mouth the Shatt-el-Arab appears to be a continuation of the gulf, for it is so wide that the banks on either hand are invisible from the deck of the steamer. But a vast bar composed of soft mud marks the line where the gulf ends and the river begins. The water over this bar was in March last—when the river was nearly at its highest—only 11 feet deep. The British India steamship 'Pachumba' drew 13 feet 6 inch., but she passed the bar by going at full speed through the yielding mud. Once inside the bar, there is a depth of six fathoms, and that continues for upwards of 100 miles—in fact, up to Kurnah. . . .

"When steaming up the Shatt-el-Arab to Bussorah you have Turkish territory on the left hand and Persian on the right. The land is precisely the same on both banks—smooth as a bowling-green as far as the eye can see, fertile in the highest degree, and, as if for convenience of irrigation, scarcely 2 feet above the river level. The wash of the steamer often sends the water over the edge of the plain on to the grass. Cultivation is easy enough, but it is only on the Turkish bank that extensive or systematic cultivation is carried on. The land on the Persian side is for the most part comparatively neglected. The date groves are all of a bygone period, and the trees are not renewed. There are no new plantations. For many miles south of Bussorah, and for forty miles above it, the Turkish bank presents a

very different spectacle. The desert is being rapidly reclaimed and an immense extent of ground has been brought into cultivation. Plantations of young date trees stretch league after league up the river. These plantations go back into the desert from four to six miles. To irrigate them little canals from 5 feet to 6 feet in width and about 4 feet in depth are cut at right angles to the river. The cutting of a couple of these canals and the setting in regular rows of date saplings by the thousand—not a very expensive process—form a plantation which in four years brings in a considerable revenue. Grain is cultivated between the trees. Great quantities of the dates thus grown are exported to Europe and America. In England the inhabitants of the Black Country have, curiously enough, a great liking for this sweet and nutritious food. So great is now the foreign demand for dates, that, notwithstanding the enormous increase in production, the price of dates has risen 400 per cent. at Bussorah within the last six years.

"It may be asked why the desert should be in course of reclamation along the Turkish bank of the Shatt-el-Arab, while land is going out of cultivation under that which owns the sway of the Shah. The answer to such a question is simply this, that the Persian Government is as oppressive and deadening in its tyranny as that of the Ottoman Empire is in Europe popularly supposed to be. . . . The difference between Turkey and Persia is illustrated by the fact that while torture of all kinds, including the bastinado and impalement has been abolished for the last 30 years in the Ottoman dominions, it is at the present moment the practice in Persia to wall-up criminals alive, and the bastinado is a common form of punishment. The roads from Bushire to the interior have been recently made quite safe—so I was informed in Bushire itself at the end of March last—through the firmness of the Prince Governor of Shiraz in building up alive in a wall every robber caught or said to be caught red-handed. Bussorah, once a city of 300,000 inhabitants, is now a very small place. But since the opening of the Suez Canal it has begun to revive, and this spring as many as 11 European steamers were anchored in a line in the river opposite its grain stores, loading for the Indian and European markets. A number of substantial buildings in the European style have been erected, and wharves are being constructed along the river bank. The climate is by no means as deadly as it is supposed to be, though the overflowing of a vast tract of country a few miles to the west of the town through the bursting of the banks of the Euphrates 200 miles to the north gives rise to a good deal of malaria in autumn.

From Bussorah to Bagdad two English steamers of light draught, but of considerable tonnage, carry passengers and goods. There are also seven Turkish steamers similarly employed. The English company are anxious to get permission to start a third steamer, for the trade on the river is increasing year by year and is very profitable. But the Turks have hitherto shown no desire to accede to the wishes of the company. Possibly, all objections will now cease, and the number of steamers plying on the Tigris will be indefinitely increased. On the Euphrates the trade is quite undeveloped. Every year the Turkish Government, or the *concessionnaires* who work the Government steamers, send a steamer up the Euphrates to Bir. It is always crowded with passengers, though the voyage is of very uncertain duration. The Euphrates is so shallow that steamers intended for it should not draw more than thirty inches. The Tigris is much deeper, and some of the boats now plying on it draw 4 feet when loaded.

Bagdad is 510 miles from Bussorah by the river, and, the current being strong, it takes a steamer on an average nearly five days to accomplish the distance. The rich pasture land on both banks of the Tigris, nearly as far as Bagdad, is in the hands of the nomadic Arabs. Immense flocks of sheep graze over these limitless plains, but they are not always the property of the Arabs in whose care

they are. Many of the flocks belong to rich merchants of Bagdad, who pay the Arabs for looking after them. The 'children of the desert' are punctiliously honest in fulfilling engagements of this kind entered into with the Jews and Armenians of Bagdad. For some years before the outbreak of the late war the Turks had succeeded in reducing the powerful tribes in this part of the country to something like order. But the withdrawal of the troops from the Pashalik of Bagdad to fight the Russians has allowed the old habits of the nomads to revive. . . . There is a considerable degree of anarchy, but as yet, at all events, there is nothing like an organised rebellion against the Sultan's authority. When the troops return from the seat of war the troubles now prevailing will, no doubt, soon subside. There is a tendency among the Arabs to settle on the banks of the river, and I saw many mud-built towns which had within the last few years sprung up upon sites formerly occupied at intervals by tents or reed huts only. When the Arab becomes 'sedentary' he soon becomes comparatively civilised.

"Bagdad is not now the great city which it was formerly, and will assuredly once again become when the resources of the Tigris Valley are properly developed. Its population numbers about 100,000, living in houses constructed for the most part of sun-dried bricks. It is a city of mud diversified by countless domes and minarets in blue porcelain. The streets are narrow, tortuous, unpaved, and filthy. Its brick fortifications are dismantled and useless, but it has some splendid modern barracks, built with all the latest improvements by Midhat Pasha, who when Governor-General began many valuable works, and finished some of them before he was recalled. A tramway 3 miles long, from the city to the large suburb of Kasmain, was made by that energetic Pasha. . . .

"Of late great tracts of land in the neighbourhood of Bagdad have been laid down under corn. Last year 50,000 tons of grain were sent down the river from the city to be exported from Bussorah. When I was there in April fully 30,000 tons more were in the granaries ready for exportation; but the authorities, acting under the constraint of the population, who feared a famine if corn were exported while the prospects of the new harvest were still uncertain, prohibited shipments, to the great disgust of the mercantile community.

"Starting from Bagdad early in April for the great shrines of the Shiah Muhammadans in the south-west, I had an opportunity of seeing something of Mesopotamia and the country beyond the Euphrates. The Arab tribes were a cause of uneasiness owing to the absence of troops; but, though they sometimes pillage villages and caravans, they usually employed their superfluous energies in raids upon one another. Land is being extensively brought into cultivation on the banks of the Euphrates, about Mosseyib and as far south as Hillah and beyond. Small irrigation canals are cut which the superabundant waters of the Euphrates fill to overflowing. That river, indeed, threatens vast tracts of country with ruin. It is continually bursting its banks and inundating hundreds of square miles, converting the land first into a lake and then into a marsh. The waters of the Euphrates were pouring in a torrent into the Tigris 3 miles from Bagdad while I was there. In the west it has formed a vast lake, extending from near Mosseyib southwards, beyond the latitude of Bussorah. I sailed in a large boat for twelve hours across one of the angles of this fresh-water lake, which in autumn will be a deadly marsh. The Turks have engineers, some of them Europeans, continually pottering over the embankments of the river; but it is evident that as yet they have not learnt how to keep the mighty stream of the Euphrates under proper control. The great system of canals with which the old Babylonians once carried its fertilising waters over every acre of Southern Mesopotamia are still intact. Their levels are still the levels which would best serve. All that is wanted is

that the channels should be cleared of the sand which chokes them. If that were done, they could be turned to practical account once more, both for irrigational and transport purposes. They would besides carry off from the river the flood waters which now overflow its banks and desolate the country.

"In spite of all drawbacks, however, large expanses of the rich soil are being yearly brought into cultivation. The Jews of Bagdad advance the necessary capital to Arabs and others, who cut the irrigation channels and sow the seed. The yield is always great, and after the Government proportion of the crops is taken the rest is usually divided between the cultivator and the capitalist. Dates are largely cultivated along the banks of the Euphrates within the limits I have mentioned. The great want is the means of carriage: to carry four shillings' worth of produce on donkeys' backs from Hillah to Bagdad costs six shillings. The consequence is that immense quantities of grain and dates rot unused in and around Hillah every year, for the carriage to Bagdad or Bussorah would eat up the profits. A tramway, or, still better, a railway from Bagdad to the Euphrates at Mosseyib or Hillah (Babylon), and thence onward for some 20 miles to the town of Kerbela, which is annually visited by 120,000 pilgrims, would, in the opinion of all the Europeans in those parts with whom I have spoken, pay as handsomely as the tramway to Kasmain.

"Kerbela is a walled town of 60,000 inhabitants, of whom 10,000 are natives of British India and Persia, attracted to the spot by its great sanctity. It is surrounded by forests of date and mulberry trees, and the approach along the broad canal leading to it from Mosseyib is wonderfully picturesque. . . .

"Having returned to Bagdad from beyond the Euphrates, I set out for Mosul, opposite the site of Nineveh, at the head of the navigable waters of the Tigris. I travelled along the foot of the hills to the east of that river, and about forty hours from Bagdad quitted the country of the Arabs to enter that of the Kurds. The country is generally under cultivation, barley being the principal cereal grain. The Kurds who are settled on the soil are much more industrious than the Arabs, but the nomadic Kurds are particularly truculent; they are born bandits, whom it is dangerous and difficult to avoid. The Bedouin will rob the traveller as a matter of course, if circumstances are favourable, but he will not kill unless an unjustifiable, because, unsuccessful, resistance be offered. But the genuine Kurd kills as well as robs. . . . I found all the wayfarers through the Kurdish country much more nervous and disturbed about the dangers of the road than I had found similar people to be in the regions where the Arabs were about. The caravans were better provided with firearms, and were much more imperative in challenging all who came in their direction. The Kurds from the mountains are perpetually raiding on the villagers, carrying off sheep, and goats, and corn. I was told of one case in which a clean sweep had been made of everything in 60 villages, the Kurds saying that for the last 20 years the Turkish Government had kept them from levying what was due to them, and now that there were no troops in the way they had come to collect the arrears. But that was to the west of Mardin, and I am now speaking of the country between Bagdad and Mosul. This region is, as I have said, fairly cultivated, and there are towns and villages of some importance along the track which the traveller who rides past, as I did, has to follow. One of these towns, Kerkook, is governed by a pasha, who has one wife, an Englishwoman. He is said to be an enlightened man and a good ruler. The population of the town is 20,000. Erbil (Arbela) has 12,000 inhabitants. In the hills close by are fountains of petroleum which have been running ever since Alexander the Great's time. The Turkish Government is working one of these fountains, and the steam flotilla on

the Tigris uses the oil as fuel. When the great railway from the Mediterranean to the Persian Gulf is made it will no doubt be carried to the east of the Tigris, along the present post route, so as to profit by the local traffic which can undoubtedly be obtained in the considerable towns, of which I have mentioned only two.

"Mosul is a large and important city, having the advantage of Bagdad in being mainly built of stone instead of brick or mud; but it is very filthy; its streets are narrow and crooked, and there is a visible tendency to decay everywhere. Here I first came upon a large Christian population, a considerable number of the towns-people being Christians of one sect or another. Their conduct, I am sorry to say, is not edifying. At three of the churches which I visited, Turkish soldiers were on duty to prevent the congregations from coming to blows among themselves. The Chaldean Christians are in a state of civil war about the election of a new patriarch in the place of one who has just died in the odour of perfidy. He had accepted a Papal Bull making portentous changes in the constitution of the Chaldean Church. The bishops approve the bull, which puts a great deal of power, hitherto wielded by the priests and laity, into their hands. The priests and laity naturally disapprove it. The consuls of France and England, the ambassadors of those two powers at Constantinople, Austria, the Pope, the Porte, the Pasha, the Mussulman roughs, and the noble art of self-defence have been all in turn appealed to or employed in this great quarrel. Were it not for the Turkish regulars at the church doors, the two factions would fight it out at the very altar. A very similar state of things prevails between the Syriac Catholics and the Jacobites; two of their churches are saved from the desecration of a free fight solely by the presence of Turkish soldiers. Yet every native Christian you meet will tell you with held breath that the Muhammadans of Mosul are dreadful fanatics, and that the Sheikh of the great Mosque has only to go out on to the gallery of the great minaret and give the word to bring about a general massacre of the Christians.

"From Mosul the post route follows for a couple of days the line of the retreat of the Ten Thousand and is nearly north-west. Then it crosses the Tigris at Jezireh, and follows a devious course among the Kurdish mountains in the north of Mesopotamia, passing through the important towns of Mardin, Diarbekir, and Orfah, and so on to Beljik, where the traveller crosses the Euphrates and enters Northern Syria. Nearly all the higher plateaus and all the peaks of the mountains along this route were covered with snow in May last, and the climate was cold as an early English spring. A considerable area of the so-called desert is under cultivation. Villagers are numerous, but so, unfortunately, are the Kurdish freebooters from the more northerly hills; and the villagers complain bitterly of their depredations. The Government has taken 500 Circassians into its service as *gendarmes*, and they are of great service. Both Kurds and Arabs have a great dread of the Circassian thoroughness in a fight. Unhappily, the Circassians (when not on duty as *gendarmes*) are more audacious robbers than either Arab or Kurd, and they are more dreaded by the villagers. This is in a great measure due to the mistake of the Government in refusing to recognise the authority of the Circassian chiefs over their followers. The chiefs could keep their people in some sort of order if the Government would empower them to do so. As it is, the law is too feeble a restraint, and the patriarchal rule of the chiefs being set aside the wild Circassian does whatever he pleases. His great physical strength and his perfect mastery over his weapons, of which he always carries a varied assortment, make him the most formidable of all the robbers in these parts. My experience was confined to those who had been taken into the Government service, and I found them to be very far the best at escort duty that I had on the whole journey. They were obliging, hearty, good-humoured fellows, never afraid of exertion or exposure, and never

inventing ingenious fictions as an excuse for coming to a premature halt. There is fine material in these Circassian settlers who have so unenviable a reputation. Possibly in the reorganisation of Asiatic Turkey, which cannot now be long delayed, they will be turned to good account.

"Having passed through the substantially-built cities of Diarbekir with its 60,000 inhabitants, and Orfah with its 50,000, I came as I have said, to Beljik, which has a population of 12,000 in its houses of chalk. The Euphrates here is as wide as the Thames at Greenwich, but it is very shallow. I saw a kafila of camels ford it, and in the middle of the river they seemed to be walking on the water, which was there not a foot deep. Onwards to Aleppo the route lies over a chalky formation. That fine city is well built of freestone, very similar to that of which modern Paris is built. There are, I am told, 200 or 300 Europeans settled there, and the shops are more European and less Asiatic in appearance than any others to be seen east of Smyrna. When the route of the great railway is finally laid down, it will assuredly pass close to Aleppo. But from Aleppo to the plain of Antioch there is a succession of rolling hills to be surmounted, which will prove a serious difficulty to the engineer who desires to combine economy with despatch. It is possible that some route may be found which will turn these hills; but if such a route exists, it must be very circuitous, or the post would now be carried over it. The plain of Antioch, which stretches for eight or ten miles from the foot of the last of these rolling hills to the foot of the great Beilan mountain, is in half its extent a deep and formidable marsh, in the pools of which flocks of pelicans disport themselves. There are the remains of two great causeways over the plain, one constructed by the Romans and the other by Sultan Murad. Both have been nearly swallowed up in the deep and treacherous soil. The Beilan Pass itself is not so difficult as it looks. The highest point traversed by the very good road over it is only some 16,000 feet above the sea level. All the gradients are easy for horses. It is for engineers to say whether they can be made easy for locomotives at a reasonable outlay. Once over the Beilan, the level and penitential plain to the edge of the Mediterranean, on which Alexandretta is built, lies before you like a map. The distance is about 15 miles. Alexandretta is not a port; it is a roadstead which is quite open to the southerly and, more or less, to the westerly winds. Between Alexandretta and Aleppo the trade is so great that 10,000 camels are employed on it. If a railway were constructed, it would be difficult to assign limits to the development of the trade of this region. A railway from the Mediterranean to the valley of the Euphrates and the Tigris would pass through countries of great natural resources, and would tap provinces of wonderful fertility and boundless extent. It is a mistake to suppose that Asiatic Turkey is now 'decaying.' Nearly everywhere throughout a journey extending over 1500 miles I saw evidence of progress rather than of decay. The population is scanty, but it is robust and well fed, and with proper inducement would work well. When you can get men any day to carry three hundredweight apiece for a few piastres there can be no want of hard muscle. The lax and inefficient rather than oppressive administration under which the country has hitherto languished will now undergo a thorough reform under British supervision. The corruption of the small officials—and even of some of the great officials—may be expected to cease out of the land when salaries are regularly paid and peculation or bribery is followed by inevitable dismissal. The Arab and the Kurd can easily be brought to order by the establishment of a few military posts. What then will stand in the way of the development of the resources of Asiatic Turkey? British enterprise and British capital will furnish the means, and all the world, we may hope, will profit not inconsiderably by the result."

## Reviews.

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### WEST YORKSHIRE.\*

SIR RODERICK MURCHISON, in his anniversary addresses, and on other occasions, often dwelt upon the close connection between the science of geology and the study of geography. This connection becomes more evident as the science of geography advances, and it is now an accepted fact that the physical geography of a region cannot be understood without a knowledge of its geological character. The exceedingly interesting work on West Yorkshire, by Mr. James W. Davis, which has just been published, is well worthy of the careful study of geographers, with reference to this connection, for it treats exhaustively of the chief bases on which physical geography must rest, namely geology and climatology. While the geologist is dependent on geography for those surveys and maps without which he could not define the relative positions of his formations, the geographer, on the other hand, is unable to describe, with the necessary precision, the physical aspects of a region, and the causes which have produced them, without the aid of the geologist.

The West Riding of Yorkshire, and still better the whole county, is admirably adapted both for the study of the various geological formations, and for the appreciation of the close connection between geology and geography. The whole of the fossiliferous strata of the British Isles are well represented in Yorkshire, and all but the liassic, oolitic, cretaceous, and tertiary are met with in the West Riding. At its north-west corner there is a series of mountains composed of Silurian rocks, which abut against the mountain limestone of the Carboniferous period. Then follow, in ascending order, the Yoredale series of rocks, the millstone grits and coal measures, then the magnesian limestone of the Permian age, and lastly the triassic sandstones, which are to a great extent overlaid with post-tertiary deposits, up to the banks of the Ouse, the eastern boundary of the Riding.

The positions of the great valleys in the western mountainous region of Yorkshire are greatly due to lines of weakness caused by faults; and the system of drainage having been thus determined, the denuding agents, water and ice, have been concentrated in the areas contiguous to the faults, wearing them down still deeper. The Silurian formations are brought to a sudden termination to the eastward, by the great Pennine Fault running north and south. The Craven Fault, running W.N.W. and E.S.E., also causes great inequalities of the surface. It is now the received opinion that the apparently violent breaks and contortions have been produced by lateral pressure acting over long periods on the unequal thickness and elasticity of the crust of the earth. The series of anticlinals parallel to the Craven Fault exhibit on the surface a number of rounded hills, and where the interior is exposed in natural and artificial sections,

the limestone and shales are found to be contorted and bent on themselves. That so hard and brittle a substance should be thus folded without being broken indicates a long-continued and gentle lateral pressure, clearly due to the powerful action producing the fault, which must, therefore, be also the result of a force prolonged over an indefinite period. The Craven Fault is traced along the limestone scars behind Settle, and the escarpments of Malham Cove and Gordale Scar. The Pennine anticlinals extend, north and south, from near Shipton into Staffordshire, and there are several smaller faults.

A study of these faults is essential to a comprehension of the relations of the various formations that are affected by them. The rocks forming the Pennine anticlinal dip to the eastward, giving place to the upper beds of the millstone grit series; and the grit rocks form a basin-shaped hollow, in which are deposited the coal measures of South Yorkshire, the whole carboniferous series dipping unconformably beneath the Permian limestone escarpment which runs north and south across the country, and is overlaid further east in the Vale of York, by the triassic sandstone.

In the present work each formation is described in detail, commencing with the Silurian rocks in the far north-west; with lists of fossils, and numerous illustrative sections. Space will not admit of our following Mr. Davis into the detail of his interesting record, but we can recommend its perusal to geographers as both suggestive and instructive; while we have never read a treatise which so clearly shows the close relation between the two sciences of geology and geography. This is especially the case in the chapter on the cave and lacustrine deposits, the warp clays and estuary beds of the post-tertiary period.

In the second part of the work, where the physical geography of the West Riding is discussed, it will at once be seen that the subject cannot be properly grasped without a previous careful study of the geological section; and the concluding portion on the distribution of plants over the various river basins is a masterly essay on botanical geography. The volume is furnished with two admirable coloured maps on a scale of four miles to the inch, one showing the geological formations and the other the river basins with reference to botanical divisions. The second volume containing the "flora" proper and the climatology of the West Riding is not yet published. The two volumes will form a most valuable work; and upon the information contained in them might well be based another volume on the agricultural statistics of the West Riding, with maps similar to those constructed by M. Delesse to show the different soils in France, and by Mr. Richardson to convey to the eye the various agricultural rentals of the county of Edinburgh.

The present work on the West Riding of Yorkshire is, however, complete in itself. Since the publication in 1853 of that most popular volume, *The Rivers, Mountains, and Sea Coast of Yorkshire*, by Professor Phillips, which preceded the Memoirs of the Geological Survey for this part of England, there has been no book of the same kind which can be compared in merit with that now under review. No library in Yorkshire ought to be without it.

\* *West Yorkshire. An Account of the Geology, Physical Geography, Climatology, and Botany.* Part I. Geology. By James W. Davis, F.G.S. Part II. Physical Geography and Botanical Topography. By James W. Davis and F. Arnold Lees, F.L.S. Maps and plates. (Lovell, Reeve, and Co., 1878.)



## MOUNT SINAI.\*

THAT indefatigable writer and traveller, the late Dr. Beke, about forty-four years ago, announced the strange theory that the land of bondage of the Children of Israel, which by the common assent of ages is believed to be the Egypt of profane history, was a distinct and separate kingdom lying to the east of the Isthmus of Suez, and thence extending to the land of the Philistines, a kingdom which in the course of time lost its independent existence and was merged in its more fortunate western neighbour, Egypt, whilst it became itself utterly waste and desolate. And, consequently, that the Red Sea, through which the Israelites passed in their exodus, was the Gulf of Akaba, and not, as was universally believed, the Gulf of Suez. This theory Dr. Beke maintained to the end of his life with much learning and ingenuity, and as a corollary to it he argued that Mount Sinai was to be sought not where universal tradition has placed it, in the peninsula of Sinai, but to the north-east of the northern termination of the Gulf of Akaba. His last journey was undertaken in his enthusiastic resolve to fix the site of the true Sinai. Before he could complete the *resumé* of this journey he died, and his widow, who is a firm believer in, and an able exponent of his views, has published in this handsome volume the letters or rather the journal he wrote for her during his absence, together with three chapters written by himself in support of his theory.

It would be impossible without far more space than is at our command to enter into a description of the many arguments adduced by Dr. Beke in support of his favourite theory; we would however remark that it is *a priori* exceedingly improbable that the entire agreement of the learned for so many ages, on such a subject as the identity of the country of the Israelitish bondage with Egypt, should have been based on error; and this is the more improbable as this country, whether Egypt or not, is mentioned not once or twice, but continuously in the Old Testament for a period of more than 1300 years. St. Matthew certainly understood this country to be Egypt in his application of the prophecy of Hosea, "Out of Egypt have I called my son," to the flight of Joseph with our Lord and the Virgin into Egypt. And even more improbable is it that a country of such power and civilisation as this is represented in the Old Testament to be should have entirely disappeared, and left no trace of its existence in profane history. Dr. Beke sets no value on tradition and adduces two amusing instances of the rapid growth of popular beliefs. He tells us that in the neighbourhood of Thebes, the natives identify Dr. Lepsius with Cambyses! the second instance we must give in his own words:—

"In 1852 a village called Harran was discovered by the Rev. Joseph Leslie Porter, precisely where eighteen years previously I had said it ought to be looked for, without his being at all conscious of the importance of this discovery; and nine years afterwards, namely, in 1861, my wife and I went to the spot to verify my identification of it, just as I now propose visiting the true Mount Sinai. Of our pilgrimage to Harran a narrative was given by my wife in her work, *Jacob's Flight*. At Harran we discovered a well which we named

\* *The late Dr. Charles Beke's Discoveries of Sinai in Arabia, and of Midian.* With Portrait, Geological, Botanical, and Conchological Reports, Plans, Maps, and Woodcuts. Edited by his Widow, Author of *Jacob's Flight*, &c. (London, Trübner & Co., 1878.)

*Rebekah's Well*, because it was in my opinion that at which the daughter of Bethuel was met by Abraham's steward. At that time no designation of any kind had been given to this well by the people themselves; and, though we were most minute in our inquiries, we could not learn that any history or tradition whatever, was attached either to the well or to the troughs near it used for watering cattle, as it is, in fact, expressly recorded in Mr. Beke's work. Indeed, when we first arrived at Harran, the people of the village denied altogether the existence of any well whatever, as our old friend, Dr. Wetzstein, who was with us, can testify. It is scarcely necessary to add that the inhabitants of Harran had not the remotest idea of their village having been the habitation of El Khalil, 'the Friend of God,' as the Patriarch Abraham is usually called. But they were not slow to adopt my identification of it; and when Major Wilson, R.E. (in 1865), and Mr. John Macgregor, of the 'Rob Roy,' visited Harran in December, in 1868, just seven years after my wife and I were there, he was shown what he described in the *Record* newspaper, as a very curious well called 'Abraham's Well,' adding that he had never met with stones and cistern more worn than those; the well thus shown to him as 'Abraham's Well' by the canny natives being our 'Rebekah's Well' which my wife discovered in 1861. But this is not all; two years later, when Captain Burton was Consul at Damascus, he wrote in the *Athenæum* that he knew the Haran well to be called 'Abraham's well' by many Syrian Moslems who had never been to that place, and who certainly never heard of Dr. Beke's visit to it in 1861. And since then, on his return to England, he informed me in person that the Moslems of other places besides Damascus all speak of 'Abraham's Well' at Haran, as a matter of notoriety!"

But these are the traditions of ignorant peasants, the belief of the learned cannot be placed in the same category.

We will now turn to Dr. Beke's journal. We can readily understand the tender regard for her husband's memory which induced his widow to publish this journal at full length, nor can we find fault with her for doing so, but we think it is to be regretted that the task was not intrusted to one less nearly connected with Dr. Beke, who would not have scrupled to cut out those portions of the journal which were designed for Mrs. Beke alone, and can have no interest for the public. Dr. Beke set out in December 1873, accompanied by Mr. John Milne, a geologist, whom he seems to have found both an agreeable and most useful companion. Three weeks were spent in Cairo whilst Dr. Beke was preparing for his voyage and return journey by land; he was very well received by the Khedive, who granted him the use of a small screw steamer the 'Erin.' The changes for the better in Egypt since his first visit to that country made a deep impression on Dr. Beke. He says:—

"The country is so changed since I first knew it, that it does not look the same: it is well cultivated, and looks most rich and flourishing, being well watered from canals and ditches. . . . Many of the villages were much improved, and there were signs of houses for the labourers approaching more to a European type than the mud-huts in which they have hitherto lived. . . . The reason of the rains, which now visit this country so much more than formerly appears to be the greater cultivation, and also the planting of trees which not only line the road, but are in parts so plentiful as to give it almost the appearance in places of being well wooded; it certainly does not look like Egypt. In the villages far and near one sees the tall chimneys of factories, which tend to increase the illusion, though the mixture with them of the native mud-huts soon destroys the charm. Ophthalmia, the great curse of the country, is certainly on the decrease, being not only less frequent, but also in a milder form. The railway, above all, is a great civiliser, from its opening up the country, facilitating the transport of its produce, and bringing the people of one part into communication with those of another."

On the 14th of January 1874 they left Cairo for Suez, where they embarked on board the 'Erin,' and

steamed down the Gulf of Suez and up the Gulf of Akaba, arriving at Akaba on the 27th. Here the Doctor had intended to find his Mount Sinai, and here accordingly he found it, and fixed for the purpose on a mountain called Jebel Bâghir, some 5000 feet high, and about 10 miles north-east of Akaba. Two engravings of this mountain, we suppose from sketches by Mr. Milne, are given, and it is certainly very well shaped and stands out nobly; but we must confess to being entirely unconverted by Dr. Beke's arguments as to its being the true Mount Sinai. He dwells much on a neighbouring Sheikh telling him that the mountain had always been known as the "Mountain of Light." One critic has suggested that this name originated with the Doctor himself, and that the Sheikh adopted his unconscious hint to please him; but even if the mountain should really be known by this name, Dr. Beké himself has demonstrated the worthlessness of ordinary Oriental tradition. There being at the foot of the mountain a mosque in honour of a famous saint from Jaffa, and the summit being a place of sacrifice, appear to us, if arguments at all, to be utterly beside the mark. Dr. Beke went a short distance inland to the north-east, experiencing very stormy weather, with torrents of rain. He then returned in a straight line from Akaba to Suez, travelling in a camel litter called a *takhterawân*, which he describes as like a London cab, only not on wheels and without fixed sides or top, which are supplied with curtains; he found this a very tolerable mode of conveyance. He reached England in March to take part in a paper war already begun in various prints, chiefly in the *Times* on his *discovery*. The Doctor gallantly held his own ground, and unconvinced as we are, we cannot but sympathise with him, and admire his perseverance and energy in undertaking this journey at the age of seventy-four and in feeble health: it is impossible too not to admire the spirit in which he undertook it, expressed in his own words:—"I feel carried away by the inward conviction that I am right, and that all things will work together for my good. I feel that I am doing the work of the Almighty, and that he will not desert me whilst in His service."

STANFORD'S COMPENDIUM OF GEOGRAPHY AND TRAVELS. Based on Hellwald's *Die Erde und ihre Völker*. Central America, the West Indies, and South America. Edited and extended by H. W. Bates, Assistant-Secretary of the Royal Geographical Society, with Ethnological Appendix by A. H. Keane, B.A. (London: Stanford, 1878.)

THE editor of this important work, so well and so favourably known as the author of *The Naturalist on the River Amazons*, and Assistant-Secretary of the Royal Geographical Society, informs the readers of this elaborate and highly illustrated volume that his chief object has been to adapt Von Hellwald's admirably written survey of the countries treated of, to the presumed requirements of English readers. In this announcement Mr. Bates does not do justice to the immense labour which he has expended in bringing up the work of the German author to the present stand-point of geographical knowledge; for in this respect the volume has been practically re-written, whilst as far as natural history and the geographical relations of faunas and floras are considered, the work is entirely original. The publisher is indeed to be congratulated in having secured the assistance of one so eminently qualified, as Mr. Bates, to write with the highest authority on the geography and natural

history of Central and South America, and the reader as he wanders from Mexico to Patagonia, led by his skilful hand, will find the most accurate information concerning each country visited, condensed in as small a space as is compatible with an account that treats of the configuration of the land, its general outlines and extent, geological formation, climate, flora, fauna, inhabitants both aboriginal and immigrant, government, social condition and products.

We can offer no more favourable recommendation of this work than to express our opinion that it is equal in every respect to the first number of the series published, namely "Africa," and which volume has, we believe, met with the appreciation it deserves from the public. If the remaining volumes of the series, which are to treat of the other grand divisions of the globe, are edited in the same masterly manner as this on Central and South America—and from the names announced in connection with them there can be no doubt that they will be—the English reading public may be congratulated on possessing in these volumes a compendium of geography and travel unsurpassed in this or any other language.

The arrangement adopted, by which the various countries included within the scope of this work are passed under review, is on the whole the best that could be devised. It has been divided into three grand sections. First, Central America, embracing Mexico and the smaller States of the Isthmus, Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, and British Honduras. Secondly, the West Indies, by which is understood the large group of islands lying east of Central and North of South America. Thirdly, South America proper, which stretches southwards from the Isthmus of Panama to the Straits of Magellan. We have already remarked that the information respecting each state, country, or empire has been condensed within the very narrowest limits possible, it is therefore impracticable in a brief notice to do more than draw attention to the method by which this very satisfactory arrangement has been attained. Each section is accompanied with one or more well-coloured maps, and the book is illustrated with excellent woodcuts. Mr. A. H. Keane, in the form of an appendix, adds a very valuable paper on the Ethnography and Philology of America.

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JENKINSON'S PRACTICAL GUIDE TO NORTH WALES.  
By Henry Irwin Jenkinson, F.R.G.S., &c. With Maps. (London: Stanford, 1878.)

THE labour and care bestowed in the production of this work is truly remarkable, and as a *practical* Guide to North Wales will, we venture to assert, prove invaluable to tourists. The general arrangement of the book leaves nothing to be desired. It is divided into eight sections, viz. Chester, Llandudno, Bettws y Coed, Snowdon, Dolgelly, Bala, Llangollen, and Aberystwith, and contains besides interesting chapters on the antiquities and history of North Wales, as well as general information most essential to travellers in a country where the language that is spoken is almost entirely unknown. The above sections are also published in five parts, each of which, illustrated with a map, can be purchased separately; but to intending tourists we would strongly recommend the complete work, which, although containing upwards of 500 pages, is of a sufficiently handy size to be carried in one's pocket. Two valuable maps accompany the work: a general map of the country described, on a scale of 4 miles to the inch, showing the railways and altitudes, and a railway map, forming an Index to the Ordnance Survey maps. A more useful companion than this last guide of Mr. Jenkinson's it would be impossible to find, and it will be the visitor's own fault if he misses anything worthy of note in the counties comprising North Wales, so rich, as is truly said, "in coast scenery, beautiful valleys, and grand mountains."

## Cartography.

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### THE PARIS EXHIBITION OF 1878.

THE arrangement of the Paris Universal Exhibition of 1878 makes it very difficult to gain a complete notion of the cartographical productions contained therein, scattered as they are, not only among different nations, but also among different groups and sections. The following notes cannot therefore claim to be an exhaustive notice of all the various collections of maps, charts, &c., but they treat of some of the more conspicuous of these collections which are of very high interest and importance.

France herself naturally claims foremost mention, and her collections alone more than fill two good-sized rooms, towards the south-east end of the main building. The largest map of all "Carte topographique du Dépôt de la Guerre à 1:80,000, Dressée par les ingénieurs géographes et les officiers du Corps Etât Major 1818-1878," (the engraving of which, curiously enough, was only completed this year), is too bulky to be exhibited in these galleries, and has been hung in a conspicuous place between the south-east dome, near the Porte Tourville and the large vestibule running parallel with the Ecole Militaire, across the road. The lower part of this map is raised to a height of 18 feet above the archways, so as not to interrupt the traffic arrangements, which has the effect of merging the details (which deserve closer examination) in the general effect. The latter is, however, very fine, and at a good distance the structure and inequalities of the ground can be well distinguished from the isolated mountain of Cassel, which forms a dark spot on the northern frontier, across the hills of the Seine valley and Paris basin, and the conspicuous summits of the central plateau down to the mountain masses of the French Alps, and the culminating peaks of the Pyrenees. The most notable feature, however, of this work—the engraving of which extends over 1750 square feet, and which represents the joint work of nearly 800 officers or artists, geodesists, topographers, draughtsmen, and engravers—is the uniformity which has been so happily preserved in its execution. Its 264 sheets have been engraved in the space of 53 years (1825-1878), by 65 different artists, but who, by being all trained in the same school, have adhered carefully to the same traditional style, which involved amongst other things the supposition of the light falling perpendicularly on the sheet and a rigorous exclusion of "fancy" treatment.

The execution of a new map of France, destined to supersede Cassini's map, was ordered by a royal decree of the 6th August 1817. The geodetical and topographical work began simultaneously on the 1st April 1818; the geodesy and triangulation of the 1st and 2nd order were completed in 1854, the triangulation of the 3rd order in 1863, and the topography in 1866. The field surveys, on the scale of 1:40,000, were executed by officers of the corps of engineer-geographers and of the *Etât Major*, and the reductions to the scale of 1:80,000 by the draughtsmen of the *Dépôt de la Guerre*. The engraving of France proper was, as already remarked, completed in the early part of this year, and of the nine sheets embracing Corsica, five have been completed. The revision of the surveys, begun in 1873, has already been carried over about a hundred sheets, forty of which are now completed.

Other works exhibited by the *Dépôt de la Guerre* include the reduction from the above map to the scale of 1:320,000, engraved on copper. This map, about 12 feet square, makes a valuable (though not a portable) communal map of France, and its general effect is good, though there is still a blank in the sheet of the Hautes and Basses Alpes round about Gap, where the hill-etching has not yet been completed. A laborious example of hill-etching may be seen close by

in the *Carte du Massif des Alpes* à 1:80,000. This is really a portion of the sheets of the larger map above described, joined together for the sake of exhibiting the delineation of a mountainous region. Subjected to a close inspection, such as the low hanging of this map allows, inequalities of style in the different sheets will inevitably betray themselves; but we consider that, nevertheless, they join together quite as well as many of the sheets of our own one-inch Ordnance Survey or Atlas of India. The map has been transferred to three differently-coloured stones, and the inequalities of the ground are shown by the addition of contour lines 20 metres apart. It extends from Mont Blanc to the Mediterranean, and from the meridian of Toulon to that of Turin. A good deal of extra-French territory is thus included, and this portion has been constructed from a larger map of Piedmont, on which the level lines are scanty.

Below the above are to be seen the following: a map of the environs of Nemours (Algeria), lithographed in six colours with contour lines, a reduction to the scale of 1:200,000, on stone, in four colours; of the large map of France, without hills; a proof of the sheet of Medeah, lithographed in four colours as a specimen of the future map of Algeria; and lastly, a lithographed sheet of the conventional signs and marks used in the maps of the *Dépôt*.

A map on the scale of 1:600,000 on copper, constantly kept up to date, exhibits all the French railways; and the same map, enlarged by photo-lithography, and printed in eight different colours, shows the lines of each concessionary company by a different tint. In the case of a map of the frontier of the Alps on the scale of 1:320,000 (a map reduced from the large map of France and extending from the Lake of Geneva to the Mediterranean and the Rhone to the upper basin of the Po), an endeavour has been made to delineate the mountains by varying shades of bistre, a plan which has the advantage of not obscuring the writing and minor details. The lines of levels throughout France, 100 metres apart, have been placed on a lithographed map on the scale of 1:800,000, which exhibits by this means the variations of height in a most exact and lucid manner. Although not yet complete, this map is a most satisfactory production. The map of the Department of the Seine on the scale of 1:80,000, lithographed in four colours, has been constructed according to the most recent reconnaissances executed between 1872 and 1874, forms a handy *vademecum* to Parisians and strangers who may require to extend their rambles beyond the limits of the city.

Besides the above, there are interesting specimens of various processes in the more mechanical of the operations of this department of the State. A copperplate in course of correction is exhibited with the erasures marked in yellow and the additions in red, and the portion of the plate requiring treatment covered with a protecting varnish, with certain openings made to receive the new material deposited by the galvano-plastic process. Other plates show the process of subsequent correction. We next see the process of producing by the galvano-plastic process, a duplicate plate showing in a central position topographical details which are scattered on the edges and corners of two or more plates. Other processes exhibited illustrate the use of zinc plates instead of the more cumbersome stones, as well as processes of minor interest.

Turning our attention to private exhibitors we must mention an interesting piece of work by Messrs. E. and R. Cortambert, entitled, "Geographie Biographique. Distribution des personnages celebres par lieux de naissance et par genre de célébrité, 1878." The numerous celebrated personages whose birthplaces are here exhibited, are divided into sovereigns, philosophers, warriors, geographers, travellers, statesmen, &c., categories which are indicated by different colours. A similar map prepared with reference to English worthies would be very interesting.

The most successful instance of showing heights by gradations of colour is called "Essai d'une carte hypsometrique de la France," (Ministère de la Guerre) Echelle 1 : 500,000. This map is done by hand, and illustrates gradations of height by shades of colour varying from blue (sea level) through yellow, green, citron, brown to white (snow) and dark blue (glaciers). But the great expense of such a process which includes fourteen different shades, and would probably require at least ten printings, will effectually prevent its general adoption. Still the general effect is very striking and picturesque.

A good instance of the same effect but managed by a much simpler method will be found in a "Carte topographique du Département des Vosges." Echelle 1:80,000, par Ad. Garnier, conducteur des ponts et chaussées." The light here is supposed to fall from the left hand upper corner, and the heights are represented by different shades of brown.

A very useful specimen of what in England county maps might be made is afforded by the "Cartes routières et hydrographiques des départements de la Dordogne, La Lozère, Haute-Vienne, &c.," on scales of 1 : 80,000, 1:100,000, &c. The scales are convenient, being less than our own one-inch Ordnance Survey, and the information supplied by them is very full, including as it does details of roads, imperial and local (completed and not completed), the limits of prefectures, sub-prefectures, cantons, communes and hamlets, cultivated and waste land, canals and navigable rivers, &c.

We must not conclude our notice of French Cartography without an expression of regret that we cannot do justice in a brief notice like the present to the various admirable works exhibited by Messrs. Delagrave et Cie, Andriveau-Goujon, and Levasseur. As specimens of works suitable for educational purposes many of their productions cannot be surpassed.

Among the many valuable charts exhibited by the Dépôt de la Marine, those of Guadeloupe, New Caledonia and Newfoundland, claim notice for the intricacy of soundings and the excellence of the engraving. The chart of the first named shows that the island is superimposed on a sort of submarine base, of larger periphery than the island itself, for at a certain distance from the shore the soundings all round drop in a remarkable manner from 62 to 145, 63 to 155 mètres, and so on. A survey destined probably to prove of great use in the opening of trade with Tongkin is entitled "Reconnaissance hydrographique du delta de Tongkin, 1874-5, exécutée par Ingenieurs Heraud et F. Bouillet;" while the commerce of the future will we trust be similarly interested in the labours of Lieut. N. B. Wyse, who sends a large-scale drawing of Southern Darien with his routes for the inter-oceanic ship-canal, from the Golfe de San Miguel to the Golfe de Uraba and the coast north, laid down thereon.

In the Spanish section we are confronted first with a fine lithographed plan of Madrid, "Plano parcelario de Madrid. Direccion general del instituto geografico y estadistico." Scale 1:2000 in 16 sheets. The sheets of the "Mapa Topografico de Espana, escala de 1:50,000," which are exhibited, are clear and good. The cultivated ground, waste, pasture and forest are all coloured differently and contours are laid down at very brief intervals. From the volume of "Memorias" accompanying these maps, we learn that the total number of sheets of this standard map of Spain is not yet settled, but that 559, embracing the larger portion of the country have been already published. A curious reproduction of the original map of the Straits of Magellan, as delineated by their discoverer, will be found in "Carta de los estrechos de Magallanes y le Maire." The Memoirs of the Geographical and Statistical Institute above referred to include, in Tome I., an amount of matter relating to every branch of trigonometrical and geodetical science and of great interest to officers engaged in such labours.

The largest collection of maps in the English Section is exhibited by Mr. Stanford, whose productions are of considerable merit. For specimens of printing we are shown some neatly-coloured geological and other maps prepared for Mr. Drew's work on Jummoo and Kashmir; and of lithography, the map of Khorassan, with parts of Irak, prepared by Mr. T. Saunders, to illustrate Captain Napier's travels in Northern Persia. The best specimens of engraving exhibited by Mr. Stanford are the Alpine Club map of Switzerland, with parts of neighbouring countries, scale 1:250,000, edited by C. Nichols, the hill-etching of which is excellent; the map of Sinai and desert of the Wanderings, compiled by Mr. T. Saunders for Dr. Smith's classical atlas; and the map of Modern London and Suburbs on the scale of 6 inches to the mile. We must observe that the omission of any date to this map (a common practice among English cartographers) is a serious fault.

A very quaint plan of London is exhibited in the same collection. It bears the title—"An exact delineation of London and Westminster and Suburbs thereof, together with y<sup>e</sup> Burrough of Southwark and all y<sup>e</sup> Throughfares, Highwaies, Streetes, Lane, Allies w<sup>thin</sup> y<sup>e</sup> Same. Composed by a Scale and ichnographically described by Richard Newcourt, of Somerton, in the Countie of Somerset, Gentleman." The buildings extend on the east to a point a little east of the Tower, and proceeding round from east to west the limits touch Shoreditch, Bunhill, Clerkinwell, St. Giles Fields, St. James Palace and Park (with deer disporting therein), and Tuttle (Tothill) Fields. Stanford's map of New Zealand, published by the Society for Promoting Christian Knowledge and the National Society, is very clear in outline, writing, and hill-drawing, and altogether is a good example of what an educational map should be.

Messrs. W. and A. K. Johnston deserve mention for their execution of "Case's Map of the United States, British Provinces, and Mexico, and part of W. Indies (1874);" and Mr. Bartholomew for a capital and varied collection of maps, among which his "Library Chart of the World on Mercator's projection" stands pre-eminent. The lines of ocean steamers are marked on this chart; the deep-sea soundings of the 'Challenger,' 'Tuscarora,' &c., are laid down; and, altogether, the production is carefully compiled. A plan of Edinburgh and Leith, and a reduced Ordnance map of Scotland, by the same firm, are good specimens of engraving.

It is much to be regretted that the Ordnance Survey and Admiralty and India Offices did not consider it worth while to exhibit any of their work. We also missed among exhibitors the name of one of the best of London map makers, Mr. Weller.

In the Italian section we noted a "Carta postale d'Italia con indicazioni dei capiluoghi di provincia e di cuondario, delle strade ferrate in esercizio ed in costruzione, e delle linee di navigazione, Ottobre, 1877. Scala 1:600,000." There is also a series of outline maps on the scale of 1:500,000, showing the national and provincial roads, (2) the railroads, (3) the telegraphic lines, and (4) the hydrographic details, ports, and lighthouses, information which might, without confusion, have been all embodied on one map. The last-named map shows also the extent of the various river basins, and the admirable manner in which the coasts of Italy, Sardinia, and Corsica are lighted. Of Sicily a finely-executed and detailed photo-lithographic reduction to the scale of 1:100,000 of the original survey was exhibited; and as regards geology, several maps of different portions of Italy were hung round the gallery, all being united in a smaller scale (1:600,000) geological map, constructed by the Reale Comitato Geologico. This map includes all Piedmont and N. Italy, Corsica, Sardinia, and Malta.

C. E. D. B.

## Log Book.

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### The Land Route between China and Siberia.

—Dr. E. Bretschneider, physician to the Russian Embassy at Peking, has recently communicated to the Bremen Geographical Society some notes on travelling through Mongolia between China and Siberia which are likely to be very serviceable to intending travellers along this route, especially since the Yenisei River promises to become a frequented thoroughfare into the heart of Asia. He says that in April, May, August, and September Siberian roads are apt to be very bad and that it is difficult then to do 20 versts a day, while in June and July Dr. Bretschneider, travelling as courier, has done 200 and even 240 versts in the twenty-four hours. In October and (still more) from November till March travelling is very trying owing to the extreme cold, which on the plateaux may be often expected to reach to 30 degrees (Reaumur) below zero. Such a time is ill adapted for researches into any branch of natural history except perhaps zoology.

The most important *vade-mecum* for travellers is a two (or four) wheeled Chinese wagon which may be generally purchased for 100 rubles in Kiachta but which travellers will do well to take the precaution of getting at Irkutsk. To these camels or horses are yoked and they serve to sleep in. The way between Kiachta and Peking may be divided into three sections, viz. that between Kiachta and Urga, which leads over hilly ground, from Urga to Kalgan across the desert of Gobi, and from Kalgan to Peking across Chinese territory. Along the entire route there are 70 stations, and the distance is 1560 versts, which in 1865 Dr. Bretschneider accomplished in nine days. The usual cost is about 240 rubles.

**Population of the Brazils.**—The *Notions de Chorographie du Brésil*, par Joaquim Manoel de Macedo, traduit de J. E. Halbout, Leipzig, gives, according to the *Proceedings of the Berlin Geographical Society*, the most authentic information concerning the population of Brazil. The estimate is based on the official figures of the Brazilian Ministry for 1872, and according to it the total population is 10,112,061 inhabitants, of which the slaves number rather more than a million and a half, the remainder being free.

**Abyssinia.**—The last number of the *Geographische Blätter*, published by the Society of Bremen, contains an interesting account of the actual condition of Abyssinia, by Herr Camil Russ; also a brief history of the turbulent state of that country from 1868, the period of the British expedition, up to the present time. In May last King Johannes was in Shoa, punishing King Menelek for his inroad into Central Abyssinia, and in the meantime the Governor of Hamazen, Wolde Michael, had invaded the Bogos country to the consternation of the Egyptians. It will be remembered that last year Camil Russ made an attempt to reach Enarea and Kaffa, south of Abyssinia, with a trading caravan, intending to reach the east coast of Africa, about the mouth of the Juba, but failed, and returned to Egypt in the beginning of March.

### Journey in Eastern Africa and Madagascar.

—Dr. C. Rutenberg, a young scientific traveller from

Bremen, has recently made an interesting journey through a portion of Eastern Africa and in the northern part of Madagascar. He started from Cape Town about May 1877, and made his way up country to Bloemfontein. From hence to Petermaritzburg he did not go by the regular post route but by a track which he followed on horseback across Basutoland over the Drakensburg Mountains, and by this means reached an interesting part of the country, from a geographical point of view, where the Maluti and Kahlamba mountains, which here form the escarpment of an extensive plateau, unite to the northward into the lower Drakensburg range. Dr. Rutenberg ascended this plateau which forms the water-parting between the Orange and Vaal rivers, which flow into the Atlantic, and the Tugela into the Indian Ocean. The height of the highest point ascended by the Doctor was, according to a trustworthy aneroid, 11,500 feet, whereas on the maps it is marked as 10,357 feet. From this plateau the above-mentioned rivers dash over perpendicular rocky cliffs down into the Orange Free State (5000 feet), and towards Natal on the other side, which lies about 3000 feet. Dr. Rutenberg detected many important inaccuracies in Teppe's new and pretty-looking map of the Transvaal. Dr. Rutenberg then crossed over and landed at Vohemar in Madagascar, and thence journeyed over to Yfassy (a route which has not yet been described), disproving the existence, as generally imagined, of a central range running longitudinally as far as this point. From Madzunga he made his way southward to Antananarivo, the capital, where about 100 Europeans live, and there are three missions. From hence he made an excursion to the Ankaratra mountain the highest in the island, and eventually returned to Vohemar after five months' absence.

### The Italian Expedition to Central Africa.

The June *Bollettino* of the Italian Geographical Society remarks that the statements made as to the failure and return to Khartum of Messrs. Gessi and Matteuci are, to say the least, premature, as the latest telegrams, dated 11th May from Khartum and 13th May from Massowah only mention that they have retraced their steps from Fadasi to Fazoklu, from whence they may very probably try to advance by different routes into the heart of the country.

## NOTICE.

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# MA B E R L I N

Geographical Magazine  
September, 1878.

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MAP OF  
**ARMENIA**  
to illustrate  
ARTICLES 58, 59, 60.  
of the Treaty of  
**BERLIN**  
Same scale as general map

A MAP SHOWING

THE  
GEOGRAPHICAL MAGAZINE.

SEPTEMBER, 1878.

THE TREATY OF BERLIN.

THE Treaty of Berlin, which was signed on the 13th of July 1878, has effected great and important changes in the political geography of the Balkan Peninsula. In our number for October 1876 (p. 258), at the time when Servia and Montenegro took up arms in the cause of their brethren who were struggling to free themselves from the Turkish yoke, we furnished our readers with maps and statistical tables showing the then political divisions of the Peninsula, the density of population, the nationalities, and the distribution of Muslims. This information marked the starting point for future changes, and the direction which they must inevitably take.

The failure of the Conference was the reason that these inevitable changes had to be effected by means of a sanguinary contest, instead of through peaceful negotiation. The forcible means, however, resulted in the changes being more thorough and more complete. Last autumn the war between Turkey and Russia was at its height, but by the end of the year the rotten fabric of Turkish dominion had fallen to pieces, and the Russian army was at the gates of Constantinople. In our number for October 1877 (p. 252) we gave a map of the seat of war, which covered the space from Shumla to Plevna and from the Danube to Philippopolis, including the Balkan range.

The Russians dictated a preliminary Treaty at San Stefano, the main effect of which was to free the Bulgarian people from the Turkish yoke, as well as a portion of old Servia, and to extend the boundaries of Montenegro. But nothing was done to deliver the Bosnians and Herzegovinians from their oppressors, or to emancipate the Greek populations. We gave a map showing the new boundaries as arranged by the Treaty of San Stefano, in our number for April 1878 (*facing* p. 101). Those boundaries, so far as they relate to Bulgaria, were drawn in accordance with Kiepert's ethnological map of the Balkan Peninsula.

This preliminary Treaty has now been superseded by the permanent Treaty of Berlin, which has secured the destruction of Turkish power in Europe, by adopting the "bag and baggage" policy of Mr. Gladstone. In his famous pamphlet on the Bulgarian massacres, the English Statesman declared that, while the military integrity of the Ottoman Empire ought to be maintained, every Turkish official must be expelled "bag and baggage" from the provinces of Bosnia, Herzegovina, and Bulgaria. The Treaty of

Berlin provides that Turkish officials shall be expelled "bag and baggage," not only from the provinces named by Mr. Gladstone, but also from the Sanjak of Nish, and from part of Thessaly, while Cyprus has also been freed from the horrors of Turkish misrule.

The change thus effected is one of great magnitude, and it is one which must lead, in a few years, to still more complete changes in the right direction—the direction of freedom and of justice. Two years ago Roumania and Servia were tributary States of Turkey; Montenegro, though ever free, was exposed to periodical attacks and devastation; while Bosnia, Herzegovina, Bulgaria, Nish, and Cyprus were groaning under the Turkish yoke. Now Roumania, Servia, and Montenegro are recognised as independent States with accessions of territory, Bosnia and Herzegovina are to be administered by a civilized European power, Bulgaria is to receive administrative autonomy, and Cyprus is also freed from the Turks.

According to the San Stefano Treaty, Bulgaria was to have formed one compact tributary State, with boundaries co-extensive with those indicated on Kiepert's map as enclosing the region in which the Bulgarians form the majority of the inhabitants. The change introduced by the Treaty of Berlin is mischievous and unjust. Instead of one compact State, there are to be two States somewhat differently constituted. The region between the Balkans and the Danube is to be called "Bulgaria," and is to be an autonomous and tributary Principality under the suzerainty of the Sultan, with an elected Prince, a Christian Government, and a national militia. But the Bulgarians south of the Balkans are to be under the political and military authority of the Sultan, with a Christian Governor-General appointed by the Sultan with the consent of the other Powers, and administrative autonomy. This province has received the absurd name of "Eastern Roumelia." Internal order is to be maintained by local police, the Sultan is not allowed to employ Circassians or Bashi-Bazouks in the frontier garrisons, the regular troops forming those garrisons may not in any case be billeted on the inhabitants, and in passing through the province they are not to be allowed to sojourn there.

The differences thus introduced between the condition of the Bulgarians north and south of the Balkans, though slight and unimportant, are mischievous so far as they go, for they furnish the germs of future discontent and disturbance. The same blunder was committed when Roumania was separated into the two Principalities of Wallachia and Moldavia,

while the people desired to form one nation. In that case the union was effected by the will of the inhabitants without bloodshed, and it is to be hoped that the evil done by this unwise severance of the two Bulgarias may hereafter be remedied in the same way.

The frontier of the new Principality of Bulgaria is thus defined by the Treaty of Berlin:—

“It follows, on the north, the right bank of the Danube from the former frontier of Serbia up to a point to be determined by an European Commission to the east of Silistria, and thence runs to the Black Sea to the south of Mangalia, which is included in Roumanian territory. The Black Sea forms the eastern boundary of Bulgaria. On the south the frontier follows upwards from its mouth the mid-channel of the brook, near which are situated the villages of Hodzakioj, Selam-Kiöj, Aivadsik, Kulibe, Sudzuluk, crosses obliquely the valley of the Deli-Kamcik, passes south of Belibe and Kemhalik and north of Hadzimahale, after having crossed the Deli-Kamcik at  $2\frac{1}{2}$  kilom. above Cengei, reaches the crest at a point situated between Tekenlik and Aidos-Bredza, and follows it by Karnabad Balkan, Prisevica Balkan, Kazan Balkan, to the north of Kotel as far as Demir Kapu. It proceeds by the principal chain of the Great Balkan, the whole length of which it follows up to the summit of Kosica.

“There it leaves the crest of the Balkan, descends southwards between the villages of Pirtop and Duzanci, the one being left to Bulgaria and the other to Eastern Roumelia, as far as the brook of Tuzlu Dere, follows that stream to its junction with the Topolnica, then the latter river until it meets the Smovskio Dere, near the village of Petricevo, leaving to Eastern Roumelia a zone with a radius of 2 kilom., above that junction, ascends between the brooks of Smovskio Dere and the Kamenica, following the line of the watershed so as to turn to the south-west at the level of Voinjak and reach directly the point 875 of the Austrian Staff map.

“The frontier line cuts at right angles the upper basin of the brook of Ichtiman Dere, passes between Bogdina and Karaúla, so as to rejoin the line of the watershed separating the basins of the Isker and the Marica, between Camurli and Hadzilar, follows that line by the summits of Velina Mogila, the ‘col’ 531 Zmailica Vrh, Sumnatica, and rejoins the administrative boundary of the Sandjak of Sofia between Sivri Tas and Cadir Tepe.

“From Cadir Tepe, the frontier, taking a south-westerly direction, follows the watershed between the basins of the Mesta Karasu, on the one side, and the Struma Karasu on the other, runs along the crests of the mountains of Rhodope called Demir Kapu, Iskoštepe, Kadimesar Balkan, and Aiji Gedük up to Kapetnik Balkan, and thus joins the ancient administrative frontier of the Sandjak of Sofia.

“From Kapetnik Balkan the frontier is indicated by the watershed between the valleys of the Rilska reka, and of the Bistrica reka, and follows the ridge called Vodenica Planina, descending into the valley of the Struma at the junction of this river with the Rilska reka, leaving the village of Barakli to Turkey. It ascends then south of the village of Jelesnica, and reaches by the shortest line the chain of Golema Planina at the summit of Gitka, and rejoins there the former administrative frontier of the Sandjak of Sofia, leaving, however, to Turkey the whole of the basin of the Suha reka.

“From Mount Gitka the western frontier goes towards Mount Crni Vrh by the mountains of Karvena Jabuka, following the former administrative limit of the Sandjak of Sofia in the upper part of the basins of Egrisu and of the Lepnica, ascends with it the crests of Babina Polana, and reaches at Mount Crni Vrh.

“From Mount Crni Vrh the frontier follows the watershed between the Struma and the Morava by the sum-

mits of the Streser, Vilogolo, and Mesid Planina, rejoins by the Gacina, Crna Trava, Darkovska, and Dranica Plan, then the Descani Kladanec, the watershed of the High Sukowa and of the Morava, goes straight to the Stol, and descends from it so as to cut the road from Sofia to Piro, 1000 mètres north-west of the village of Segusa. It ascends in a straight line the Vidlic Planina, and thence Mount Radocina in the chain of the Kodza Balkan, leaving to Serbia the village of Doikinci, and to Bulgaria that of Senakos.

“From the summit of Mount Radocina the frontier follows, towards the west, the crest of the Balkans by Ciprovec Balkan and Stara Planina up to the former eastern frontier of the Principality of Serbia, near to the Kula Smiljova Cuka, and thence that former frontier as far as the Danube, which it joins at Rakovitza.”

This arrangement finally destroys the military power of the Turks in the direction of the Danube. Before the war these invaders held the impregnable fortress of Shumla, the first-class fortresses of Widdin, Rustchuk, and Silistria on the Danube, and Varna on the Black Sea. In former wars these strongholds enabled the Turks to hold their own, and maintain their ground against the whole power of Russia. But henceforward the Danube waters will be neutral, all the above strongholds will be razed, Turkish officials will be removed “bag and baggage,” and the Bulgarian plains will cease to be the periodical theatre of desperate and indecisive conflicts. This alone is a clear gain for humanity.

The boundaries of the new province of “Eastern Roumelia” are thus defined by the Treaty of Berlin:—

“Starting from the Black Sea the frontier follows upwards from its mouth the mid-channel of the brook, near which are situated the villages of Hodzakiöj, Selam-Kiöj, Aivadsik, Kulibe, Sudzuluk, crosses obliquely the Valley of the Deli Kamcik, passes to the south of Belibe and Kemhalik, and north of Hadzimahale, after having crossed the Deli Kamcik at a distance of  $2\frac{1}{2}$  kilom. above Cengei, reaches the crest at a point situated between Tekenlik and Aidos-Bredza, and follows it by Karnabad Balkan, Prisevica Balkan, Kazan Balkan, to the north of Kotel as far as Demir Kapu. It proceeds by the principal chain of the Great Balkan, which it follows throughout its whole length to the summit of Kosica.

“At this point the western frontier of Roumelia leaves the crest of the Balkan, descends southwards between the villages of Pirtop and Duzanci—the one being left to Bulgaria and the other to Eastern Roumelia—as far as the brook of Tuzlu Dere; follows that stream to its junction with the Topolnica; then the latter river until it meets the Smovskio Dere, near the village of Petricevo, leaving to Eastern Roumelia a zone with a radius of 2 kilom. above that junction; ascends between the brooks of the Smovskio Dere and the Kamenica, following the line of the watershed so as to turn to the south-west at the level of the Voinjak, and reach directly the point 875 of the Austrian Staff map.

“The frontier line cuts at right angles the upper basin of the brook of Ichtiman Dere, passes between Bogdina and Karaúla so as to rejoin the line of the watershed separating the basins of the Isker and the Marica, between Camurli and Hadzilar; follows that line by the summits of Velina Mogila, the ‘col’ 531, Zmailica Vrh, Sumnatica, and rejoins the administrative boundary of the Sandjak of Sofia between Sivri Tas and Cadir Tepe.

“The frontier of Roumelia leaves that of Bulgaria at Mount Cadir Tepe, following the line of the watershed between the basins of the Marica and of its affluents on one side, and of the Mesta Karasu and of its affluents on the other, and takes the direction south-east and then

south along the crest of the Despoto Dagh Mountains, towards Mount Kruschowa (whence starts the frontier line of the Treaty of San Stefano).

"From Mount Kruschowa the frontier is the same as the line laid down by the Treaty of San Stefano, that is to say, the chain of the Black Balkans (Kara Balkan), the mountains Kulaghy-Dagh, Eschek-Tschepellü, Karakolas, and Ischiklar, from whence it descends due south-east till it reaches the River Arda, and follows the mid-channel of this river up to a point close to the village of Adacali, which remains to Turkey.

"From this point the frontier line ascends the crest of the Bestepe-Dagh, which it follows; then descends and crosses the Maritza, at a point situated 5 kilom. above the bridge of Mustafa Pasha; thence it takes a northerly direction by the line of the watershed between Demirhanli Dere and the small affluents of the Maritza to Küdeler Baïr, whence it runs east to Sakar Baïr; from this point it crosses the valley of the Tundza in the direction of Bÿjÿk Derbend, which is left to the north, as also is Soudzak. From Bÿjÿk Derbend it regains the line of the watershed between the affluents of the Tundza on the north and those of the Maritza on the south, up to the level of Kaibilar, which is included in Eastern Roumelia, and passes to the south of V. Almali between the basin of the Maritza to the south and the various streams which flow straight into the Black Sea, between the villages of Belevrin and Alatlî; it follows to the north of Karanlik the crests of Vosna and Zuvak, the line which separates the waters of the Duka and those of the Karagac-Su, and rejoins the Black Sea between those two rivers."

These boundaries include the Sanjak of Philipopolis, the scene of the horrible atrocities of 1876, which is thus for ever freed from Turkish misrule, and, after order has been established, from the recurrence of similar calamities.

The independence of Montenegro is recognised by all the great Powers of Europe, and by the Sultan; and thus the heroic struggle of four centuries is crowned with the success it has so nobly won. Moreover, the gallant mountaineers have driven the Turks from the frontier fortresses of Nicsics, Spuz, and Podgoritza; have secured for themselves a seaport in the Adriatic; and have extended their frontiers. Their new boundary, as finally arranged, is as follows:—

"Starting at Ilino-brdo, to the north of Klobuk, the line descends to the Trebinjcica towards Grancarevo, which remains to Herzegovina, then ascends the course of that river up to a point 1 kilom. below its confluence with the Cepelica, and from thence passes by the most direct line on to the heights which border the River Trebinjcica. It then proceeds in the direction of Pilatova, leaving that village to Montenegro, and continues along the heights in a northerly direction, maintaining as far as possible a distance of 6 kilom. from the Bilek-Korito-Gacko road, up to the 'col' between the Sominia Planina and Mount Curilo, whence it proceeds in an easterly direction by Vratkoviç, leaving this village to Herzegovina, up to Mount Orline. Starting from this point, the frontier, leaving Ravno to Montenegro, goes straight to the north-north-east, crossing the summits of the Lebersnik and of the Volujak, then descends by the shortest line on to the River Piva, which it crosses, and rejoins the River Tara, passing between Crkviça and Nedvina. From this point it ascends the Tara to Mojkovac, from which place it passes along the crest of the ridge as far as Siskojezero. Leaving this point, it coincides with the former frontier as far as the village of Sekulare. From there the new frontier passes along the crests of the Mokra Planina, the village of Mokra remaining to Montenegro; it then reaches the point 2166 on the Austrian Staff map, following the

principal chain and the line of the watershed between the Lim on the one side, and the Drin as well as the Cievna (Zem) on the other.

"It then coincides with the existing boundaries between the tribe of the Kuci-Drekaloviç on one side, and the Kucka-Krajna, as well as the tribes of the Klementi and Grudi, on the other, to the plain of Podgorica, from whence it proceeds towards Plavnica, leaving the Klementi, Grudi, and Hoti tribes to Albania.

"Thence the new frontier crosses the lake near the islet of Gorica-Topal, and, from Gorica-Topal, takes a straight line to the top of the crest, whence it follows the watershed between Megured and Kalimed, leaving Mrkoviç to Montenegro, and reaching the Adriatic at V. Kruci.

"On the north-west the frontier will be formed by a line passing from the coast between the villages of Susana and Zubci, and terminating at the extreme south-east point of the existing frontier of Montenegro, on the Vrsuta Planina."

Thus Montenegro receives the seaport of Antivari and the coast belonging to it; as well as full and entire liberty of navigation on the Boyana, and the lake of Scutari.

Two years ago Serbia declared war upon the Turks, with the object of assisting her compatriots who were engaged in an unequal struggle against their oppressors; and though unable to stand up against the whole strength of the Ottomans, and beaten down for a time, she once more drew the sword and advanced in aid of the Russian army. Free Serbia is bound to take every opportunity that occurs to emancipate old Serbia from Turkish misrule, and the wisdom of her policy is shown by the result. She now ceases to be a tributary State, and all the Powers of Europe have recognised her complete independence. Moreover, she receives a large accession of territory, including the Sanjak of Nish, and comprised within the following boundaries:—

"The new frontier follows the existing line ascending the mid-channel of the Drina from its confluence with the Save, leaving Mali Zvornik and Sakhar to the Principality, and continues to follow the former boundary of Serbia as far as the Kopaonik, leaving it at the summit of the Kanilug. From that point it follows at first the western boundary of the Sandjak of Nish by the southern spur of the Kopaonik, by the crests of the Marica and Mrdar Planina, which form the watershed between the basins of the Ibar and Sitnica on one side, and that of the Toplica on the other, leaving Prepolac to Turkey.

"It then turns to the south by the watershed between the Brvenica and the Medvedja, leaving the whole of the basin of the Medvedja to Serbia; follows the crests of the Goljak Planina (which forms the watershed between the Kriva-Rjeka on one side and the Poljanica, Veternica, and Morava on the other), as far as the summit of the Poljanica. It then follows the spur of the Karpina Planina as far as the confluence of the Koinska and the Morava, crosses this river, and ascends by the watershed between the Koinska brook and the stream which falls into the Morava near Neradovce, to gain the Sveti Ilija Planina above Trgoviste. Thence it follows the crest of the Sveti Ilija as far as Mount Kljuc, and passing by the points marked 1516 and 1547 on the map, and by the Babina Gora, it reaches Mount Crni-Vrh.

"From Mount Crni-Vrh, the new delimitation coincides with that of Bulgaria, that is to say:—

"The line of frontier follows the watershed between the Struma and Morava by the summits of Streser, Vilogolo, and Mesid Planina, rejoins by the Gacina, Crna Trava, Darkovska, and Drainica Planina, then the Descani Kladanec, the watershed, of the High Sukova and

of the Morava, goes straight to the Stol, and descends from it so as to cut the road from Sofia to Pirot at a point 1000 mètres north-west of the village of Segusa. It ascends in a straight line the Vidlic Planina, and thence Mount Radocina in the chain of the Kodza Balkan, leaving to Servia the village of Doikinci, and to Bulgaria that of Senakos.

"From the summit of Mount Radocina the frontier follows towards the north-west, the crest of the Balkans by Ciprovec Balkan and Stara Planina up to the former eastern frontier of the Principality of Servia, near to the Kula Smiljova cuka, and thence follows that former frontier as far as the Danube, which it rejoins at Rakovitzta."

The Roumanians, whose conspicuous gallantry and devotion in the recent war have received universal recognition, gain for themselves complete independence; and, while giving up to Russia the portion of Bessarabia detached from that power by the Treaty of Paris in 1856, they receive in exchange the islands forming the delta of the Danube, the Sanjak of Tulcha, and the territory south of the Dobruja as far as a line drawn from Silistria on the Danube to Mangalia on the Black Sea.

Bosnia and Herzegovina are to be occupied and administered by Austria, and are thus rescued from Turkish misrule, while the Austrians reserve the right of keeping garrisons and having military and commercial roads in the Sanjak of Novi-Bazar.

The great blots in the Treaty of Berlin are the handing over of Bosnia and Herzegovina to Austria, and of Lazistan to Russia, without the consent of—and against the wishes of—the inhabitants, and the abandonment of the cause of the Greeks. It is true that a rectification of the Greek frontier is suggested, the new line following the valley of Salamyrias (the ancient Peneus) on the side of the Ægean Sea, and that of the Calamas on the side of the Ionian Sea. But there is obvious insincerity in the clause which contains this suggestion, while the brave Cretans, who have been so gallantly struggling for their freedom, are shapefully handed over to Turkish misrule. The unjust treatment of the Greeks is as short-sighted as it is dishonourable, and ensures the re-opening of the Eastern question in the near future.

But on the whole the Treaty of Berlin has made a very great and beneficial change in the political geography of Eastern Europe. Three independent States have been recognised with extended frontiers, a tributary Principality and an autonomous Province have been created, and two large and rich, but long-misgoverned Provinces have been placed under the rule of a civilized Government, while the whole of these territories have been for ever rescued from the anarchical oppression of the Turkish invaders. A very few years will mark the beneficial effects of these changes, by the increasing population and material prosperity, and by the revival of trade and agricultural enterprise.

In Asia the Russians have acquired additional territory, which includes Kars and the port of Batoum. The new Armenian boundary is thus defined:—

"The Sublime Porte cedes to the Russian Empire in Asia the territories of Ardahan, Kars, and Batoum, together with the latter port, as well as all the territories comprised between the former Russo-Turkish frontier and the following line:—

"The new frontier starting from the Black Sea, and coinciding with the line laid down by the Treaty of San

Stefano as far as a point to the north-west of Khorda, and to the south of Artwin, continues in a straight line as far as the River Tchoroukh, crosses this river and passes to the east of Aschmichen, going in a straight line to the south so as to rejoin the Russian frontier indicated in the Treaty of San Stefano, at a point to the south of Nariman, leaving the town of Olti to Russia. From the point indicated near Nariman the frontier turns to the east, passes by Tebrenek, which remains to Russia, and continues as far as the Pennek Tschaï.

It follows this river as far as Bardouz, then turns towards the south, leaving Bardouz and Jönikiy to Russia. From a point to the west of the village of Karaougan, the frontier takes the direction of Medjingert, continues in a straight line towards the summit of the mountain Kassadagh, and follows the line of the watershed between the affluents of the Araxes on the north and those of the Mourad Sou on the south, as far as the former frontier of Russia.

"His Majesty the Emperor of Russia declares that it is his intention to constitute Batoum a free port, essentially commercial.

"The valley of the Alaschkerd and the town of Bayazid, ceded to Russia by Article XIX. of the Treaty of San Stefano, are restored to Turkey.

"The Sublime Porte cedes to Persia the town and territory of Khotour, as fixed by the mixed Anglo-Russian Commission for the delimitation of the frontiers of Turkey and of Persia."

#### RICHTHOFEN ON PREJEVALSKY'S JOURNEY IN CENTRAL ASIA.

Six hundred years ago Marco Polo told of the horrors of the desert of *Lop*, of which Europeans had not previously heard. From *Cotam* (Khotan) the great traveller had made his way past *Pein* and *Ciarcian* (the site of which has, of late years, been fixed by Colonel Henry Yule), through deserts where thinly populated places lay at intervals, till he reached the town of *Lop*. "*Lop*," he says, "is a large town at the edge of the desert which is called the desert of *Lop*. It belongs to the great *Kaan*, and the people worship *Mahommet*. Now, such persons as propose to cross the Desert, take a week's rest in this town to refresh themselves and their cattle, and then they make ready for the journey, taking with them a month's supply for man and beast. On quitting this city they enter the Desert." For thirty days the Venetian journeyed through the shifting sand, and its horrors, both real and imaginary, are described in a highly vivid manner by him. From this time the "*Desert of Lop*" had a permanent place on the maps, but its precise locality was unknown. The Jesuits, on the strength of native information, were surprisingly near the truth in their map of Central Asia, subsequently published by D'Anville, in 1735, in Du Halde's great work. For the first time *Lop-Nor* appeared as a basin without an outlet, into which the rivers of *Yarkand*, *Kashgar* and *Karashar* flowed, lying S.E. of *Turfan*, 109° E. of *Ferro*, and in 42½° N. latitude. A correction of its delineation was made by the Fathers *D'Arocha*, *Espinha* and *Hallerstein*, whom the Emperor *Kien-Lung* despatched to make a map of the enormous region subjugated by him as far as the *Pamir* and *Ili*. They based it on a number of astronomical positions, and compiled the remainder of the map from itineraries and existing Chinese maps.



About the same time many references to Lake Lop, and the historical importance of the adjoining regions were found in Chinese literature. De Guignes was the first to accumulate these in his History of the Huns. The Chinese had never been able to understand how so many streams could suddenly come to an end in the lake, and were persuaded that they must re-appear elsewhere. It was an old and almost hallowed supposition that the Yellow River rose in the Kuen Lun. But at the time that geography received an impulse in the time of the Han dynasty (207 B.C.—221 A.D.), people were unacquainted with these mountains and had not followed the Yellow River to its sources. When General Chang-kien, on the return of the expedition to the West, related how he had found the Kuen Lun south of *Yutien* (Khotan), it was immediately concluded, in spite of the audacity of the theory, that the waters flowing from thence into Lake Lop must dive into the earth and re-appear somewhere in the unexplored mountain region as the Yellow River. Later on the sources of the latter were found in Hsing-su-hai or the Sea of Stars, about 500 geographical miles from Lake Lop, and probably about 10,000 feet higher. The old theory still endured, however, and has survived to the present day in the Hsi-yu-ki, or Description of the Western lands, where it is stated that "east and south-east of Lop-Nor there is an innumerable number of springs which, seen from a height, resemble a sea of stars, and which are evidently a great river that flows underground. To the east are sand hills, and to the south-east is a steppe extending for 1000 *li*." The Yellow River, too, rises in a wide steppe basin where the great number of lakes has given it the name of Sea of Stars.

The results of the operations under Kien-Lung and all native geographical information were worked up by Klaproth, especially in his map of Central Asia, which appeared in 1830, and which formed the basis of Humboldt and Ritter's further researches. The first determined most shrewdly the probable height of several places, and assigned 2000 *toises* as that of Lop-Nor. Its geographical position was placed about 3° further west, and nearly 2° further south, than by D'Anville (*i.e.* 88½° E. of Greenwich and 40½° N. latitude at the point where the Tarim enters it). With few modifications this position was universally accepted by geographers, the position of the lake in the centre of an unapproachable region having effectually prevented any traveller from reaching it.

Slowly was the barrier broken through from the west. After that Russian explorers had begun in 1857 to investigate the Western Tian-Shan and its hydrography: Johnson in 1866 accomplished his important journey to Ilchi, the capital of Khotan. Hayward and Shaw soon followed with their visit to Kashgar, and other English travellers investigated the Tarim river system to the west and south-west. The entire basin of the stream proved to extend over a larger area than those of any other known stream. A wide semi-circle of mountains with ridges between 18,000 and 20,000 feet in height, and peaks attaining 25,000 and even 28,000 feet in height surrounded, it on three sides, while the intervening depression sloped from a height of 6000 feet at the edges to about 2000 feet above sea level at the lowest point in the centre.

This depression is part of an ancient sea into which flowed streams down the declivities encompassing it

on the southern, western and northern sides. The winds blowing from every direction deposited their moisture on the outer sides of the surrounding ranges, and the streams formed thereby, breaking through the mountain ranges, converged into the old ocean bed. The more insignificant lost themselves in the sand, others flowed further and spread themselves over a flat, salt basin and were there absorbed; while the larger, reckoned at about sixty in number by the Chinese, united themselves in the Tarim, a river which in point of length ranks between the Rhine and Danube, but exceeds both in the massiveness of its surrounding mountains, just as it exceeds the Danube in the extent of its basin. Its tributaries created a number of oases along the feet of the mountains, which were fertilised by the drainage of the mountains, and played an important part in the history of these regions. The exploration of the more western of these from Kiria and Khotan to Kashgar lent additional interest to the lake wherein all the drainage converged. People learnt from native information of a place as well as a lake called Lop. But many points in the problem remained undetermined, and especially the position of the lake, although endeavours were made to fix its position from the various itineraries leading thereto from different directions. Shaw reckoned the lengths of the daily journeys too short and the sinuosities of the road as much too great, and so arrived at the conclusion that the lake lay in reality from 4½ to 5 degrees of longitude further west than it was placed on the maps. He reckoned the days (see *Proceedings R.G.S.* xvi., p. 243) at 20 miles, and deducted about one-third for sinuosities, bringing the net amount of ground covered *per diem* at 11½ geographical miles, whereas 21 geographical miles, and one-seventh for sinuosities (as the crow flies) is a truer allowance, making the distance *per diem*, 18 geographical miles. Yule reduced this westerly shifting to three degrees, while others hesitated to accept this removal at all in the face of the general accuracy of the Jesuit maps. The formation of the ground was another matter of uncertainty. The height above the sea of the lake was very probably about 2000 feet, but the surroundings were all involved in doubt. Until some months ago the opinion prevailed that the lake lay in a huge basin and was as far removed from the southern mountain range encompassing the basin as from the Tian-Shan. Without a sufficient regard for the Chinese accounts, all maps gave the diameter of the basin at about 330 geographical miles. A map reproduced on a reduced scale by Baron von Richthofen in his work on China, and compiled from Chinese information, shows the mountain mass south of Lop-Nor pretty correctly as extending up to beyond the 39th parallel, and reduces the breadth of the basin about the 88th meridian to about 100 geographical miles.

Prejevalsky had been attracted to the subject during his journey in Tsardam, when he had crossed a river, by following which, up stream, people would arrive at a country where there were wild camels, and could reach Lop-Nor without difficulty. His accomplishment of this journey belongs to one of the most important geographical feats of modern times. Taking his discoveries one by one the first one that claims notice is the *Little Yuldus plateau*. From Chinese maps and works it appears that the structure of the



Tien-Shan, in parallel chains running from W. by S. and E. by N., is broken by two plateaux running W.N.W. and E.S.E. and known as the Great and Little Yuldus. It was also known that the latter of the two lay on a formerly-frequented route, and that it was covered with luxuriant pasture. In the fifteenth century, the embassy which Shah Rukh, the son of Timur, sent to the Chinese Court, took their outward journey by way of the Yuldus which was described by the physician of the party. The Chinese often mention both plateaux, and inform us that Yuldus means "star." Prejevalsky confirms and completes former information and gives us a very lucid description of the tract. From the Kunges valley, which he ascended to the height of 4000 feet, he crossed over a pass 6000 feet high into the equally high Tsanma valley, which to the south was shut in by a quasi-Alpine range called Narat, over the pass of which he descended into the lower end of the Little Yuldus (7-8000 feet), which in consequence of the Dungan rebellion had been abandoned, although eleven years ago Turguts (11,000 *kibitkas* strong) had dwelt here. The Great and Little Yuldus are divided by a lofty range rising above the snow-line and running W.N.W. and E.S.E. On the north side the system of parallel ranges peculiar to the Tian-Shan appears to set in. A road leads hence to Urumtsi, and according to the Chinese map, appears to cross the Tangri-ula mountain chain by the Ulan-Sadak-dabaghan pass. Where Prejevalsky to the north found the Odonkure mountain, on the Chinese map, we find Odungkur-dabaghan. To the south also the inhabitants appear to recognise the existence of passes as the four names there given by Prejevalsky are coupled with the word *daban*. To the east, according to the Chinese map, two passes lead from the plateau, the Khabtchil-dabaghan or "Ravine pass" and the Dalan-dabaghan or "Seventy passes." The position and description of the first appear to correspond to the one Prejevalsky crossed, the height of which is given as 9300 feet. The ravine, 40 versts long, through which the Khabtsagai-ghol river runs, correspond probably to the Khabtchil-gool of the Chinese map. After this follows the ravine or valley, 22 versts long, of the Balgantai-ghol, and the traveller next came to the Khaidu-ghol at a height of 3400 feet. The mountain slopes on the south side are bereft of all vegetation, and a contrast to these on the north, suggesting to Prejevalsky's mind an idea of lifelessness.

*The Kuruk-tagh Mountains.*—Without visiting the town of Karashahr and the neighbouring large lake of Bostang-Nor (as it is called on the Chinese map—Prejevalsky calls it Bagarash) into which the Khaidu-ghol flows, the traveller turned southward and reached the not very high, arid, and sterile range called Kuruk-tagh. Hitherto it has appeared as Kurungletak on our maps, a name derived from Korla or Kurungle, a town on the south side thereof, which Prejevalsky visited. The Kaidu-ghool which leaves the lake a little above, breaks through the range in an extraordinarily narrow gorge, 10 versts long. The Chinese work descriptive of the western countries referred to above (probably compiled by Hsii-Sung in 1821) says: "The river flows for 100 *li* in a south-west direction, turns and flows south through the mountains, and for a short distance beyond it, after which it bends to the west. Here it passes the

ancient coal mine opened by the Governor Yung-kung-kin in 1815. It flows then further westward and about half a *li* south of Khalgo-aman-kuentai." This is one of the forts described by Prejevalsky. The river now enters a narrow, dreary gorge, which is depicted in very gloomy and picturesque language by the Chinese author. This gorge which played an important part in the history of Chinese conquests bore for a time the name Tie-monn-kwan or pass of the Iron Gate. On the south side there stood a fort built of clay. Korla, visited by the travellers, lies, according to the Chinese accounts, 150 *li* south-west of Karashahr and has a population of 700 families, the people being described as lazy, slow, quarrelsome and uncultivated. Rice, wheat, grapes, melons, fruit, fish, crabs, wild geese, ducks, herons, &c., are mentioned as products.

These explorations throw light on the strategical value of the gorge in the Kuruk-tagh, and on an episode in Chinese history. Immediately north of Khalgha-aman, and probably to one side of Prejevalsky's route, we find on the Chinese map "Ruins of an old town," which, from other sources, we conclude must have been Ului-chong, which, at the time of the Han dynasty, was the seat of the Governor-General of Hsi-yue or East and West Turkestan. In the Han annals the distance of every place to the west is always given, reckoning from Ului as the most important place. We now see that its position enabled its ruler to afford protection to the caravans against the unruly tribes on the southern slope of the Tian-Shan.

3. *Character of the Desert.*—Along a southern slope of the Kuruk-tagh there extends a strip of ground between 20 and 25 versts in breadth, covered with flints and gravel. Prejevalsky considers it to be the shore of a former sea. Then follows the immense extent of the desert of the Tarim and Lop-Nor, which has a twofold character, being composed of a thin loam impregnated with salt on the west and shifting sand on east. On these points, however, Baron von Richthofen does not make any remarks. But with regard to the—

4. *River System*—he observes that the map south of Korla assumes a totally new aspect; only the great western bend of the Khaidu-ghol, which Prejevalsky here calls Konche-daria, having been previously known, and this being probably more important even than it is now made out. It does not, as shown on the Chinese maps, reach the Tarim about three-quarters of a degree south of Korla, but makes a bend eastward and then flows southward to join the complicated network of the Tarim. While Korla proves to be only 5 minutes further north and 8 minutes further west than hitherto supposed, Lop-Nor, contrary to Shaw's arguments, assumes a more south-easterly position.

5. *The Altyn-Tag Mountains.*—Baron von Richthofen remarks of the discovery that it is one of the greatest importance, both for geography and for the history of Central Asian intercourse. Now one can understand why the old silk traders in their route to the western countries journeyed so close to the south of Lop-Nor, although here lay the dreaded deserts between Sha-chow and the lake; for to the south the road was blocked by mountains. It is clear a road lay in that direction as well, but it was but little

used, probably on account of its great difficulties. Armies and caravans always journeyed through the Lin-lan or Shan-shen kingdom, which lay on the south bank of the lake. Other points in ancient history are cleared up by the same means. At the time that the Chinese, under the Han dynasty, were first directing their gaze to the west, Shang-kien on his return in 127 B.C. from his remarkable expedition to Ferghana and the lands about the Oxus, found the whole country, as far as the Salt Lake or Lop-Nor, in the hands of the Hiungnu, whose possessions extended as well over wide tracts in Mongolia. He therefore endeavoured, on his return, to make a way through the country, which, to the south joins the Tibetan country of Kiang, in order not to fall into the hands of the Hiungnu. Shortly after, in 121 and 119 B.C., Chinese troops, under the young leader Ho-kin-ping, penetrated for the first time into the regions to the west, and found the right wing of the Hiungnu settled on the Salt Lake and the Ping-nan mountains, (*i.e.* the mountainous region south of the plain). This statement was incomprehensible as long as extensive plains were believed to lie south of the lake, whereas now it is clear that they could have complete control and oppose the movements of caravans and armies between the east and west.

6. *Lop-Nor*.—It is remarkable that Prejevalsky found the lake much further south than the Chinese accounts and maps made it out to be, and that the water proved to be fresh instead of salt. The first lake, Karabunan, appears to be merely a preliminary fresh water basin, the water of which only undergoes any change in summer through evaporation. But the statement that the water in the second basin, which corresponds to the true Lop-Nor, is fresh, is, Von Richthofen points out, most surprising. The region through which the Tarim flows is highly charged with salt, the saltish water borne down must have been subjected for centuries past to a high evaporation, and the Chinese during all time have called Lop-Nor *the Salt Lake, par excellence*. Richthofen suggests as possible explanations, that the river bed, like that of the Po and Hoang Ho, being upraised above the level of the surrounding country, has consequently diverged from its eastern course, as shown hitherto on our maps, and that the two lakes at its mouth are of recent origin, the older one to the north-east having dried up in the course of time. A third and likelier explanation suggested by Von Richthofen is that besides the two lakes seen by Prejevalsky there remains a third lake communicating with the Tarim by means of an arm. He observes that a wide experience of Chinese maps has convinced him that though they are characterized by a paucity of detail nothing is ever laid down thereon that does not actually exist. (Would that Europeans had arrived at the same perfection of geographical science!) From the place of confluence of the Ugen-daria and Tarim as given by Prejevalsky on his map, taking it with reference to its distance from Korla on the Chinese map, a road (apparently identical with the one followed by Prejevalsky) leads in a southerly direction. The same map shows no indication of a road running on the eastern side of the river (as Prejevalsky's does), and makes the latter flow almost due east into a large lake, apparently not seen by Prejevalsky, and cut into two unequal parts by the

forty-first parallel of latitude. This lake is called on the Chinese map Lop-tchor or Lop-Nor, and about it lie seven small lakes, the northern of which are called *tsan-hu* (grass or reed lake), and the southern by various names. The map also shows further to the south-east and wholly unconnected with the Tarim, another lake called Khas-omo, the centre of which lies about 3 degrees east and  $1\frac{1}{2}$  degree south of Korla, only a little way from the place where Prejevalsky places the Kara-kochun. On the same map there is a second lake without a name westward of the Kara-kochun, but it is not to be found on older maps. Koshun is, etymologically considered, not unlike Khas. Khas-omo is Mongolian, and means Nephrite-lake, probably referring either to the colour of the waters or to the fact of the nephrite trade route lying in that direction. The Turks say *Kash* instead of *Khas*, and *Kara-Kash* is the name for the common sort of nephrite, so that Kara-koshun (black Koshun) might well be derived from the Mongolian Khas. The Chinese also called the district Kara-Huo-tchou, which they pronounce Kara-khocho.

Baron von Richthofen's conclusion, therefore, is that the Tarim formerly had only one bed, and that lay to the east towards the true Lop-Nor, but that later on a branch diverged to the south-east from the place where the Ugen-daria now joins it, and that this, flowing into the Khas lake, became the principal stream, and the Khas lake the chief reservoir.

The following arguments point to the same conclusion:—

(a) The Chinese maps represent plains south of Lop-Nor, but mountains south of the Khas lake, and these, with reference to the positions of Prejevalsky's lake and of Korla, occupy the same place that the Altyn-Tag mountains do.

(b) South of Lake Khas they show the road eastward to Sha-chow and another road leading southward to Tibet just as Prejevalsky does.

(c) Prejevalsky found that the name of Lop-Nor, which according to the information collected by Shaw, Forsyth and others is well known far and wide, was not applied by the natives to the two lakes he discovered, which leads one to imagine that he took the wrong direction, *i.e.*, one west of the true Lop-Nor.

(d) The combination of historical data regarding the former trade-route from China to the West points tolerably clearly to the conclusion that the region of the true Lop-Nor was not touched by it, and that it led to the south and west of Khas-omo, so that there, and not by Lop, must the kingdoms of Lin-lan, Shan-shen, &c., have been situated, which, in the course of history, were described as in the neighbourhood of the "Salt Lake."

(e) A last argument is based on the mass of water borne by each stream, and this shows that the river, when joined by all its tributaries, is considerably smaller, apparently less than half the aggregate of the different streams. As Prejevalsky travelled between the two arms, it is possible that the eastern arm sends a portion of its waters through a channel unseen by him into a basin to which the name Lop-Nor more rightly belongs.

It is therefore probable that Prejevalsky has not completely solved the problem of Lop-Nor.

(To be continued.)

## ABYSSINIA.\*

THE highlands of Abyssinia form a series of terrace-shaped plateaux between six and nine thousand feet above sea level, which on the one side are over-topped by lofty ranges and isolated conical peaks, and on the other side are seamed by numerous ravines caused by the drainage of ages. In their lower course these ravines become narrow valleys exposed to a tropical sun and shut out from the healthy action of the breezes, and so breed miasmatic influences which deter settlers. The higher valleys and table-lands, on the other hand, enjoy a much healthier atmosphere and more equable climate, and are studded with villages and hamlets shaded with clumps of trees and perched, now on an eminence and, now, nest-wise, on the extreme edge of a perpendicular cliff. The rainy season usually lasts from the middle of June to the middle of September, and agreeably tempers the heat which at the height of 6000 feet seldom falls below 18° or rises above 32° Centigrade. At a higher elevation thin ice is not unfrequent at night, but snow is quite unknown, although the loftiest peak of the Semien mountains (upwards of 15,000 feet high) is for a brief season covered with encrusted hailstones, and ice is to be found in clefts on its northern side for ten or eleven months in the year.

The geological structure of the country is not complicated, the base being uniformly granite, while the overlying metamorphic slate is frequently broken through by eruptive masses of porphyry, trachyte and less often greenstone, close to which eruptions, quartzite and other veins indicate the probable mineral wealth of the country. Coal measures crop out in the Chelga district to the west of Gondar, on the Sassela river, north-east of Sokoto, and to an important extent along the eastern boundary of Shoa. Abyssinia has no volcanoes, though earthquakes are not unfrequent and numerous hot mineral springs give evidence of volcanic activity.

The varying heights are characterised by a corresponding variety in the fauna and flora, and, in a comparatively limited expanse, Abyssinia can boast of all the products of the three zones. In the lowlands of Kolla, cotton, indigo, ginger, and tea grow wild, while the table-lands grow cereals and other European products. In timber the country is very poor, and though the remains of juniper and olive woods are to be seen on the mountains, it is only in the ravines and valleys that any abundance of timber is to be found. Hyænas, jackals, hares, water-fowl and partridges are tolerably abundant on the highlands and common on the lower levels.

The population of Abyssinia, including the Galla tribes of Shoa, according to an enumeration made by King Theodore in 1860, amounts to twelve millions, consisting mainly of Christians, Muhammadans and Pagans—these last among the Gallas and Shangalas to the south and west. Besides these there are a few Jews in Amhara. The principal language is the Amhariaña, which is derived from Göez, a tongue

\* By Herr Camill Russ, a traveller well acquainted with the customs and languages of Abyssinia and the Galla country, and who proposes, if possible, to renew further attempts of his to follow the caravan route from Enarea and Kaffa and to reach the coast to the south-east. (*From the Geographische Blätter of the Bremen Geographical Society.*)

having a near kinship with Arab and Hebrew. About the countries to the south and south-west but little can be ascertained from the traders. The trade route goes from Baso, on the Blue Nile, to Guderu, which is tributary to Gojam and, further on, to Chima and En Narea, where a great Sultan rules and the people speak the Galla dialect, and thence to Kaffa, which is the mart, or rather limit. This country is inhabited by Christians, is governed by a King, and gold there is not much dearer than silver. The Abyssinian towns usually have markets which are held once a week in the suburbs. At least one church is to be found in each city even when the inhabitants are mostly Muhammadans. There are but few towns of any commercial importance, and these are generally frontier towns or towns where two or three routes converge. Sokoto, the capital of the province of Lasta, is the most important, and is situated at the point where several routes meet, viz, those to the north to the coast, to the salt-mines of Arrho to the east, to the south towards the eastern Gallas and Shoa, and lastly to the west towards Amhara and Gojam. Baso is the principal mart of Gojam, Gondar, which has 44 churches and 12,000 permanent inhabitants, of the Amhara country, and Adua, with its 4000 inhabitants, of the Tigree country. This last town is on the route from Gondar and Sokoto to Massowah and is of importance to European traders.

The Abyssinians are naturally given to agriculture and have been so since the earliest times, but, notwithstanding that, only about four per cent. of the culturable land is actually under culture. Any one can clear a plot of waste land and proceed to plough it up, and this constitutes an irrevocable title thereto. Their wooden ploughs are of the most primitive construction, and are driven solely by oxen. The harvest is a slow business, and it usually takes from eight to ten reapers three days to reap a field of half a hectare. The threshing or process of treading out the corn by oxen and cows is equally tedious. Manuring is quite unheard of, as the droppings are dried and used for fuel. Irrigation can be very easily resorted to in the uplands, and three harvests in the year can by this means be secured, but the natives lack the knowledge and experience to put it into practice. Cattle are tolerably plentiful, as the waste tracts afford more pasturage than enough; goats are only to be found in the lowlands and sheep in the uplands. Horses are mostly to be found among the Amhara and Galla inhabitants, while mules are bred in pretty good numbers in Hamazen, Lasta, and Gojam. The wheat principally grown is the *Poa Abyssinica*, which is cultivated throughout the whole of Abyssinia and in the southern Galla country. It gives a light digestible bread, which forms the chief subsistence of the people. Barley and leguminous plants are largely cultivated, and bear a dry heat well. Peas and beans, pounded and cooked, form the holiday food. Potatoes were introduced by the Naturalist, Dr. Schimper, and flourish excellently, but their cultivation is nevertheless neglected by the natives. Cotton (*Gossypium arboreum*) is confined to a few low-lying districts in Wolkait and Yedshu; and coffee is grown chiefly in Western Galla and Shoa. Tobacco is cultivated everywhere, but sparingly; indigo is found wild in large quantities and exuberance at Barezza, not far from Massowah, and valuable timber trees and several species of fruit

trees abound in the valleys; sugar and rice only need to be introduced to flourish.

Commerce is unimportant compared with the size, population, and productiveness of the country. The rivers are numerous but not navigable, while during the rains they are swollen to torrents, and the bleak mountains and deeply-cut valleys make travelling a difficult and tardy matter, bridges and roads being unknown. All goods are carried either on the shoulders or on a beast of burden—asses and mules more rarely—horses being generally used. Camels cannot be employed, owing to the stony ground. The exports consist chiefly of ivory, coffee, gold from the Galla country, raw and prepared hides and skins, and wax; the northern provinces towards Massowah yield butter and honey in small quantities. Until recently the slave trade with the Galla country was extensive, and the route thereof lay between Baso, the mart, Matamma and the Sudan; but now, although the Abyssinians own many Galla slaves, a slave cannot be sold for a third of its former price. Horses are brought in large numbers to the Sudan; mules are seldom taken further than Massowah. For safety sake the merchants travel in caravans. The traders from the Galla country bring their goods generally to Baso, and exchange them for European articles; at other times they take them *viâ* Gondar and Sokoto to Massowah, or by way of Matamma into the Sudan. The caravans from Shoa often come to Sokoto and even to Massowah. Besides the difficulty of the roads, the frequent stoppages for tolls form a great obstruction to trade, and the traders are furthermore compelled to submit to the will of the toll collector who squeezes the merchants as much as he can. Under these circumstances a caravan considers itself lucky if it accomplishes the journey from Gojam to the coast and back, a distance of under 500 miles, within the year. The European goods imported comprise chiefly calicoes, cottons, light silks and silky stuffs, wine flasks called *berille*, red morocco leather for saddles, snuff, incense, and spices, which last three items are exclusively in the hands of the Banyas. Raw cotton is mostly exchanged for coffee in Matamma. The trade in salt is of some importance. The mineral is found on the surface in the plain of Arrho east of Enderta and south of Zulla. The Taltals, who monopolise the trade more and more, bring the salt to Sokoto where it gets dispersed in various directions. The north-eastern provinces use salt from the coast.

The only current coin is the Maria Theresa dollar; and the diadem and the clasp on the shoulder must be clear in the impression, or else it will not pass. In the Amhara country bars of salt about 8 inches long are used as a lower currency, and their value varies with the distance they have travelled. In Tigree long hanks of coarse cotton, two of which go to the dollar, are used; wheat is also a pretty general medium of exchange.

The measure of length used is the length of the arm from the elbow to the tips of the fingers. This method of reckoning leads to occasional disputes, as some buyers are in the habit of bringing a long friend with them to measure their purchases by.

A useful table of prices current at Adua, Sokoto, Gondar and Baso, is given in Herr Russ's paper, showing the usual money value of such products as

barley, butter, honey, coffee, sheep, cows, horses, hides and gold.

In northern Tigree cultivation is but slight and the land suffers much from drought and locusts. In the Amhara country the soil is more productive, the rainy season lasts longer and locusts are unknown. The want of roads brings other evils with it, for in event of a war or drought the deficit cannot be made good by neighbouring countries. Northern Tigree and Adua are now in this condition in consequence of the war with Egypt, followed by a scanty rainfall.

Cotton spinning is the work of women, and yarn for clothing many millions of men is spun by them. Weaving is a subordinate employment practised by the Muhammadans, who also follow commerce and agriculture. A coarse, but smooth and soft stuff is prepared by them which serves for clothing in most parts and for currency in Tigree. A rough, dark fabric is woven out of sheep's wool and serves for tents and clothing in the colder regions.

Iron ore of good quality is found pretty well everywhere on the surface, but the process of smelting is so rude and slow that a ploughshare of about 3½ pounds (?) weight costs a dollar. Other metals are found but not worked. The Abyssinians have an extraordinary idea regarding gold—that in the portion of ground on which the moon shines at night gold will be found in nuggets by digging. Pottery is a trade belonging chiefly to the Jews. Tanning is pretty flourishing, especially in the Amhara country, though the leather is but an indifferent article.

The mode of life is exceedingly simple, comforts and luxury being unknown to the Abyssinians. Within an enclosure of loose stones and thorns the peasant builds a rude, windowless hut of selected stones, smearing the interstices with dung: a conical-shaped roof of reeds and grass gives shelter from the rain and sun. Within are to be seen baskets for storing grain, jars and gourd flasks. A place raised from the ground and covered with a cow-hide serves as sleeping quarters for the whole family. On the wall opposite the entrance are two goat's horns driven into the wall, from which hang lances, a shield and not unfrequently a matchlock. One or two hives are to be seen in a niche with an opening in the wall of the hut to allow the bees free egress. In cold weather a fire is lit in the middle of the hut and the smoke fills the hut, escaping by the low entrance and by any crevice it can discover. The peasant's fields are often situated at a distance in some unhealthy valley, whither he must needs repair to protect the crops against elephants, buffaloes and antelopes, who occasionally make a sort of playground of the cultivated fields. The peasants are also subject to ruinous raids from soldiers, who do not scruple to levy black mail, though in the immediate vicinity of towns greater security is enjoyed. Here the land is better cultivated, the fields are richer and the dwellings better in every way. With regard to food, the wealthier people eat meat, but the poorer eat only bread and onions; pepper is largely used with most food. Abyssinians are fond of drinks, but the general poverty makes drunkenness rare.

It cannot be denied that the Abyssinians are progressing, and this may be ascribed partly to intercourse with the coast, and partly to the indefatigable efforts of missionaries. The number of priests and monks

is very large, and a third of the imposts is reserved for their maintenance. The head of the Abyssinian-Coptic church is the Abuna or Bishop, who must be a Copt, and under him is the Prelate of the monastic orders. There are but few monasteries or monastic villages in the country, and their inmates travel about as mendicant friars. The churches are numerous, and are situated for the most part on mountains and hills in a wood or clump of olive trees (*Olea chrysophylla*). The priests are obliged to marry while the monks are enjoined celibacy. The least number of priests in a church is seven, but in most churches there are many more. In the five churches at Adua the population is 3000 souls, and the number of church officials, &c., is no less than 1300. During the year there are constant holidays (about 200 in all) on which no work is done, and which contribute very much to the poverty of the land. The taxes are always farmed out, and the chief tax farmer has his seat in Gondar, with subordinate officers in Adua, Sokoto and Baso. Excluding the salt taxes in Sokoto the ruler draws as farm rent for all taxes the sum of 26,000 dollars per annum. There is no regular army, but the people are all very warlike, and in times of peace act as policemen, messengers and other functionaries.

Abyssinia is ruled by a king called Negusse Negest, *i.e.*, king of kings, and the different provinces are under governors. Negus Johannes, formerly a provincial governor, ascended the throne in 1875, and the same year the Egyptian troops invaded the country chiefly under the pretext that they feared an invasion of the Bogos country on the part of the Abyssinians, and were therefore compelled to occupy the province of Hamaze. This led to the war with Egypt, which trouble has since been followed by the attacks of Negus Menelek of Shoa. At the end of May last, Negus Johannes who has now but little influence in Amhara and Tigree and who relies mainly on the priesthood, was waiting in Shoa to punish Negus Menelek for his attacks on the Amhara country. Northern Abyssinia was being afflicted by a severe famine.

#### A NEW SURVEY OF THE AMAZON.

We learn from the *New York Herald* that the United States' corvette 'Enterprise' arrived off Para on the evening of the 24th of last May, with all on board well. The 'Enterprise' has been detailed by the U.S. Navy Department to survey the Amazon as far as Manaos, and the Madeira as far as San Antonio, the point of departure of the line of railway around the falls of the Madeira. She is to make a track chart of both these rivers, to determine latitudes and longitudes along their banks, to find shoals, rapids, and bars, and to generally so map and plot these comparatively unknown streams that they will be safe for future navigation by vessels engaged in commercial pursuits.

This will be a long and tedious operation, and, therefore, the 'Enterprise' has been selected, for she has greater storing capacity than the smaller craft used on our own coast for surveying purposes. She is 185 feet long, 35 feet beam, and draws 16.2 feet of water; consequently, wherever she can go, any ordinary ship of the merchant marine can follow.

The 'Enterprise' is no novice at river surveying. During December of last year and the three months following of this she was engaged on the river front of New Orleans. Although at work but a short time her officers accomplished the task given them, which was to ascertain the profile of the river from Carrollton to Jackson Barracks, a distance of over 10 miles, and necessitating thousands of careful shore and channel soundings. Having thus made herself familiar with one great river it is perhaps fitting that she should be selected to first make the acquaintance of its great rival—the mighty Amazonas. Her former labours and her quick traverse of the ocean between Norfolk and Para prove her a rapid steamer, averaging 9 knots on an expenditure of nine tons of coal per diem. She steers as beautifully as a pilot boat; her compound engines are most prompt in their action, and, generally, she is much more vivacious in her movements than a vessel of her size is expected to be. Her quarters are slightly cramped, it is true, but the glory that awaits her officers and the privileges promised her crew are sufficient, it is to be hoped, to enable them to bear with equanimity the few months of heat, mosquitoes and lack of breathing room.

The Amazon survey will be under the command of Commander Thomas O. Selfridge, United States' Navy, well known to the department and the scientific world from his elaborate surveys of the route for the Inter-oceanic Canal, projected across the Isthmus of Darien. Commander Selfridge has passed through several seasons of hard tropical labour, and is as thoroughly acclimated as one can be who is not to the manner born. He brings to the Madeira work, therefore, not only a wide experience and a strong physique, but also—if the future can be judged by the past—an indomitable energy, that will not quail before anything but the invincible powers of nature.

He will be assisted by the following staff:—

- Lieutenant-Commander S. H. Baker, United States' Navy.
- Lieutenant F. W. Nichols, United States' Navy.
- Lieutenant G. Blocklinger, United States' Navy.
- Lieutenant C. P. Perkins, United States' Navy.
- Lieutenant L. G. Spalding, United States' Navy.
- Master M. F. Wright, United States' Navy.
- Paymaster G. H. Griffing.
- Passed Assistant-Engineer, W. A. Mintzer, United States' Navy.
- Passed Assistant-Surgeon M. L. Ruth, United States' Navy.
- Draughtsman Q. W. Sparrow, United States' Navy.
- Ensign D. Peacock, United States' Navy.
- Ensign H. J. Hunt, United States' Navy.

All of these officers are experts in river work or are eager to become so. Several of them are accomplished stellar observers, a speciality that will be particularly useful in determining latitudes and longitudes on the rivers. Thus with a good ship finely equipped, a skilful commander, educated officers, and a well-disciplined, healthy and young crew, there is every reason to believe that the survey will be carried to a successful termination, rapidly, thoroughly, and it is also hoped, without disaster.

It would be imagined that the Amazon, draining as it does millions of acres of richly-wooded and immensely-fertile territory would have been long ere this carefully surveyed, properly buoyed, and thoroughly lighted. This, unfortunately is not the case. The Amazon to-day is almost as much of a mystery as it was when Orellana, the faithless lieutenant of Pizarro, picked his lonely way down to the great

ocean. A river that should be as well known as the Hudson or the Delaware, whose currents, shoals, channels and islands should be as plainly located as are those of the Mississippi, is a fluvial highway whose many dangers are known only to a few Indian or Portuguese pilots. The longitude of its principal city is not yet accurately determined; its channels and shoals are not even marked on the best Brazilian charts that can be obtained. Steam craft, it is true, ply on the river from Para to Tabatinga, but these are intrusted to Indians, who rely more on the light draught of the vessels than they do on their own knowledge of the stream. The reason of this utter neglect of what should be the source of revenue to the Brazilian Government is found in the general apathy of the people, the poverty-stricken condition of the Brazilian Treasury, and the incomprehensible stupidity of the decree which, until lately, kept foreign flags from trading on the Amazonas.

A great stream that should be populated from its source to its mouth, whose banks should be studded with villages, towns, and cities, is, from these causes, almost deserted. It flows at times for hundreds of miles without passing a human habitation; or if here and there, along this desolate stretch, smoke arises to show that human beings are sheltered beneath the roof of the rude hut that barely shows itself amid the tropical green, it will come from the fire of a half savage, or the embers of a runaway slave who has hidden himself in the fastnesses of the forest, away from his enemy, the white man. Attempts have been made to settle the river, but the Jesuits, indefatigable as they were, failed; and the people of the south, who at the close of the war came to Santarem, followed their example. It remains to-day, as it has been for ages, silent and mysterious, its banks unfrequented, and its waters unknown. No well-organised effort has ever been made to properly survey either the great river or its principal affluents. What has been done was in reality accomplished by the English explorers, Maw, Smyth, Wallace, Spruce, and Bates; by the Americans, Herndon and Gibbon; by Admiral Tucker, for the Peruvians; by the German Keller; the English engineers Sidstone and Browne; and by the late Professor Orton, whose body lies high up in Peru, and whose grave, on a quiet island in the clear lake of Titicaca, overlooks one of the sources of the river he loved so well. These gallant men, in canoe and launch, have sailed and paddled from the head-waters of the Amazon to its gigantic mouth. They have wandered up its tributaries and have traced out its feeders, but they, despite their willingness could not accomplish the impossible (to them) task of mapping out majestic rivers for commercial purposes. For this a great incentive was needed, and this incentive has at last presented itself.

A safe pathway for merchant vessels drawing over twelve feet of water is imperatively demanded. The cause of this sudden demand for practical working charts of the Amazon, and particularly of the Madeira, is the prospect which is most fair, of the speedy completion of the Madeira and Mamore Railway. The history of this railway, which now, after years of costly litigation and endless Chancery suits, has at last fallen into energetic American hands, has already been given in the *Herald*. It will suffice to say that the former

contractors, not having fulfilled their promises, have been entirely withdrawn, and that the construction contract has been awarded to the Messrs. Collins Brothers, of Philadelphia, who have guaranteed to build the road in three years. This railway, if successfully completed, will surround the falls of the Madeira and give an outlet to the products of the fertile valleys of Bolivia. The scheme seems to be one of such unbounded promise that it is strange it has not already been realised.

Ernest Morris, the youthful explorer, who returned from Brazil about a month ago, having explored the region of the Lower Amazon, is about to set out under more favourable conditions to continue his work in Brazil and also to explore some of the comparatively unknown regions of Bolivia. He goes out as Naturalist to the expedition organized by Messrs. Mackie and Scott, of Philadelphia. The object of the expedition is to arrange a route by way of the large rivers which connect Bolivia and Brazil over which trade can be carried on. As a preliminary measure a surveying party will go to Bolivia to study the country. It is composed as follows: Mr. Mackie, chief; Jas. W. Gorham, assistant; G. P. Lockwood, mineralogist; G. W. Keasby, geographer; J. C. Pennington, M.D., surgeon; R. Hope Hepburn, chief of transportation; John Robb, secretary; Ernest Morris, naturalist; C. S. Mackie, volunteer aide; F. W. Berry, quartermaster. The party will also be accompanied by Messrs. Lawford, Moray and Hunt, with the necessary native assistance. It is intended to place steamers on the Lower Amazon, the Lower Madeira, and also on the Madeira above the falls, and thus open a route to Northern and Western Bolivia. Hitherto the bulk of the American goods sent to Bolivia has been landed on the coast of Peru, and carried by mules over the mountain ranges. In this way it took 180 days for goods to reach their destination, while the freight averaged \$55 per ton. By the new route it is expected that the time will be reduced to thirty days from New York, and the cost of transportation to \$15 per ton. The plan is to carry freight up the Amazon to near Barra, where the Madeira joins the Amazon. It will then be taken in steamers up the Madeira, as far as the rapids. It will be carried in railway cars past the rapids, and will then be transhipped to other steamers, which will carry it to its destination. The railway along the rapids is now building, and when it is completed a direct highway to Bolivia will be opened, by which the necessity of carrying merchandise around Cape Horn and up the Pacific coast will be obviated.

Several members of the surveying party have already left for South America. The others will sail shortly, and the party will meet at San Antonio, near the first rapid of the Madeira, about the middle of August. They will proceed with boats and Indian guides over the falls, making a scientific survey of the Rio Mayutata, Rio Beni, Rio Mamore, Itenez or Guapore and other rivers. Above the rapids of the Madeira it is estimated that there are 1800 miles of navigable water. The party will take a number of steam launches in sections with them. Their head-quarters will be at Cochabamba, a town near the centre of Bolivia, and surveys will be made in several districts by divisions of the party. Rubber, Peruvian bark, gums and dyes



are at present the chief articles of export from Bolivia. Gold, silver and copper abound in the mountainous regions.

Mr. Ernest Morris, who accompanies the party as Naturalist and Correspondent of *The World*, will be absent about two years. He has already made three trips to Brazil. His first trip was devoted to an exploration of the lower part of the Amazon, and he was absent fourteen months. On his second trip he went as far as the head-waters of the Tapayos, and his third journey was up the Amazon.

### INDIAN IRRIGATION.

THE *Times* of the 5th inst. places this subject before us in a light that is not visible to those who are now advocating an increase of irrigation works as a sure remedy against the anticipated ruin of future famines. We are supplied with figures giving the actual expenses of certain works. If these figures are right they expose a melancholy failure of the works in a mercantile view, while their political and social economy is carefully kept out of sight. If you will allow of a few words on these points, the subject may be more intelligible to those who undertake to guide the public into their own theories without seeing their workings and results.

"The report on irrigation in Guzerat and the part of the Deccan in the Bombay Presidency for 1876-7 shows that out of twenty-two works fourteen are entirely new. The total capital outlay up to April 1876 was 10,804,333 Rs.; the assessments during 1876-7, 136,645 Rs., the working expenses 101,894, leaving the surplus of assessments over working expenses at 34,751, and giving a net return of  $\frac{1}{2}$  per cent. on the capital outlay. The area irrigated is 13,762 acres." It may be pointed out in passing that the 34,751 Rs. do not make  $\frac{1}{2}$  per cent. on the capital, and it is not said whether that sum was actually collected. Taking the figures as they stand, the capital cost may be put down at 785 Rs. per acre, and the assessment on the capital is more than 94 Rs., the working expenses are more than 7 Rs. per acre, so that we only realise about 2 Rs. per acre, or 27,524, in lieu of 34,751 as the amount for collection. This is as near as possible only  $\frac{1}{4}$  per cent. on the capital outlay. Under either condition the works are failures in a mercantile view, but the figures before us do not point out that the area irrigated by these twenty-two works would have given a revenue of at least 1 R. per acre without a farthing of outlay. The real profit is therefore the difference between a wet and dry cultivation: by the figures in the *Times* this comes to 20,989, by the other calculation to 1 R. per acre on 13,762 Rs. as the actual profit to the treasury. The dry collections might have been much more than this, as dry lands near large towns are assessed up to 3 and 4 Rs. per acre. The actual loss to the treasury may therefore be much greater than here shown.

The political and social economy is rather more enigmatical. The assessment on food-producing land may be put down at 1 R. an acre. The assessment on irrigated land is seldom under 5; in the case before us it is over 9 Rs., but no ordinary food is ever grown on these wet lands. Rice is grown on land with a natural irrigation; superior sorts may be

grown on artificially irrigated areas, but the price of this grain is beyond the reach of the poorer classes. It follows that every acre of irrigated land, under the works alluded to, takes away from the food production. The value of the produce being greater more money is realised, but by the time the assessment is paid the cultivator is scarcely better off than his dry neighbour. It is allowed that any excess of profit enables a farmer to buy more food, but in seasons of scarcity that cannot now be bought on the spot. Formerly the cultivators kept a store of food, the roads were bad, and transit duties were levied on all grain; these duties were taken off in 1836, the roads are improved, and railways carry off the produce of the country. This produce is that which sells elsewhere, not the ordinary food. The area for this has been growing less and less, while the consumers are increasing. The price of food is therefore much higher than it was, but the price of labour has not increased, the supply is above the demand; our social economy is therefore at fault, and we are doomed to perpetual famines in some parts of our Indian Empire. It must be recollected that our rivers, tanks, and wells depend upon the rainfall; if that is plentiful all goes right, if it is deficient the entire water supply follows suit, and the irrigated land may be in a worse predicament than the dry. It is only near the estuaries of the larger rivers that the supply of water may be considered safe: in 1876-7 the Godavery supply nearly failed with one year's drought. I have known the sources of this great river quite dry, but its lower channels drain several basins, and water percolates beneath its sandy beds. The question may now be asked, is our political economy right? Are we improving the condition of the ruled or the rulers by our great works on irrigation? and do we in any way avert famines by decreasing the area of food production? Any one asserting that we do meet times of scarcity, or that we do cheapen food by these works, must place before the British public statistics to prove it; the figures here referred to prove the contrary; but when the irrigating advocates get the influence of Mr. Bright into their scales, it seems almost natural that they should outweigh the evidence of facts.

H. P. MALET.

### IRRIGATION IN MONGHYR.

AN interesting little work by Mr. Edward Lockwood, of the Bengal Civil Service, has just been published by Messrs. Allen. Mr. Lockwood was formerly Magistrate of Monghyr in Bengal, and his book gives a lively and interesting account of that district, especially of its natural history. Mr. Lockwood is of opinion that it is idle to talk of irrigation as a permanent preventive of famine. All it can do in Monghyr is to increase a pauper population up to a certain limit by producing more food than is produced at present; but irrigation cannot possibly increase food as population increases, in geometrical ratio. It very rarely happens that water, other than what the clouds supply, is required for the principal rice crop, and as the holdings generally are very small, the tenants can sink wells, and irrigate their scanty crops from them, or from tanks which can be made without cost during leisure hours.

The Government has already made extensive irrigation works at Kharakpur, about 15 miles from Monghyr, and will thus be able to form a fair estimate how far irrigation on a large scale is likely to succeed and ward off famine in this district.

## HIGHWAYS AND BYEWAYS OF NAVAL HISTORY.

## IV.

## SIR RICHARD GRENVILE AND THE 'REVENGE.'

(For the previous articles by our valued contributor, Robert Lendall, see our numbers for November and December, 1873, and January, 1874.)

THE Poet Laureate, in the March number of the *Nineteenth Century*, brought into a prominence which it might never have otherwise had, a byeway of Naval History, causing us to retrace our steps 287 years for the purpose of travelling over the path with him.

Those who have read his stirring poem, of which the very ruggedness has an illustrative meaning in view of the hero's character, will see at once that the poet has been to contemporary records for his subject. But those who, as simple historians, go to the same records, may perhaps observe that the Laureate has given a dash of fine colour to the character of his central figure, which in the original pictures it wants.

These pictures have been painted in the firm outlines, and the broad masses of contrasted light and shade, which distinguish the old masters of narration from their later disciples. Not to go, in a short article like the present, to more recondite sources, we may take the narratives of Sir Walter Raleigh; of John Huighen van Linschotten, a Dutchman; and of Sir William Monson, as giving us not all the facts, but enough to produce, however clumsily, a picture in prose, as a companion to that already drawn in verse.

Sir Walter Raleigh's account is remarkable as being his first published literary effort. As printed in Hakluyt it is entitled, *A Report of the Trueth of the Fight about the Iles of Açores, the last of August 1591, betwixt the 'Revenge,' one of her Maiesties Shippes and an Armada of the King of Spaine: penned by the honourable Sir Walter Raleigh, Knight.* Sir Walter was a kinsman of Sir Richard Grenville. The two had been joint promoters of the Virginian expedition of 1584, and Sir Richard had himself commanded the expedition which followed next year. It was on all grounds fitting that Raleigh should be the public defender of Sir Richard Grenville from the calumnious reports spread by bombastic Spaniards all over Europe. It was, as Sir Walter put it, "agreeable with all good reason for manifestation of the truth, to overcome falsehood and untruth; that the beginning, continuance, and success of this late honourable encounter of Sir Richard Grenville, and other of her Majesty's Captains with the Armada of Spain, should be truly set down and published without partiality or false imaginations."

But while we may well take Raleigh as our leading authority in drawing out the story, we must not forget that he necessarily wrote as an advocate, and as an advocate with a natural bias towards Grenville. On the other hand, he wrote his account from the depositions of seamen who had fought in the 'Revenge,' and he confirmed or checked their accounts by that of a Spanish captain who had been present at the fight, and who was, when Raleigh wrote, a prisoner in London. Our friend the Hollander wrote as one nearly an eye-witness of the fight. He was at Terceira at the time, not 200 miles off, and met immediately

afterwards, both Spaniards and Englishmen who furnished him with the details of the encounter, and with that bye-gossip, which, growing as it passes from mouth to mouth, after an exciting incident, ultimately takes form and shape as tradition, which it is impossible to separate from true history. Van Linschotten had that sense of the ridiculous in the midst of the most stirring dangers which characterised the "Adventurer" of the time, and which, strong amongst the English, made the "Morris dance on the waves" seem such an appropriate title wherewith to denote the defeat of the great Armada. Coming to the Azores apparently as a merchant adventurer, and not sure in the unsettled state of things whether he was a Dutchman and an ally, or a Spaniard and an enemy of Englishmen, he is hopeful of business in either case. But under no circumstances could he avoid seeing the fun of the thing when, being chased by three English ships, his crew took an hour to recharge and shoot off their piece of ordnance, and made so great a noisy fuss over it that the Englishmen drew near on purpose to jeer at them. But unless this worthy narrator had a prejudice in favour of the humorous side of things so great as to mislead him, there is no reason for us to doubt but that what he heard he set down.

The last of the three who tell the story is Sir William Monson. At the time of the fight he was a prisoner of war at Lisbon, and had been Flag-Captain to the Earl of Cumberland in the 'Garland' on the coast of Spain, immediately before his capture. This contemporary writer, one of the band of purely "Naval" officers who made the age of Elizabeth so conspicuous, was certainly in a position to know the truth of any matter about which he wrote. He has been strongly condemned as a captious grumbler; but though he may be one of the earliest to assert that truly naval privilege, I think that every naval reader of his voluminous writings will admit that a little self-glorification was a venial offence on his part, and need not throw any doubt on his veracity or carefulness. He knew Sir Richard Grenville personally, and the picture he gives of his character is not out of accordance with his last acts, while it is supported by the stories which were told to the Dutch authority already mentioned.

Let me now glance at those circumstances which led up to, and finally brought about, this famous fight. Immediately on the heels of the defeat of the Armada came reprisals against Spain of that semi-public and semi-commercial character in which the Queen so trusted. Six of the ships which had fought the Armada sailed under the command of Sir Francis Drake, and conveyed an army under Sir John Norris to Portugal. The object in view was a strange one for an expedition chiefly depending on voluntary subscriptions to undertake; it was no less than the re-erection of Portugal into independence. Perhaps one of the most curious touches given to the naval history of the day is the incidental mention of the means of transport available. The ships sailed from Plymouth short of all supplies, but most notably short of transport, and the remedy was found in the impressment of "Easterlings" and in turning over to them soldiers from the overcrowded transports. The expedition had the ill success which it courted, though, as the army actually reached the gates of the Castle

of Lisbon, a very slight increase in munition and supplies would have made it fully successful.

But it deserves mention as it appeared to show that purely naval expeditions were less expensive and more damaging to Spain than joint naval and military ones, and therefore led to that of 1590, which again became the forerunner of that of 1591, with which I am about to deal. Moreover, Drake's flagship was on this occasion that very 'Revenge,' whose superior handling and sailing had, under Drake's command, so pestered the Spaniards in 1588, and which was in two years to be the short-lived prize of Spain.

Drake quitted sea service for a time after this expedition, possibly because therein he was not "blessed" as he desired, "with some lettell comfortable dewe of heaven, some crownes, or some reasonable bootys for his soldyers and maryners;" and because "to want meat, munycyon, and lybertty, was too heavy a burden to beare." Sir Francis was succeeded in the 'Revenge' by Sir Martin Frobisher, and she spent seven months of 1590 off the coasts of Spain and the Azores as part of a fleet of ten Queen's ships, looking out, on the one hand, to intercept the Spanish trade from the West Indies; and on the other, to observe and hinder any naval preparations of the King of Spain.

The King, more alive to the realities than he had been two years before, feared to face the ten English ships with the twenty which he had ready under Don Alonzo de Bazan. He fell back for a time on the weaker policy of forbidding the sailing of the Silver Fleet from the West Indies. Whether this commerce were delayed or interrupted, it brought nearly equal distress on the Spanish merchants; and the long stay of the ships in the Indies would, it was known, so weaken the ships by the ravages of "the Worn," that many years would hardly suffice to repair the damage. In the result, however, not a single Spaniard fell into the hands of our fleet, and a portion of the Indian Squadron trusting to fortune, and passing clear of the Western Islands, found its way in security to Lisbon.

There was still, however, the great body of the Spanish commercial fleet abroad. And though non-success changed the Commanders, it did not change Elizabeth's purpose to gather the value of the Spanish ships into her pocket. Two expeditions were accordingly fitted out, and sailed in the spring of 1591. The larger, under the command of Lord Thomas Howard, son of the Duke of Norfolk: the smaller, under the Earl of Cumberland. Howard flew his flag in the 'Defiance,' of 500 tons and 250 men, and his Vice-Admiral, Sir R. Grenville, flew his in succession to Sir Martin Frobisher, in the 'Revenge,' also of 500 tons and 250 men. Besides these were the 'Nonpareille,' the 'Bonaventure,' the 'Lion,' the 'Foresight,' and the 'Crane.' The 'Nonpareille' was of like force with the 'Defiance' and 'Revenge,' the 'Foresight' and 'Crane' were smaller, the former being but 300 tons with 160 men. There were besides a few pinnaces and some victuallers.

Howard's squadron went direct to Azores, with the sole purpose of intercepting the "Indian Fleet," as it was called. The Earl of Cumberland's ships hovered off the coasts of Spain and Portugal, both to observe the Spanish war ships and to intercept those silver ships which might escape through Howard's hands.

The King of Spain, on his side, was not idle. The fleet of twenty ships which had, under Don Alonzo de Bazan, been mistrusted as against ten English ships, was now, when increased to forty sail under the same commander, to be trusted against the six or seven ships of Lord Howard. But even this hazard was only to be run in the last extremity. It was not possible to delay the return of the Indian Fleet a second year, but if they put off their hour of sailing to the last moment, Lord Howard's squadron, poorly furnished as all Elizabeth's ships were, might be forced to abandon their watch and to return to England for supplies. But as it happened, fresh stores of victuals had reached the ships, and they were maintaining their post under shelter of the most westerly of the Azores, the islands of Flores and Corvo.

The Spanish fleet was thus composed: 30 sail of war ships—Biscayans, Portuguese, and Spaniards; ten Dutch fly-boats—large flat-bottomed vessels, which had been pressed into the service at Lisbon; other small despatch vessels and cargo ships, the latter to take in certain cargoes waiting at the islands. The Spanish ships, were, as usual, larger and finer, but yet more unwieldy than the English; as usual, also, the war ships were crowded with soldiers, while of such forces the English were entirely devoid. The Spaniards fresh from Ferrol were in a better general condition than the English, who had been some six months away from a home port.

The result of such an absence had been to reduce their stores, their beer and provisions, to a low ebb; and though the victuallers from England, which were still with them when the fight took place, had somewhat replenished them, yet the ships were light, and their ordinary crankness was increased by the fact that a sufficiency of ballast, to replace the consumed weight, could not be had. But the great difficulty of the English was their sick list. Half the people were down with the fevers and scorbutic disorders too commonly due to "weake victuallinge and filthie drink." The 'Revenge' herself had ninety sick. The 'Bonaventure' hardly had men enough to furl her mainsail, and a small vessel had been destroyed for the sake of her crew of twenty, which were drafted to this ship.

Setting aside these two serious matters, it was not to be presumed that—unless Lord Thomas and Grenville were guilty of neglect which has never been attributed to them—the utter disorder pictured by Raleigh existed in the squadron. It had one sole object in view, the capture of the Spanish Indian Fleet, and in August some of the ships had already arrived at the islands, and the bulk of the fleet might be expected at any moment. To weigh, to cut, or to slip their cables, and to be off into the heart of the fattest prize that had ever gladdened the hearts of English seamen, must have been the momentary expectation of Howard and Grenville, neither of whose imaginations were slow to conceive the delights of fingering the Spanish gold and silver.

The best anchorage at the Island of Flores is on its eastern side, in a bay of which the town of Santa Cruz forms the northern point. The water is deep, and in about thirty fathoms the English Squadron lay at anchor, on a fine afternoon at the end of August or the beginning of September, 1591. Many of the people were on shore at the time collecting

water, ballast, refreshing themselves on the free soil, and buying or seizing from the "Portugals," their friendly enemies, the fresh fruit and fowls which made new life for the unhappy sick ones on board. There was but a single sail in sight, and she was to the eastward and flew English colours. Neither to the south, nor to the north where ten miles off the limpit-shaped Island of Corvo grew grey in the haze, was there any sign of that fat prize to be seen.

The English ship came in quite early in the afternoon, and her captain reported himself to Lord Howard as Captain Middleton of the pinnace 'Moonshine.' He had been despatched by the Earl of Cumberland from the coast of Spain to warn the admiral of an unforeseen danger. The Spanish Fleet of fifty-three sail in all, most of which were war vessels, was at that very moment on its way from Terceira—180 miles to the eastward only—supposed to be in search of the English, and bent on destroying them. Only three days before Middleton had been in their company, and though he certainly sailed much better than they did, it was a wonder that they were not now in sight on the eastern horizon. Possibly they might—not knowing exactly where the English Squadron lay—have gone to Fayal, and if so, they might make their appearance rather more to the southward. "Had Captain Middleton any news of the Indian Fleet?" "No. Not of the main body, but as some stragglers had already reached the Islands, the main body could not be far off."

Middleton had hardly delivered his alarming message than a general stir amongst the ships showed that something novel and exciting was on foot. Several ships ran their ensigns up to their tops, denoting "Strange sail in sight;" and then, rounding the southern point of the island, and therefore coming from the westward whence the Silver Fleet was expected, and not from the eastward where the war fleet would appear, were seen several ships flying Spanish colours. The wind was from the northward, and as the ships drew clear of the land they hauled their wind on the port tack, and thus stood out about E.N.E.

Here then, at last, was the fat prize—the Indian Fleet—falling innocently into the trap laid for them! But Middleton and Lord Howard were less elated. Suppose that this was not the fat prize, but the war fleet of Don Alonzo de Bazan, what then? It was quite possible that hearing the whereabouts of the English at Fayal, and meaning to "shroud their approach by the island," so that the light and handy British ships should not escape them, they had passed south of Flores in darkness, and had then tacked to the eastward. If they were the war fleet, the usual northerly current would soon sweep them up, and the English would be caught where they lay. If on the other hand this was the van of the Indian Fleet, then nothing could improve the present position. It might be a little time before the Spaniards made out the English Squadron lying close under the land, and every moment would make their capture more easy and more certain.

But before Lord Thomas and Middleton had had time to do more than go over their pros and cons, the leading ship of the Spaniards made the usual signal for discovering strange sails. She fired one of her port guns to the northward, thus denoting the direction

of the sails; and she struck her topsail several times, thus denoting the number of sails seen. "Those are no Indian ships," cried Lord Thomas; "the leader is a war ship of the King of Spain! That is the Armada." Said Middleton, "It is the squadron of Seville and the Portugals, with the Admiral. Soon we shall see Britadona in that mighty and puissant ship of his, with the rest of the Biscayans and the Dutch fly-boats. I know how they sail with their four squadrons drawn together into two, with an Admiral and Vice-Admiral, as our own use is."

Says Howard to his Captain, and says the Captain to the Master and the master-gunner, "Loose the topsail and fire a warning-piece withal, that the ships may collect their companies and weigh their anchors."

"Send," again says Howard, "to the Vice-Admiral, and bid him call his mariners off the shore with all speed. Tell him that these be the ships of the King of Spain, of which I have news by the 'Moonshine,' and not the ships from the Indies. Faith, I trust," continued his lordship, almost *sotto voce*, "the knight be not in the mood to crush glasses with his teeth this day, and that he will yield obedience to his General. But he is of a strong will, and much desires the Spanish silver. I pray he think me not witless as to this fleet."

Soon, in obedience to the signal, the long drift of cables came slowly in on board the ships. Such captains as had to wait for their hands from the shore felt that they would be late for the booty, if this were, as they hoped, the fleet from the Indies; but bound for the galleys of Philip, if, as they feared in view of the greatness of the ships, this was a new Armada. For the longer the delay at anchor, the more difficult it would be to get the wind of the Spaniards, now stretching away to E.N.E., ready to tack and come in upon them.

But presently all were away except the vice-Admiral in the 'Revenge,' who still stuck at his anchor, though with his sails loosed. The Admiral weighed first, firing piece after piece, while he made sail on the port tack, to hasten the others, as he became more and more satisfied that the fleet closing upon them was that of Don Alonzo. As the remaining ships saw how the Admiral held his luff, and kept the wind of the leading Spanish squadron, their captains and companies remembered the stories they had heard of the Spanish King's preparations, and of Don Alonzo's twenty sail of the year before, and they knew that their fears, and not their hopes, were answered. Not they the men to turn their backs if there were any use in turning their faces, but they could not forget the tactics of Drake in the Channel in 1588, when his own handy 'Revenge' was there to remind them. The Lord Thomas was doing that which well suited the discretion and trust of a general, in avoiding to commit himself and his charge to an assured destruction without any hope of prevailing. But if he kept the wind, who knows what a day may bring forth amongst these unwieldy Spaniards and these flat-bottomed Dutchmen? Therefore the remaining ships, all but the Vice-Admiral, either weighed, or, if time pressed, cut or slipped their cables, and followed the Admiral close hauled on the port tack.

But what delays the Vice-Admiral? He lies there with his fighting sails loosed, while the rest of the

squadron are drawing away from him, and while the two squadrons of Spaniards, now in full view, are every moment so crawling to windward, that he can hardly expect to get the wind of their rear squadron, to say nothing of their more powerful weather one. What says the gentleman who bore the Lord Howard's message to Sir Richard. He tells that the Vice-Admiral was in one of his wild ecstasies. That his captain and master could do nought with him. There were still some stragglers on the shore, and God's blood! but he would have them aboard before he quitted his anchorage. That the ships in sight were not those of the King of Spain's, but the silver fleet which was to repair his losses in the Virginian Adventures. But be they whom they might, he would move for no man, English General or Spanish Don, till the passion of his soul had worn itself away. He that first—captain, master, mariner, or gunner—put his hand to the bill to cut the 'Revenge's' cable, let him look to his life—Richard Grenville was to be obeyed!

But while yet they spoke on board the 'Defiance' of the Vice-Admiral's peril, and regretted that obstinate audacity and self-will which was so uselessly threatening the safety of the 'Revenge' and her crew, and so absolutely thwarting the tactical policy of the Lord Howard, the 'Revenge' weighed, and casting to starboard, filled her fighting sails and followed on the port tack.

The condition of things, as seen from the deck of the 'Revenge,' was now as follows. To the left, a little on her port or weather bow, was the heavy part of the Spanish Fleet, under the command of Don Alonzo. To windward of this squadron, and therefore more to the left, on the 'Revenge's' port bow, were the English ships, in a straggling order, the Admiral and others being ahead and to windward, while the 'Foresight' and some of the victuallers were nearer the 'Revenge.' The leading Spanish squadron was in the usual cluster round their chief, and immediately ahead and on the lee, or starboard, bow, to the right of the 'Revenge' was the second squadron under Britadona; these were also in a cluster, but as usual, more straggling, so that they spread along the lee quarter to where their rear ships were just opening from the south point of the island.

The 'Revenge' was one of the fastest, as well as one of the handiest ships in the navy. She was under her "fighting sails," her fore and main topsail and her foresail. She had yet to set her square mainsail, often called from its size, her "Great Sail," and her latten mizen. Now that the 'Defiance' had got out into the current, it was seen that she and the rest of the English ships could easily keep the wind of the Spaniards, even under their fighting sails. But the 'Revenge,' by her long delay, would have had more difficulty, as while she lay at anchor the Spanish ships had been swept so far north by the current. But it was, even in her case, pretty certain that she could do well what she liked, if she set her mainsail.

Sir Richard Grenville still remained in the state of stormy passion which was habitual to him. He glared round upon the crew, who hated him for his severity and fierceness, and who feared him much more than any Spanish force, however powerful. He gnashed with his teeth, as if even then crashing between them, in bravery and defiance, the glasses which in Spanish company he sometimes made believe to swallow.

That great will of his was asserting itself, and, backed by his passion, was dominating his reason. "My Lord Howard," he muttered, "when I have shown you your error, and that the ships you are flying from are none other than the Plate Fleet, you will think to claim the best for your plans at Audley End! But, my lord, he who is frightened at shadows must take the consequences! Captain, let the master gunner see to the loading of his pieces, and take his place to leeward."

"Sir Richard, Sir Richard," replied the Captain, "these be not the ships of the Silver Fleet! The gentleman from the Admiral expressly told me that Middleton knew the ships, and that those ahead of us are the squadron of Don Alonzo de Bazan, while those to leeward form the squadron of Britadona."

"Be they what they will," cried the Vice-Admiral, in return, "they shall give way to Richard Grenville. Helmsman! Bear away!"

A momentary hesitation on the part of the helmsman, and almost a start on the part of the Captain and Master, showed the portentous nature of the movement, which was, in effect, to drive the 'Revenge' between the two squadrons of Spaniards, and across the bows of Britadona's great ships. A peal of fire was the answer from these latter, as, to their astonishment, they saw the single English war ship plunging into a destruction as certain as that which in later years was known to await the wonderful six hundred at Balaclava.

"By God's body!" exclaimed Grenville, as the storm of "random shot" flew high over the masts of the 'Revenge,' "it is as you have said, good Captain. But these Spanish dogs shall give way to Grenville for all that. 'Tis too late now to keep the wind of them, we will even push through!"

"Too late?" cried the Captain. "Not so, Sir Richard. The 'Revenge' has the heels of any Spaniard. Helmsman, luff! Master, cut the great sail loose; We will tack, Sir Richard, and rejoin our General where he waits for us to windward."

A dozen men had swarmed aloft to cut the main-sail loose, almost before the order could be given. But Grenville stayed them with a shout—"I will hang the first man who dares to cut a stop! Helmsman! bear away!"

There was then a moment of dead silence, and a quivering glance of astonishment and of fear in the look which all eyes turned upon the fierce, enraged figure of the Vice-Admiral. The whole matter covered but an instant's pause, and then the Captain exclaimed loudly enough for all near him to hear—"That which will be done, will be, betwixt this and dark. I hope in God that he will make us strong enough for them, for all are men of good courage here. God send Sir Richard Grenville as much honour and all good fortune as heart can wish! Master and mariners all, we will even push through as the Admiral desires."

The moment of irresolution had passed, and that strange phase of excited determination which imminent danger rouses in the English nature when it has warning, gained the mastery of the 'Revenge's' reduced company. Such of the sick as were able, fell into their usual places. Such as were unable for the fight had long before been carried below to the usual place of safety, the hold, and were now, in the empty condition of the ship, laid upon the ballast. There also

were the surgeon and his mates, ready to receive the wounded. The usual division of the company was made; one-third to work the guns under the direction of the gunner; one-third to ply the small shot under care of the corporal; and the remaining third to trim and work the sails under the orders of the Master. But, as usual in a fight, as it grew fiercer each part assisted and mingled with that which most required strengthening.

As the little 'Revenge' drew closer and closer to the mighty Armada, it was seen that she would either fall on board of the leading ships, or that they must tack to let her pass. As yet, though the Spanish fire was sustained, and was replied to by the starboard guns of the 'Revenge,' not much damage was done, the random shot of both forces flying for the most part harmlessly overhead. It was now that the one of the English ships nearest to the 'Revenge'—the victualler, 'George' of London—bore away under the lee quarter of the 'Revenge,' and her Captain hailed to know what he should do. Grenville hailed him back again to haul his wind and save himself. The 'Foresight,' too, being, as I have said, nearer to the 'Revenge,' now edged off a little, and began firing on the rear ships of Don Alonzo's squadron. And now also one or two of these rear ships kept away a little for the purpose of engaging the 'Revenge' to windward. Remarkable amongst these was a great ship three times the size of the 'Revenge,' and known afterwards to have been the 'San Philip.'

But the strange sight was now seen of the leading Spaniards on the lee bow of the 'Revenge' doing that which Grenville swore they should do—giving way to the English flag. Three or four of them threw themselves in the wind, and came round on the starboard tack, thus actually facilitating the effort of the 'Revenge' to push through. This movement of theirs also slackened the fire of the Spaniards for a time, as the guns could not be freely used in the act of tacking and as the movement threw the ships which had tacked across the line of fire of their friends.

But even the slackened fire was now getting hot; the sails and rigging of the 'Revenge' had been cut about in many places, and every moment the fall of the Spanish shot was becoming lower. The great 'San Philip' was now also using her starboard guns, and being replied to by the port guns of the 'Revenge.' Both sides were yet firing random shot, that is, shot from guns which were elevated as much as their carriages would allow. But as each side saw the lowering damage on the rigging of their opponents, gun after gun was levelled, and the earnest work of point blank discharges went on. Presently, too, the deadly work of the small shot from hundreds of match and wheel locks, in the hands of the Spanish soldiers, began to tell heavily upon the reduced crew of the 'Revenge,' who, by reason of having to employ both broadsides of guns at the same time, could have but a diminished party to ply the small shot in return.

But still the ship held on her course, drawing as she did so, more ahead of those ships on her starboard side, and which being more distant, had not tacked; there was a good hope that she might yet push through and make sail to leeward; especially now that her hull was suffering instead of her masts and sails. Her

excellent sailing qualities were making themselves manifest, as the first ships which had given way to her by tacking were now seen, having tacked again, to be unable to gain upon her in coming up astern.

The blood of the men was fully up; Grenville alternately cheered, stormed, prayed, and devoted the Spaniards to perdition. Exposing himself with determinate rashness, and remaining unharmed amid the crash of shot, the whiz of the small shot and the whirlwind of splinters, he bore in his face the light of triumphant bravery, and stirred to new exertions those who looked on him. Whatever his faults, and however great the mistake to which his passion had led, he stood there a grand man amongst a splendid band.

Next perhaps, in dogged resolution, to the Vice-Admiral, was the Master-gunner. A man, every whit as hot in passion and as reckless of consequences as Sir Richard, he had given no encouragement to the Captain and Master in their endeavours to turn the latter to a more politic course of action. He now sprang from side to side of the ship, directing each broadside of guns alternately, and calling to the helmsman to luff or to bear up according to the setting of the sea, and the position of the enemy's ships, so as to have his better level for the guns at the moment of discharge. At the instant when the truth as to the strength of the war fleet of Spain broke upon the mind of Grenville, he had sworn that he would rather die than turn back now, and the Master-gunner had repeated the oath as he ordered the starboard broadside to vomit its first fire.

But, however great the superior sailing of the 'Revenge' might be, and however the spirits of those on board were cheered by the prospect of pushing through the enemy, that triumph was not to be. However dangerous a foe the great 'San Philip' might be from her offensive power, she was about to show herself more terrible by an undesigned act. Slightly edging away from to windward, and gradually closing on the 'Revenge,' this great ship drew into the wind's eye, and by consequence becalmed the sails of the English vessel. Where, then, was the advantage of her superior speed? She lost way; the 'San Philip' bore more closely down upon her, on one side, while some of the ships which had tacked to leeward now gained on her and showed signs of grappling on her lee or starboard quarter, and foremost amongst these ships was that of Britadona herself. Thus the unhappy Vice-Admiral found himself between two close fires, and about to be boarded on both sides. Escape was now abandoned as hopeless, but there was no thought of surrender—indeed, in those fierce times, the thought of surrender was accompanied by the thought of the legal tortures of the Inquisition. But this thought could hardly have dominated the mind of Spanish-speaking Grenville. Captain Monson was at this very time a prisoner-of-war at Lisbon and suffering no such rigours. But it did not occur to those English minds to surrender. They had a fight to do, and they would do it as long as they could. When they could not fight any longer, when they were all either helpless from loss of blood, or stricken to death, then the fight would have its natural termination. Meantime, until that result was achieved, the yeoman of the powder room would continue to hand



up his powder; eighteen pounds for his demi-cannon and twelve pounds for the culverins. The privileged gunners, of whom the ship originally bore thirty, under the direction of the quarter-gunners, charged and re-charged their pieces, ladling the loose powder to the bottom of the bore, and rolling the loose shot down to it. The mariners and sailors forming the crews ran out the charged pieces, while the matchman knelt and blew upon his match ready to apply it at the Master-gunner's order. The loss of the wind had taken away the work of the Master; and the boatswain could only with a small party knot and repair those main parts of the rigging, on which the masts depended. But the corporal's party of men at work with small shot was increased now that the enemy was closed, and these people filled and re-filled their bandoliers from the budge barrels handed up from the powder room.

But a settled order for the fight was fast becoming a thing impossible. Spars, ropes, and canvas were falling continually and hampering the guns. Men, more precious, were falling at their posts, under the rain of lead and iron, either to be hastily passed below wounded, or more hastily thrust overboard dead.

Now the 'San Philip' fell alongside the 'Revenge' on the port side, and collected her men to board her. But the Master-gunner was prepared with a broadside which shook the Spanish nerve; a volley of small shot, a thrust of the long keen pikes: the 'San Philip' misliked her entertainment and sheered off. At that moment Britadona fell aboard to leeward and stuck to his work. Four other ships grappled soon afterwards, two on each side, and now the hand-to-hand conflict raged in confusion. The decks of the 'Revenge,' slippery with blood, afforded small grip to the feet of her defenders in the roll of the ship from side to side. Then the crash and tear of the wood-work of the six ships clustered in a death struggle, was hardly less destructive to them than the shot which now passed backwards and forwards through all parts of the hulls. It was impossible to keep the 'Revenge' free from the pollution of the invaders' feet. The Spaniards boarded her again and again, but the Vice-Admiral, Captain, the Master, and the Master-gunner—the leading officers of the ship—all remained unwounded and alert. Under their shouted orders the company tore from point to point wherever the danger was greatest. Climbing over the fallen spars, and struggling, as in a net, with the tangled and torn sails and rigging, they pushed back the Spaniards, who had entered for a moment, wounded, scared, and beaten into their ships again, or into the sea.

The fight had not opened till three o'clock in the afternoon, and it was now growing dusk. Two of the ships which had actually grappled the 'Revenge' were evidently in greater suffering as to damage than she was herself; as darkness came on they went down beside her, and the attention of her foes was diverted to saving their crews. The 'Revenge' was for a time free, and able to make preparations for those dark hulls which, as fresh ships, still kept closing on her. It was the same thing over and over again as darkness gathered a heavy cluster of ships round the gallant and unyielding English. Attempts at boarding more or less sustained, but always beaten back by the continually diminishing force in the

'Revenge'—a cessation of the battle for a time, and then another struggle.

It was now that he, whose passionate magnanimity and stubborn rashness had brought into one astonishing focus all this moral grandeur, physical suffering, and material desolation, fell upon the deck wounded in the body by a musket ball. He was carried below senseless, and the wearied surgeon applied himself to his probes and his dressings. But not to him was to be allotted the task of preserving Grenville's life; he was engaged on the wound when struck to death by a shot which inflicted a second wound on Grenville—this time in the head. Then he lay down, and sometimes speechless, sometimes awake to his condition, listened to the sad complainings of the wounded who surrounded him, and to the confused clamour from the deck. Now shaken by the discharge of a demi-cannon above him, now pained by the eternal roll of the ship. But for all this, not losing colour, courage, or determination. Daylight found things above and below as described, and then it was that for the first time that Captain and Master began to review the situation. The Vice-Admiral was wounded—probably to death. There were 80 or 90 of the original sick still lying on the ballast, and the water from shot holes was rising so, that they would soon drown where they lay. Not less than 40 bodies had been cast overboard, and the unwounded might be numbered on their fingers. It was clear that there was no more fighting to be done—what else was possible?

Sir Richard, in a moment of consciousness, had his terrible views on that point. His talk to the wounded, and to such of the company as passed him from time to time, was of the mercy of God and the shortness of life. What mattered a few days more of pain and misery? Why not shorten it? They had all fought a wonderful fight, like valiant and resolute men—why not complete the task, and leave absolutely nothing for the Spaniards to boast about? Where was the Master-gunner? He was a resolute man.

The Master-gunner hearing that Sir Richard had asked for him, soon attended. No sense of weariness or of failing resolution troubled him; and he, too, had some ideas about the proper method of proceeding before the Spanish ships should close round them again, and make an entry into the 'Revenge,' because no force remained to forbid them.

"What powder was now left in the powder room?" asked Sir Richard.

There was only one barrel still remaining, but, skilfully placed, it might very well do what the Vice-Admiral desired, and keep the 'Revenge' for ever out of the hands of the Spaniards.

"My father went down in the 'Mary Rose'" cried Grenville, through his set teeth; "and I will even go down in the 'Revenge.' Master-gunner do thou take the order from me; split and sink the ship!"

But an Admiral half-fainting, wounded in the head and body, and lying helpless, was no longer the responsible commander of the 'Revenge.' The Admiral Don Alonzo de Bazan, had himself drawn near to see this great sight of a conquered but unsubdued Englishman! The responsible officers on deck had determined on their course, and the Master bore the terms of a capitulation—not of a surrender—to the Spanish Commander. "The battered and sinking hulk full of wounded and sick over there, would

yield herself if all lives should be spared; if the mariners and common sort were set free, and the better sort held to reasonable ransom. Were these terms not accepted, the Master-gunner had his orders from the Vice-Admiral, and would be let out of his cabin where he was now secured. That was all." "Two ships sunk;" thought Don Alonzo, "over 1000 men killed and wounded; fifteen of my ships more or less damaged; and all by one little English ship! There are eight or ten more of them not far off; I shall do well if I accede to these terms."

So the Master went back to the 'Revenge,' and her tattered red cross came down. The Master-gunner was let out of his cabin. Grenville, and the Captain in his suit of black velvet were to go on board the Admiral's ship, the rest of the old 'Revenge's' were to be distributed, except perhaps some few of the wounded. The command was gone from Grenville's hands by the fortune of stray missiles—what mattered the rest? "Let them do with his body what they would," he said, as they came to carry him away. Then the movement was too much for him—he fainted; but recovering for a moment as he got into purer air, the nearness of the hidden world smote him. "Pray for me," were the last words he uttered on board the 'Revenge.'

The story of the fight is told when Grenville's weakened body leaves his ship. That he died a few days later on board the Spanish Admiral's ship appears to be certain. Where he was buried is unknown. That he bore his wounds with the composure of great physical power, and hardly changed demeanour or colour, in such sort as to surprise the Spanish officers, Van Linschotten tells us; and it is he who also gives us those illustrations of his character which confirm Monson, in spite of the vehement denials of those whose minds are unsatisfied unless a hero should be all hero. Linschotten also has handed down to us the final well-known words, "Here die I, Richard Grenville, with a joyful and quiet mind, for that I have ended my life as a true soldier ought to do, fighting for his country, queen, religion and honour." Words which might have come from the lips of a Nelson, but which a Nelson would never have uttered in any tongue but his own; and then they would have borne only the sense of resignation which the mere words convey. But the prisoner, Grenville, in the hands of the Spanish Admiral, who would neither see him nor speak to him, uttering the words *in Spanish*, fires a last shot at his enemies and dies as defiant as ever.

The contemporary writers dwell with complacency on the effects of a storm which followed this battle, and destroyed large numbers of the Spanish ships, as well as the poor 'Revenge.' Raleigh says she was cast away at St. Michael's, but Linschotten tells us that it was against the cliffs of Terciera that she dashed herself to pieces, and as a single wounded English seaman escaped from the wreck and was befriended by that author till he died, he is unlikely to be wrong.

ROBERT LENDALL.

## Reviews.

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### MEMOIR ON THE INDIAN SURVEYS.\*

THE first edition of the *Memoir on the Indian Surveys* was published in 1871. Its object was to furnish a general view of all the surveying and other geographical operations in India from their first commencement; in order that, in reading reports of current work, ready means of reference to the previous history of each branch of the subject might be at hand. In case it should be desired to follow up an enquiry into the details of any particular operation or series of operations, the references in the foot notes were made as copious as possible. The Sections, into which the first edition of the Memoir was divided, contained histories of the Marine Surveys, of the Route Surveys in the days of Major Rennell, of the Great Trigonometrical Survey, of the Topographical Surveys, of the measures for the Supply of Instruments for the Surveys, of the Geological Survey, of the Archæological Survey, of Meteorological Observations, of Astronomical Observatories, of researches relating to Physical Geography, and of the Geographical Department of the India Office.

The result of the publication of this first edition was very satisfactory. It was a part of the plan that the Memoir should be supplemented by "Annual Abstracts" on the same model, each abstract being a memoir for one year; and at the end of seven years the contents of the Annual Abstracts were to be embodied in the second edition of the Memoir. Accordingly, these abstracts of the operations of the surveys were published from 1871 to 1876 inclusive, and in 1877 the time came for the appearance of the second edition of the Memoir. This second edition was completed by the end of 1877, but, owing to much unnecessary and harassing official obstruction, it was not published until August 1878!

In the new edition of the Memoir it has been found advisable to increase the number of Sections. An additional sub-section has become necessary for the Marine Survey Department, and separate Sections have been added for the route surveys beyond the frontier of British India by native explorers, for the Revenue Surveys, for Tidal Observations, for the Statistical Survey of India, and for a discussion of the orthography of Indian proper names. The operations treated of in all the Sections have been brought up to date, and a general index has been added. In other respects the arrangement of the two editions is identical.

All who have been concerned in furthering the operations of the various Indian Surveys must look back with feelings of deep satisfaction to the amount and character of the work that has been achieved in the interval between the publication of the two editions of this Memoir.

The same system of publishing annual reports will be continued, but the title, instead of "Abstract of the Surveys," will in future be as follows:—*The Indian Surveys, 1878. An Annual Continuation of the Memoir on the Indian Surveys.*

\* *A Memoir on the Indian Surveys.* By Clements R. Markham, C.B., F.R.S. (Second Edition), 1878. Printed by order of the Secretary of State for India in Council (pp. xxix. and 481, with five maps). Sold by Messrs. Allen, 13, Waterloo Place; Stanford, 55, Charing Cross; King & Co., 65, Cornhill; and Trübner & Co., 57 and 59, Ludgate Hill.

## LANGUAGES OF THE EAST INDIES.\*

MR. ROBERT CUST contributed two articles on the geographical distribution of the languages of the East Indies, illustrated by two language maps, to our numbers for January and February 1878. The present volume is a very considerable amplification of those articles, and is a comprehensive and pains-taking attempt to bring the whole of our existing knowledge of an important subject into one focus. Mr. Cust discusses, in due order, the Aryan family of Indian languages, the Dravidian, the Kolarian, the Tibeto-Burman, the small Khasi family, the Tai and Mon-Anam, and the Malayan. He then considers the number of languages into which each of these eight families should be divided, and the amount of dialectal variation which constitutes a dialect of a language. A difficulty is found in deciding whether a form of speech is to be considered as a sister language or merely as a dialect, and of course much of the classification adopted by Mr. Cust must be looked upon as provisional.

From a geographical point of view the most important part of the investigation lies in fixing the boundaries of language fields, and for this purpose the Census Reports have supplied useful data, although the present boundaries are mere approximations. In treating of each language, Mr. Cust first endeavours to define, with as much accuracy as is attainable, the boundaries and area of the language field. He then gives some account of its affinities, of the grammars and dictionaries that have been published, of the literature of which it is the vehicle, and of its dialects.

Mr. Cust defines his object as twofold, to display the extent of the field, and to bring to one focus the labours of the past, and at the same time to organise some scheme of general co-operation for the future. There can be no doubt that a very great and valuable service has been done by Mr. Cust in thus laboriously and conscientiously bringing together in one volume so large a mass of information on an important subject, and above all in applying to this mass his remarkable powers of classification, and orderly arrangement.

BAY LEAVES. A TRIBUTE TO ENGLAND'S HEROES.  
By E. Garnet Hall. (Provost and Co., 1878.)

THIS is a little volume of poems dedicated to Sir George Nares and the Officers and Men of the Arctic Expedition of 1875-6. The first—"A God Speed to the Arctic Expedition"—was recited at the banquet given at Portsmouth before its departure; and another of these poems—"Welcome Back"—was set to music and sung by the band of the Royal Marine Artillery when the expedition returned. The other Arctic poems are "A Welcome to King Frost," "Our Thanks to King Frost," and "The Arctic Expedition." The volume contains several other poems, most of them intended to commemorate the services of England's heroes in various parts of the world; and all displaying a cultured imagination finding expression in verse of more than average merit.

\* A Sketch of the Modern Languages of the East Indies, accompanied by two Language Maps. By Robert N. Cust, &c. (Trübner 1878), pp. ix. and 198.

THE CEYLON DIRECTORY: CALENDAR AND COMPENDIUM OF USEFUL INFORMATION. (Edition of 1878). To which is added a Planting Directory for India (Coffee, Tea and Chinchona Estates), with much Useful Information referring to the enterprise of the opposite Continent. Compiled and edited by A. M. and J. Ferguson. (Ceylon Observer Office).

THIS work will be found most useful not only to the enquirer desirous of obtaining accurate and detailed information, but also to all persons who are engaged in industrial pursuits in India or Ceylon, or who contemplate the investment of their capital in those eastern possessions of Great Britain. The Directory, in the first place, contains a complete statistical record of the progress and present condition of the colony in all its administrative departments, including a table of events, arranged chronologically, which amounts to a succinct history of the island.

But the most valuable feature of the Ceylon Directory is comprised in the practical papers on the cultivation of tea, coffee, chinchona, the cocoa palm, tobacco, and cassava. Mr. Ferguson deserves the gratitude of all who are interested in the industrial enterprises of Ceylon and India for the conscientious care he has bestowed on this portion of his most useful work.

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RETURN OF WRECKS AND CASUALTIES IN INDIAN WATERS FOR THE YEAR 1877, TOGETHER WITH A CHART SHOWING THE POSITIONS IN WHICH THEY OCCURRED. Prepared by R. C. Carrington, F.R.A.S., F.R.S.L., Registrar of Wrecks, Marine Survey Department (Calcutta 1878).

THIS is one of the valuable annual publications issued by the Indian Marine Survey Department, and it shows the great value of that department as a channel for obtaining and publishing really accurate information, for the number of reported wrecks and casualties in Indian waters, during 1877, has considerably exceeded that of any former year since an official record has been published, although the year was marked by no particular cyclonic storm; and the only conclusion to be arrived at is that the former statements have been incomplete. There is no increase in the number of wrecks, but a great change in the care taken to record them accurately.

There were 32 wrecks of English, French, and American ships, 4 Arab, 29 Burmese and Indian native craft, or a total of 65 ships (26,847 tons) and a loss of 138 lives; besides 98 casualties to ships. Many merchant captains persist in using charts issued by private firms which have not been corrected for the latest information, and nine wrecks, during 1877, have been distinctly traced to this cause. The Board of Trade should make the owners of ships responsible for the supply of correct official charts.

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THE *Bulletin of the Soci t  de Geographie Commerciale de Bordeaux* (Nos. 14, 15 and 16), contains some interesting articles. Among these is one on the rich mines of Copper pyrites at Castifao and Moltifao, in the northern part of the island of Corsica; on the people resident at the Cape of Good Hope, who bear French names, and whose ancestors emigrated originally to Holland and then to the Cape; on the revocation of the Edict of Nantes; on the economic geography of Frankfort-on-the-Main; and a notice of the discovery of some fossil elephant bones found at Pombonne near Bergerac.

## Log Book.

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**The Surveying Expedition of Sir George Nares.**—It is satisfactory that the work of surveying and exploring, one of the most important public duties performed by the Royal Navy, is now receiving more attention than has been the case for some years. There are four regular surveying ships in commission. The 'Sylvia' is doing valuable work in Japanese waters, under the able direction of Commander Pelham Aldrich, one of our leading Arctic sledge travellers; the 'Nassau,' under Captain R. H. Napier, with whom is Lieutenant Pirie, R.N., who served in both the Arctic voyages of the 'Pandora' with Sir Allen Young, is on the coast of China; and the 'Fawn,' commanded by Captain Wharton, is on the east coast of Africa.

On the 20th August 1878 Sir George Nares again commissioned the 'Alert,' at Sheerness, for surveying service in Magellan's Strait and the South Pacific. Since his return from the most successful and brilliant of all modern Arctic Expeditions, Sir George has been actively engaged in the preparation of his record of the voyage which was published last June, and which will be an enduring monument of valuable scientific work nobly and thoroughly executed. We rejoice that the old 'Alert' is still to be employed, under her former gallant leader, although not on that glorious Arctic service which has made her name immortal. We fear that two or three years will be wasted before English Arctic enterprise is again renewed, but meanwhile it is well that the brave old 'Alert' should be employed on useful service.

Under Sir George Nares the 'Alert' has five carefully-selected executive officers. The first Lieut., George R. Bethell, was in the 'Challenger.' The second Lieut. is the Hon. Foley Vereker, who did good service in the 'Nassau,' on the east coast of Africa, under Captain Gray, and is an admirable draughtsman. Lieut. Gordon S. Gunn received his surveying training in the 'Sylvia,' under Captain St. John; and the Navigating-Lieut., W. H. Petley, was in the 'Nassau.' He is the brother of the officer of the same name in the Indian Marine Survey Department. Sub-Lieut. James H. C. East passed in March 1877. The medical officer is Dr. Coppinger, who was Surgeon of the 'Discovery' in the late Arctic Expedition. Dr. Coppinger's scientific attainments are of a high order. He wrote a most valuable paper on the Petermann Fjord and Glacier, which he explored with Lieut. Fulford, and his telling evidence before the Scurvy Committee alone refutes the absurd report of that body. The Paymaster is Mr. North, an officer who served in the 'Nassau,' and who is warmly interested in surveying work. He also served in the 'Hydra' turret ship, under Captain Markham, from April to August 1878. Sir George Nares will have with him two or three of the old Arctics, besides Dr. Coppinger. Robert Joiner, the leading Stoker in the 'Alert,' again joins her as Engine-room Artificer. Spiro Capato, the Steward in the Arctic Regions, also rejoins the 'Alert:' and we believe that George Winstone, a young Able Seaman who was in the 'Challenger,' and also in the Arctic Expedition, is again to serve under

Sir George Nares. Winstone was one of Lieut. Parr's sledge crew in the Northern Division, and behaved most gallantly.

The first work of the 'Alert' will be in Magellan's Strait. Captain Mayne's survey extends from the Atlantic entrance at Cape Virgins to about Port Famine, with bits further westward. The triangulation from Cape Froward to Cape Pillar, and the survey of channels to the northward remain to be executed. Steamers used to enter the inner channels from the Gulf of Peñas in 47° 30' S. on the Pacific coast of Patagonia, but there is a dangerous place in Smyth's Channel, called the English Narrows, between Wellington Island and the main, owing to which steamers have lately been ordered to avoid this part of the route, and to enter the inner channels from the Gulf of Trinidad in 50° S. One important piece of work to be done by the 'Alert' is to explore the channels supposed to exist between the western side of Wellington Island and some outlying islands, so as to survey and explore another protected route for commerce. The work in Magellan's Strait will occupy from one to two years.

Sir George Nares will then proceed to execute several isolated but important surveys in the South Pacific. The first of these will be fixing the positions of Minerva Reef, in about 136° 30' W. longitude; of the Duke of Gloucester Islands; of Mopiha, or Howe Island, one of the Society Islands; and of Mauki, S.W. of the Society group. There are also some remarkable changes in the depth of the sea, caused by volcanic action, in the neighbourhood of the Friendly Islands; and a ridge with less than twenty fathoms lying east and west to the north of the Fijis, and extending to Mitre and Cherry Islands. D'Entrecasteaux reef, to the north-west of New Caledonia, also requires surveying, and there are several reported dangers which need investigation, between New Zealand and the Fijis. Finally, we believe that the 'Alert' will complete the soundings on the south-western coast of Australia, from Houtman's Albrolos to King George's Sound, including Geographe Bay.

**The Dutch Arctic Expedition.**—Good news has been received from the gallant little 'William Barents' up to the 22nd of July.

After leaving Bergen on the 18th of May, the Dutch explorers experienced a succession of northerly gales, in which their vessel behaved splendidly, but which tried their patience not a little. Still they kept steadily to their task and at last arrived at Jan Mayen Island, where they intended to land. But just before reaching the anchoring ground, they were driven away by a tremendous storm, and were obliged to steer to the north in accordance with their instructions. They proceeded along the West Greenland ice as far as 80° N., and then along the north coast of Spitzbergen to Wyde Bay, but northerly gales prevented them from going more than thirty miles away from the coast. Returning to Amsterdam Island, they made a good series of magnetic observations at Sabine's observatory, and then shaped a southerly course to Bear Island, which was reached on the 15th of July. From Bear Island they went to Vardö to post their letters, sailing thence for the Barents Sea and Novaya Zemlya on the 23rd of July. Many valuable magnetic, meteorological and other observations had been taken,

zoological collections had been made, and all on board were in good health and excellent spirits. They expected to find the pack ice far to the north, in the Barents Sea.

**Cummunications in Assam.**—A memorial on the subject of the urgent necessity for improving the communications in Assam was presented to the Secretary of State for India on the 24th and the signatories of the memorial, including Sir Rutherford Alcock, K.C.B., Colonel Hopkinson, C.S.I. (late Commissioner of Assam), Colonel Godwin Austen, Mr. Maitland (Director of the Assam Company), Mr. James Warren (Director of the Wilton Tea Company), Mr. J. B. Chalmers, Mr. Alfred J. Holiday, and Mr. Langford Locke had an interview with Viscount Cranbrook at the India Office, on the 31st of July, 1878.

The deputation pointed out that the fertile soil and unvarying rainfall of Assam ought to make the province the natural provider of grain for all the neighbouring districts of Bengal; while it is in fact a large importer of rice for the use of coolies in the tea plantations. The reason is that the supply of labour in Assam is so deficient, so difficult of increase, and so costly that it would not pay to employ it in the cultivation of low-priced grains. The consequence is that vast tracts of fertile country are lying waste for want of the needful labour to render them productive. One great object, with a view to remedy this evil, is to improve the communication between Calcutta and Assam, and it appears that the Government of India is alive to its importance. It is in contemplation to establish a fast line of steamers between Dibrugarh and some point near Dhubri, together with a short railway from Rungpur on the northern Bengal line to Dhubri. But the second object of the deputation is of most interest to geographers. It is to explore the region between Upper Assam and the Chinese provinces of Yunnan and Szechuen, where a large, needy and industrious population might supply a considerable portion of the required labour. The deputation very properly deprecated the short-sighted and mischievous reductions which have recently been made by the Government in the Survey Department, and especially the abolition of the most useful Topographical party in Assam, which has, it is said, been carried into effect.

Colonel Godwin Austen stated that at the village of Shangkam, on the banks of the Tenga-Pani river, a tributary of the Brahmaputra, three or four days journey east of Sudya, a petty chief resides who acts as interpreter between the Deputy Commissioner and the Singphus and Kamptis at the Sudya fair. This man has been to China and is prepared to act as a guide. Half way between his village and the River Irawadi is the town of Hobong where supplies could be renewed, an important point. Our relations with the hill tribes round the Assam valley have been continually improving for some years past. The presence of the officers of the Survey, who are accustomed to these people and their ways, has a very beneficial effect; and Colonel Godwin Austen considers that Lieut. Woodthorpe and other surveying officers could surmount the difficulties, and extend their explorations to Bhatang across an intervening narrow belt of 180 miles.

The importance of the interests concerned in the welfare of Assam furnishes a claim which cannot be

ignored. According to the latest return, that of 1876, there were 34,000 coolies imported into Assam in that year, making a total of 190,000 engaged in the province, and there were 800 tea gardens, 37 of which were opened last year. The out-turn of tea for this year, is estimated at not less than 34,000,000 lbs.

Efficient measures ought to be adopted for improving the communications of a province which contains so important an industry; and, in connection with these measures, most valuable geographical work should soon be undertaken, in exploring the still unknown region between Upper Assam and China. Lord Cranbrook, in reply to the Deputation, said that the requests it had urged, appeared to be both reasonable and important, and that he would communicate them to the Government of India.

**Indian Coast Surveys.**—A Survey of Paumban Pass has just been made by Mr. M. Chapman and one assistant, which will be shortly published. It will not only be of considerable use to navigators, but it is of still greater importance, as, from the elaborate detail in which it has been drawn, a clear idea of the exact state of the Ship Channel or "Pass" and its capabilities of improvements are at once demonstrated. It is rather a pity that Mr. Chapman has as yet given us no opinion as to the feasibility and value of further operations for the improvement of the "Pass," as it appears from his remarks that, between 1830 and 1854, works which cost only Rs. 350,000 improved the depth in the channel from 2½ feet at low water to 10½ and 15 feet, the depths at present obtained. It appears also from his description of the "Great Dam" that something might be done to confine the water, which now rushes over and between the rocks of which it is composed; and that if, as he says, "the northern Great Dam was built upon—say in three sections—to a height of 5 feet *above low water*, a much greater scour would be sent through the 'Pass' and deeper water obtained in the Sandbank Channel." From the records of the Marine Department it appears that in the years 1873-74 and '75 there was considerable traffic through the "Pass," the receipts on account of pilotage being from Rs. 22,234 in the former to Rs. 23,404 in the latter year; since then, however, there had been a marked falling off, as the receipts for 1876-77 only amounted to Rs. 18,709, and for 1877-78 only Rs. 10,553. In 1851 the receipts were Rs. 7716. Mr. Chapman does not give us any opinion as to the cause of the falling off apparent in the traffic through the "Pass" since 1875, and it would be worth while to enquire into this.

Lieut. Jarrad, R.N., and his party have also completed the survey of Viziadroog and Rajapur bays, with the intermediate coast. On comparing this survey with Montriou's survey of 1844 it does not appear that the former port has in any way deteriorated, but rather improved, if anything, in the depths of water obtained. Montriou's surveys, however, were hardly charted in sufficient detail to allow of a proper comparison being made. This little port would afford perfect shelter during the S.W. monsoon to vessels drawing 12 feet; and if vessels were moored head and stern, at least six could lie there at a time. During the N.E. monsoon it is a capital anchorage, and vessels of any draught can anchor there. Rajapur bay would also afford anchorage in the S.W. mon-

soon, but it is by no means so well sheltered as it is open to the westward, and on this part of the coast the wind during the monsoon is seldom southward of W.S.W. Charts of these surveys, as well as of Ratnagiri, will be published in Calcutta as soon as possible.

A new chart of the Gulf of Martaban, including the recent surveys of Rangoon and Maulmain rivers, with other additions, and corrected to the latest astronomical positions, has lately been issued by the Marine Survey Department, Calcutta. We observe what we consider to be a decided improvement in this chart on the old practice of depicting the character and limits of lights. On this chart the true limit of visibility of the light is shown, as well as the arc. On most other charts, including the Admiralty ones, the line showing the arc of visibility is not made to serve the double purpose, and is drawn at no particular radius. A chart which shows at a glance whether the estimated position of the ship comes within the limit of visibility of a light, is a much greater help to the navigator than one that does not.

These charts are published by the Department for immediate use in India, and are very clearly printed by the photo-zincographic process, which has been brought to such a high standard of excellence, under the superintendence of Captain Waterhouse, at the Surveyor-General's Office at Calcutta.

**A Lighthouse on Cape Guardafui.**—It is a disgrace to the civilized world that no international memorial has yet been raised to the late Captain Maury, the accomplished author of *Physical Geography of the Sea*, to whom the seamen of all nations owe more than to any other man who has lived in the present century. Captain Maury's friend and coadjutor Commodore Jansen, of the Royal Netherlands' Navy, (who wrote the memoir in our number for March 1873, p. 380) proposed that this international memorial should take the form of a lighthouse, and he has since suggested that no better site could be selected than Cape Guardafui.

The wrecks during the year 1877 strongly confirm the view of Commodore Jansen that a lighthouse ought to be erected on this cape. Hazy weather constantly prevails near Guardafui, and it is consequently exceedingly difficult to estimate distances. Two vessels, the 'Cashmere' and 'Meikong,' were wrecked this year in consequence of the absence of a light. Mr. Carrington, in his *Return of Wrecks for 1877* says that a light ought to be placed in the immediate vicinity of the cape with as little delay as possible.

**African Exploration Fund.**—The Report of the African Exploration Committee to the Council of the Royal Geographical Society having been adopted by the Council and approved by the Subscribers at a Meeting on the 14th of June, it was determined, in accordance with the Report, to despatch a small expedition to explore the country between the East Coast and the northern end of Lake Nyassa. The expeditionary party will be commanded by Mr. Keith Johnston, the well-known Geographer, who has had two years' experience as a scientific explorer in Paraguay, and will leave England in the autumn. Starting from the end of the caravan road, now being constructed by a party of English engineers, from Dar-es-Salaam (25 miles south of Zanzibar), the Expedition will direct its course to the northern end

of Lake Nyassa, a distance of 350 miles, and examine the newly-discovered Livingstone or Kondi Mountain range, reported to be 15,000 feet high, to the N.E. of the lake. Should this part of the journey be successfully performed and the resources of the party not have been exhausted, a further exploration will be made of the country (190 miles in width) lying between Nyassa and the southern end of Tanganyika.

As the extent and completeness of the proposed exploration will depend on the means at the disposal of the Committee, which at present do not reach £2000, a renewed appeal is made to the public for further support.

Donations and Annual Subscriptions may be paid to the Chief Clerk of the Royal Geographical Society, 1, Savile Row, W.; or to Messrs. Cocks, Biddulph, and Co., 43, Charing Cross, to the credit of the African Exploration Fund.

**Silver in Peru.**—Mr. Gibbs, the United States' Minister, has submitted to his Government the following interesting report on silver in Peru, written in reply to the interrogatories of the U.S. Monetary Commission: "Peru had up to last year no regular code of mining laws, the only ones in existence there being the modified colonial laws of Charles III. and Fernando VII., under which any person could establish his claim to a plot 200 varas square by publicly posting a description of the claim, and if the mine were a new discovery, to three additional plots of the same size adjoining the first. Each province has its special mining tribunal, subject to the Chief Court of Mines at Lima. The Peruvian Congress has, however, passed a new mining law aiming to counteract the evils of the old system under which mines could be held indefinitely, although under merely nominal working. There are over fifteen thousand mines in Peru, of which not more than six hundred are actually worked. The legal ratio between gold and silver was formerly one to fifteen and a half; but gold has been demonetised, and silver is no longer in circulation, owing to the suspension of specie payments. In 1876 gold ranged at 90 per cent. premium and silver about 56 per cent. While silver was a legal tender debts could be paid in either silver or gold; and by a decision of the courts, debts contracted previous to the suspension of specie payments by the banks, when not specially contracted to be paid in gold or silver, could be discharged in bank-notes. There is but little silver coin in Peru at present, although much plate, comprising even common bed-room utensils, is still owned by the families in the interior and in the large towns. The subsidiary copper coinage amounts to \$300,000, and is legal tender to the amount of five cents. The circulation of the four associated banks is \$13,000,000 against which \$1,800,000 is held, mostly in silver. Their bank-notes are a legal tender for all debts, taxes and imposts. During the past ten years \$36,000,000 worth of silver have passed through the Lima Mint for coinage or assay, the amount coined being over \$17,000,000.

Gold was demonetised by a law of December 30 1872. National gold coin pays 3 per cent. export duty, and coin is accordingly melted into bars to evade the prohibition. There is slight production of gold, but silver is largely produced and exported as metal or ores. Gold is imported for mercantile purposes, and having to be paid for in silver the loss of



time, freight, insurance, &c., enhances the relative premium on gold. Prices in Peru have nearly doubled with the premium on gold. Coinage is unlimited, gratis, the mint receiving bullion and returning its value in coin, even supplying the copper alloy at its own expense. Silver is found in all parts of the western range of the Andes, from lat. 3° to 22° south. The most important district, Cerro del Pasco, produced between the years 1630 and 1849 \$475,000,000. Mr. H. Meiggs offered to complete the railroad to the Cerro del Pasco mines. The existing road runs as far as Anahi, eighty-five miles, reaching a height of 12,220 feet above the sea, and is graded forty miles further, passing the summit at an altitude of 15,645 feet, some hundreds of feet higher than Mount Blanc. A tunnel, on the plan of the famous Sutro Tunnel, is projected at Cerro del Pasco, 150 feet below the present workings, and is calculated to open up 100,000 square yards of surface and \$500,000,000 worth of fresh ore. This is but one of the many mining districts. Others of equal or greater value exist in the province of Puno, with better railroad facilities. The difficulties in the way of smelting silver under the old system were incredible, the ores being transported great distances on mules over rugged mountain paths, where the animals and their loads were often lost through a mis-step; yet in thirty years, from 1790 to 1820, 101,784,476 ounces of silver were smelted at the seven Government works. Railroad facilities and modern processes of extracting the precious metal will soon give greater production from a larger area than any other in the world. There is an immense and fluctuating export trade in ore and bullion from Peru to England, the ore exported amounting, in 1872, to 598,404*l.*; in 1873 to 45,027*l.*; in 1874 to 175,927*l.*; besides \$1,600,000 in coin. In 1875, coin to the value of \$2,735,000 was exported, and in August, September and October of 1876, \$2,024,920."

**The Population of the Globe.**—Messrs. Behm and Wagner have brought out the fifth annual number of their tabular estimate of the population of the globe. We have subjected a good portion of the paper to minute examination, and, judging from the scrupulous care exhibited therein, we conclude that the whole paper is not only the best estimate of the world's population in existence, but in regard to well-known countries is very near the truth. The total population of the globe, as estimated in these annual reports, was 1424 millions in 1876, 1439 millions in 1877, and has risen this year to 1446 millions. This increase must of course be attributed almost wholly to increased accuracy in the returns.

**Survey of Albert Nyanza Lake.**—Mason Bey's survey of this lake in June 1877 has reduced its area considerably as compared with that executed by Romolo Gessi. Mason Bey checked his work by four astronomical positions, two at the lake's southern limit, which he lays down in 1° 10' N. latitude instead of 0° 50' N. as laid down by Gessi. It is much to be hoped that the facility and security of communication between Khartum and the lake, resulting from Gordon Pasha's measures, may lead to the hydrography of Lake Albert being thoroughly investigated, including the question of Stanley's Beatrice Gulf, and the entire region south of the Lake which is now involved in such uncertainty.

## Proceedings of Geographical Societies.

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### BRITISH ASSOCIATION.

#### GEOGRAPHICAL SECTION (E).

THE British Association for the Advancement of Science held their Annual Meeting on the 13th August at Dublin, under the Presidency of Mr. William Spottiswoode F.R.S. The Geographical Section (E) was presided over by Sir C. Wyville Thomson F.R.S., from whose opening address we have given the following extracts, relating, as they do, to subject matters to which the attention of geographers will naturally turn, considering how entirely Sir Wyville Thomson has made them his own. After referring to the chief geographical events of the past twelve months and pointing out how much they had added to our physical knowledge of the sea, the President went on to speak as follows of the general ocean circulation. It was pointed out long ago by Sir Charles Lyell that many of the most marked phenomena of the present physical condition of the globe depend upon the fact that the surface of the world is divided into two hemispheres, one of which contains nearly the whole of the dry land of this world, while the other is almost entirely covered by water. The centre of the land-hemisphere is somewhere in Great Britain, and the centre of the water hemisphere, which includes the southern sea, the South Pacific, whatever Antarctic land there may be, Australia, and the southern point of South America, is in this neighbourhood of New Zealand. With a full knowledge of the absolute continuity of the ocean we have hitherto been too much in the habit of regarding it as composed of several oceans, each possibly under special physical conditions. All recent observations have, however, shown us that the vast expanse of water which has its centre in the southern hemisphere is the one great ocean of the world, of which the Atlantic with the Arctic Sea and the North Pacific are merely northward extending gulfs; and that any physical phenomena affecting obviously one portion of its area must be regarded as one of an interdependent system of phenomena affecting the ocean as a whole.

Shallow as the stratum of water forming the ocean is—a mere film in proportion to the radius of the earth—it is very definitely split up into two layers, which, so far as all questions concerning ocean movements and the distribution of temperature is concerned, are under very different conditions. At a depth varying in different parts of the world, but averaging perhaps 500 fathoms, we arrive at a layer of water at a temperature of 40° F., and this may be regarded as a kind of neutral band separating the two layers. Above this band the temperature varies greatly over different areas, the isothermotic lines sometimes tolerably equally distributed, and at other times crowding together towards the surface, while beneath it the temperature almost universally sinks very slowly and with increasing slowness to a minimum at the bottom.

The causes of natural phenomena, such as the movements of great masses of water, or the existence over large areas of abnormal temperature conditions, are always more or less complex, but in almost all cases

one cause appears to be so very much the most efficient that in taking a general view all others may be practically disregarded; and speaking in this sense, it may be said that the trade-winds and their modifications and counter-currents are the cause of all movements in the stratum of the ocean above the neutral layer. This system of horizontal circulation, although so enormously important in its influences upon the distribution of climate is sufficiently simple. Disregarding minor details, the great equatorial current driven from east to west across the northerly extensions of the ocean by the trade-winds, impinges upon the eastern coasts of the continents. A branch turns northwards and circles round the closed end of the Pacific, tending to curl back to the North American coast from its excess of initial velocity; and in the Atlantic, following a corresponding course, the Gulf Stream bathes the shores of Northern Europe, and a branch of it forces its way into the Arctic basin, and battling against the palæocrystic ice, keeps imperfectly open the water-way by which Nordenskjöld hopes to work his course to Behring Strait. The southern deflections are practically lost, being to a great extent, though not entirely, dissipated in the great westerly current of the southern anti-trades.

One of the most singular results of these latter investigations is the establishment of the fact that all the vast mass of water, often upwards of 2000 fathoms in thickness, below the neutral band, is moving slowly to the northward; that in fact the depths of the Atlantic, the Pacific, and the Indian Oceans are occupied by tongues of the Antarctic Sea, preserving in the main its characteristic temperatures. The maintenance of a low temperature while the temperature of the floor of the ocean must be higher, and that of the upper layers of the sea greatly higher, is in itself a conclusive proof of steady movement of the water from a cold source; and the fact that the temperature of the lower layers of water, both in the Atlantic and the Pacific, is slightly but perceptibly raised to the northward, while the continuity of every layer with a corresponding layer in the southern sea can be clearly traced, indicates the southern position of that source.

The immediate explanation of this very unexpected phenomenon seems simple. For some cause or other, as yet not fully understood, evaporation is greatly in excess of precipitation over the northern portion of the land-hemisphere, while over the water-hemisphere, and particularly over its southern portion, the reverse is the case: thus one part of the general circulation of the ocean is carried on through the atmosphere, the water being raised in vapour in the northern hemisphere, hurried by upper wind currents to the zone of low barometric pressure in the south, where it is precipitated in the form of snow or rain, and welling thence northwards in the deepest channels on account of the high specific gravity dependent on its low temperature, it supplies the place of the water which has been removed.

The cold water wells northwards, but it meets with some obstructions on its way, and these obstructions, while they prove the northward movement, if further proof was needed, bring out another law by which the distribution of ocean temperature is regulated. The deeper water sinks slowly to a minimum at the bottom, so that if we suppose the temperature at a depth of

2000 fathoms to be 36° F., the temperature at a depth of 3000 may be, say, 32°. Now, if in this case the slow current meets on its northward path a continuous barrier in the form of a sub-marine mountain ridge rising to within 2000 fathoms of the sea-surface, it is clear that all the water below a temperature of 36° will be arrested, and, however deep the basin beyond the ridge may be, the water will maintain a minimum of 36° from a depth of 2000 fathoms to the bottom. In many parts of the ocean we have most remarkable examples of the effect upon deep-sea temperature of such barriers intersecting cold indraughts, the most marked instance, perhaps, a singular chain of closed seas at different temperatures among the islands of the Malay Archipelago; but we have also a striking instance nearer home. Evaporation is greatly in excess of precipitation over the area of the Mediterranean, and, consequently, in order to keep up a supply of water to the Mediterranean, there is a constant inward current through the Straits of Gibraltar from the Atlantic: I need not at present refer to an occasional tidal counter-current. The minimum temperature of the Mediterranean is about 54° F. from a depth of 100 fathoms to the bottom. The temperature of 54° is reached in the Atlantic at the mouth of the Straits of Gibraltar at a depth of about 100 fathoms, so that in all probability future soundings will show that the free water-way through the Straits does not greatly exceed 100 fathoms in depth.

It seems now to be thoroughly established by lines of trustworthy soundings which have been run in all directions, that the average depth of the ocean is a little over 2000 fathoms, and that in all probability it nowhere exceeds 5000 fathoms. Depths beyond 4000 fathoms are rare and very local, and seem to be usually pits in the neighbourhood of volcanic islands. In all the ocean basins there are depressions extending over considerable areas where the depth reaches 3000 or a little more, and these depressions maintain a certain parallelism with the axes of the neighbouring continents.

Within 300 or 400 miles of the shore, whether in deep or in shallow water, formations are being laid down, whose materials are derived mainly from the disintegration of shore rocks, and which consequently depend for their structure and composition upon the nature and composition of the rocks which supply their materials. These deposits imbed the hard parts of the animals living on their area of deposition, and they correspond in every way with sedimentary formations with which we are familiar, of every age. In water of medium depths down to about 2000 fathoms, we have in most seas a deposit of the now well-known globigerina-ooze, formed almost entirely of the shells of foraminifera living on the sea-surface, and which after death have sunk to the bottom. This formation, which occupies a large part of the bed of the Atlantic and a considerable part of that of the Pacific and Southern seas, is very like chalk in most respects, although we are now satisfied that it is being laid down as a rule in deeper water than the chalk of the cretaceous period.

In depths beyond 2500 or 3000 fathoms no such accumulations are taking place. The shores of continents are usually too distant to supply land detritus, and, although the chalk-building foraminifera are as abundant on the surface as they are elsewhere, not a shell

reaches the bottom; the carbonate of lime is entirely dissolved by the carbonic acid contained in the water during the long descent of the shells from the surface. It therefore becomes a matter of very great interest to determine what processes are going on, and what kind of formations are being laid down in these abyssal regions, which must at present occupy an area of not less than ten millions of square miles.

The tube of the sounding instrument comes up from such abysses filled with an extremely fine reddish clay, great part amorphous, but containing, when examined under the microscope, a quantity of distinctly recognisable particles, organic and inorganic. The organic particles are chiefly siliceous, and for the most part the shells or spines of radiolarians which are living abundantly on the surface of the sea, and apparently in more or less abundance at all depths. The inorganic particles are minute flakes of disintegrated pumice, and small crystalline fragments of volcanic minerals; the amorphous residue is probably principally due to the decomposition of volcanic products, and partly to the ultimate inorganic residue of decomposed organisms. There is ample evidence that this abyssal deposit is taking place with extreme slowness. Over its whole area, and more particularly in the deep water of the Pacific, the dredge or trawl brings up in large numbers nodules very irregular in shape, consisting chiefly of peroxide of iron and peroxide of manganese, deposited in concentric layers in a matrix of clay, round a nucleus formed of a shark's tooth, or a piece of bone, or an otolith, or a piece of siliceous sponge, or more frequently a fragment of pumice. These nodules are evidently formed in the clay, and the formation of the larger ones and the segregation of their material must have taken a very long time. Many of the sharks' teeth to which I have alluded as forming the nuclei of the nodules, and which are frequently brought up uncoated with foreign matter, belong to species which we have every reason to believe to be extinct. Some teeth of a species of *Carcharodon* are of enormous size, four inches across the base, and are scarcely distinguishable from the huge teeth from the tertiary beds of Malta. It is evident that these semi-fossil teeth, from their being caught up in numbers by the loaded line of the trawl, are covered by only a very thin layer of clay.

Another element in the red clay has caused great speculation and interest. If a magnet be drawn through a quantity of the fine clay well diffused in water, it will be found to have caught on its surface some very minute magnetic spherules, some apparently of metallic iron in a passive state, and some of metallic nickel. From the appearance of these particles, and from the circumstance that such magnetic dust has been already detected in the sediment of snow-water, my colleague Mr. Murray has a very strong opinion that they are of cosmic origin—excessively minute meteorites. They certainly resemble very closely the fine granules which frequently roughen the surface of the characteristic skin of meteorites, and from their composition and the circumstances under which they are found there is much to be said in favour of this view. I cannot, however, hold it entirely proved; there can be little doubt, from the universal presence of water-logged and partially-decomposed pumice on the bottom, and from the constant occurrence of particles of volcanic minerals in the clay, that

the red clay is formed in a great measure by the decomposition of the lighter products of submarine volcanoes drifted about by currents, and finally becoming saturated with water and sinking; and it is well known that both iron and nickel in a metallic state are frequently present in minute quantities in igneous rocks. I think it is conceivable that the metallic spherules may be derived from this source.

So far as we can judge, after a most careful comparative examination, the deposit which is at present being formed at extreme depths in the ocean does not correspond either in structure or in chemical composition with any known geological formation; and, moreover, we are inclined to believe, from a consideration of their structure and of their imbedded organic remains, that none of the older formations were laid down at nearly so great depths—that, in fact, none of these have anything of an abyssal character. These late researches tend to show that during past geological changes abyssal beds have never been exposed, and it seems highly probable that until comparatively recent geological periods such beds have not been formed.

It appears now to be a very generally received opinion among geologists—an opinion which was first brought into prominence by Professor Dana—that the "massive" eruptions which originated the mountain chains which form the skeleton of our present continents, and the depressions occupied by our present seas date from the secular cooling and contraction of the crust of the earth from a period much more remote than the deposition of the earliest of the fossiliferous rocks, and that during the period chronicled by the successive sedimentary systems, with many minor oscillations by which limited areas have been alternately elevated and depressed, the broad result has been the growth by successive steps of the original mountain chains and the extension of the continents by their denudation, and the corresponding deepening of the original grooves. If this view be correct—and it certainly appears to me that the reasoning in its favour is very cogent—it is quite possible that until comparatively recent times no part of the ocean was sufficiently deep for the formation of a characteristic abyssal deposit.

Time will not allow me even to allude to the interesting results which have been obtained from the determination of the density of sea water from different localities and different depths, and from the analysis of sea water and its contained gases, and perhaps these results have been scarcely sufficiently worked out as yet to afford safe bases for generalisation. I must, however, say a few words as to certain additions which have been made to our knowledge of the two hitherto impregnable strongholds of the frost, the regions round the North and South Poles.

The PRESIDENT then made a few remarks upon the question of the condition and nature of the North Polar Sea as deduced from various observations, and then proceeded to speak of the Antarctic regions. His remarks on this subject, together with abstracts of the various papers read at the meetings of this Section, will be given in our next number.

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## FRENCH GEOGRAPHICAL SOCIETY.

June 5th, 1878.—M. VIVIEN DE SAINT MARTIN in the chair. M. Chousserie, Professor of French at the Commercial School, Galatz forwarded a copy of a work entitled *The Geography of Roumania*. Letters from M. Savorgnan de Brazza and Dr. Ballay were received, the latter stating that he had ascended the Ogowai river up to the Pubava Falls, where it shrinks to the width of 20 yards. M. DUVEYRIER read a letter from M. Masqueray, who has journeyed to the south of Arabia in order to make researches into the ethics of a sect of Muhammadans called Abadia. The ABBE DURAND then read a paper on Cashmir and Tibet.

June 19th, 1878.—M. DE QUATREFAGES, presiding. M. DUVEYRIER, Vice-President, gave an account of the Italian expedition to Shoa from the time of its organisation up to the most recent news received, which was to the effect that the Marquis Antinori was at Shoa organising a scientific station. He had obtained a grant of land on the eastern slope of the Shoa mountains, and was making zoological collections. Messrs. Chiarini and Cecchi were proposing to penetrate into the southern provinces of Shoa and to explore the upper course of the Hawash, and M. Martini hopes to join them later on. M. WOEIKOF, a Russian *savant*, gave a description of his travels in Japan, in the course of which he took 400 barometric-height observations.

Extraordinary Meeting of June 28th, 1878.—Admiral Baron DE LA RONCIERE LE NOURY, President, in the chair. The meeting was held in the large amphitheatre of the Sorbonne, which was crowded to witness the award of the medals. The large Gold Medal was awarded to Mr. Stanley for his last important African journey, and another Gold Medal to M. Vivien de Saint Martin for his geographical works, and labours, comprising the editing the *Annales des voyages* for a period of 14 years, the compiling of his valuable *Année Géographique* for 13 years and his Dictionary of Historical Geography. M. Vivien de Saint Martin is the sole survivor of the original founders of the French Geographical Society in 1821, when he was 19 years of age, and his lifetime has since been strenuously devoted to geographical science. The third Medal was awarded to Dr. Harmand, whose travels in Cambodia were briefly sketched by M. Hubert.

July 3rd, 1878.—M. DE QUATREFAGES, presiding. The death was announced of two Englishmen, Messrs. Ryder and Rothwell, while ascending the Misti Peak, a volcano upwards of 15,000 feet high and situated about six miles north-west of Arequipa, in Peru. The death was also announced of M. Frederick Harit, Professor of Geology and Palæontologist, and head of the Geological Commission of Brazil. M. DELESSE made a few remarks on the projected Russian railway between Orenburg and Tashkent, especially with reference to the Karakum Sands, which were not so difficult to traverse. M. FRANTZ SCHRADER gave a rapid sketch of that portion of the Spanish Pyrenees between the Goritty pass to the north-west of Pampeluna and the north-west extremity of Spain. The Spanish Pyrenees, with the exception of their central part, he described as

altogether inferior to the French, and as presenting a wild and steep aspect, while several peaks attain the limit of perpetual snow. Their northern spurs are short and abrupt. The three principal chains are the Cantabrian, Austurian and Gallician Pyrenees. The spurs of the latter, which run out towards the ocean, form deep valleys covered with luxuriant vegetation. Coal mines are abundant, and other minerals are also to be found.

July 17th, 1878.—M. DE QUATREFAGES presiding. M. R. CORTAMBERT announced the death of M. Adolfo de Varnhagen, Minister Plenipotentiary of Brazil to the Austrian Government, one of the most distinguished *savans* in South America, and known for his writings on the historical geography of Brazil, and the discoveries of Amerigo Vespucci. M. GRAVIER read a review of the History of French Brazil in the sixteenth century by M. Paul Goffarel, showing that the French visited Brazil before 1500 and recalling the deeds of de Gonneville, Jean Ango, Parmentier, Verrazzano and others. The second and third parts, the Organisation and Decline of the French Colonies, treat mainly of the history of the French colony of Rio de Janeiro from 1555 to 1565.

## LYONS GEOGRAPHICAL SOCIETY.

Monthly Meeting of May 16th, 1878.—M. DE LA VAISSIERE, Superior of the Mission in Madagascar, gave an account of missionary enterprise in that island, together with a sketch of his journeys. The Catholic mission was regularly established in 1861, and numbers now between 42 and 45,000 members. The length of the island is about 1700 kilometres long, by 650 wide, and its various populations number in all about four or five millions. The summits of the interior range do not rise much above 6000 feet in height. The island is tolerably rich in vegetation, and in parts very fertile, though the indolence of the inhabitants deters them from making fair use of the soil. M. de la Vaissière gave some particulars regarding the Ovas, the most powerful people in Madagascar. They fatten and export oxen in considerable quantities to Mauritius and Réunion. The currency system is exceedingly primitive, but five-franc pieces circulate generally, and are cut up into fractional parts to serve as smaller change. The inhabitants in the north are said to be cannibals, but M. de la Vaissière traversed the whole country without being molested, and even experienced great hospitality. There are neither roads nor bridges, travellers are borne on a sort of chair carried on men's backs, a kind of locomotion which is very expensive. A French house is now endeavouring to start interior navigation on one of the rivers.

M. MILSOM then read a paper on the famine in the northern provinces of China, and ascribed the present distress to the disforestation which had there taken place, and to the apathy and indolence of the Chinese government in allowing all means of communication, roads, bridges, &c., to fall into complete decay. After detailing the relief system adopted, the author concluded with a strong appeal to France for contributions.

The PRESIDENT seconded this appeal, and suggested that the Journal of the Catholic Missions, which had

collected close on 500,000 francs (£20,000) for the Indian famine, should start a similar subscription for the Chinese famine.

—:o:—

#### ROCHEFORT GEOGRAPHICAL SOCIETY.

THE first meeting of the Rochefort Geographical Society was held on the 19th July, M. FONCIN, Vice-President of the Bordeaux Geographical Society, being in the chair. An opening address was delivered by M. FONQUIER, Professor of Philosophy at the College of Rochefort, who afterwards spoke on the subject of Canada, a country which, as an old colony, possesses great interest for Frenchmen.

—:o:—

#### HALLE GEOGRAPHICAL SOCIETY.

June 5th, 1878.—Dr. KIRCHHOFF presiding. Dr. KOHLSCHÜTTER read a paper on "A visit to the towns along the Riviera di Ponente." He explained that this term included San Remo, Mentone, Monaco and in fact all the Ligurian coast east of Nice. The three places mentioned were well protected from the north winds, the Sirocco blowing from the sea has its force mostly broken, and the Mistral, which reaches Nizza and Mentone scarcely touches San Remo. Dr. Kohlschütter entered fully into the natural characteristics of the various places and displayed a numerous collection of photographs of the places visited.

—:o:—

#### SPANISH GEOGRAPHICAL SOCIETY.

THE *Boletín* of the Spanish Geographical Society for January 1878 contains two valuable memoirs by Don Justo Zaragoza and Dr. Hamy (the latter translated from the *Bulletin de la Société de Géographie de Paris*), on the early discoveries of the Spaniards in the South Pacific, and on the coasts of New Guinea. In a previous number (*Tomo I.*) Señor Zaragoza had given some account of the expeditions of Memdãña and Quiros, up to the time when the latter returned from the New Hebrides to Mexico in October 1606.

The present number opens with the letter which the second in command, Luis Vaez de Torres, addressed to King Philip III. from Manilla, on the 12th of July 1607. The original is at Simancas. It is also given in Burney's voyages, and by Lord Stanley of Alderley in his Philippine Islands. Torres says that after parting company with Quiros at the bay of San Felipe y Santiago, in the island of Espiritu Santo (one of the New Hebrides) he sailed N.W. until he came to New Guinea, and coasted along the south end. He describes the country as thickly peopled, with many large harbours and rivers, and islands off the coast. He went thence to the Moluccas, passing innumerable islands.

The valuable surveys executed by Captain Moresby, in H.M.S. 'Basilisk,' proved that the eastern extreme of New Guinea did not end in a long narrow point, as shown on former maps, but in two arms enclosing a deep bay, with an archipelago of islands prolonged from the southern arm. Señor Zaragoza claims that all these details had been discovered and mapped by Torres, 270 years before.

Torres had been preceded, on the coast of New Guinea, by other Spanish Explorers, namely Saavedra in 1528, Grijalva and Alvarado in 1537, and Inigo Oriz de Retes in 1545. Of the two first there are only vague accounts, but the narrative of the voyage of Retes is more circumstantial. All appear to have been on the northern side of the island. Torres, however, made a more remarkable voyage; and it was Alexander Dalrymple who brought to light the memorial of Juan Luis Arias, showing that Torres sailed between New Guinea and

Australia. Dalrymple, therefore, gave the name of Torres to the strait. The Spanish navigator sailed to the eastern extreme of New Guinea, was unable to double it, and therefore returned through the strait which now bears his name, and along the southern coast.

It appears that Diego de Prado y Tovar was captain of the ship of Quiros, but that he deserted at Taumaco, and joined Torres. This man sent two letters, with a map of the discoveries of Torres, and some plans, to the King of Spain in 1614, from Goa. The letters are preserved at Simancas. The map is lost, but the four plans have lately been discovered at Simancas. The first represents the Bay of San Felipe y Santiago in the island of Espiritu Santo. The second is called the "ports and bays of the land of San Buenaventura;" and it is maintained that this represents the south-eastern end of New Guinea, which was re-discovered by Captain Moresby in 1873. The Milne Bay of Moresby is shown on the Spanish plan of 1606, as well as Challis Head of Moresby, which Prado calls "Cabo Fresco." Jenkins Bay is called, "Baya de San Millan." "Rocky Pass" of Moresby is "Boca de la Batalla" of the Spanish surveyor, "Buenaventura" is Basilisk Island, and Hayter Island is "Magna Margerita." Many of the other localities can also be identified. The latitude of the Spaniard is correct, namely 10½° S. and on his chart is written "*descubierta por D. Luis Vaez de Torres, el 18 de julio de 1606, a\* los 10½° Sur.*"

The third plan is of the great bay of San Lorenzo discovered by Torres on the 10th of August 1606; which is identified with that named by Bourgainville Le Baie de l'Orangerie.

Don Francisco Coello, the President of the Spanish Geographical Society, is of opinion that the old names given to these localities by Torres in 1606 ought to be preserved. The plans, coloured like the originals, are given at the end of the *Boletín*.

In the *Boletín* of March 1878, there is an account of the exploration of part of the south-west coast of Africa in search of the site of an ancient Spanish port known in history as "Santa Cruz de Mar Pequeña." This service was performed by Captain Cesareo Fernandez-Duro, on board the steamer 'Blasco de Garay.' That officer has corrected the position of the mouth of the River Asaka, near Cape Nun, and often called Guad Nun on old charts. He has also approximately fixed the site of the old fort, as well as the mouths of the Rivers Draa and Xiliba. The *Boletín* contains a coloured chart of the part of the African coast that has been surveyed by Captain Fernandez-Duro.

\* See the map facing p. 361 of our number for December 1873.

## NOTICE.

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THE  
GEOGRAPHICAL MAGAZINE.

OCTOBER, 1878.

CONTINUANCE OF ARCTIC RESEARCH.

II.

ITS VALUABLE RESULTS, AS SHOWN IN THE STUDY OF THE KNOWN PARTS OF GREENLAND.

IN the article on the above subject in the number of the *Geographical Magazine* for Sept. 1877 (page 223), I pointed out that if the encouragement of maritime enterprise and the exploration of the unknown polar region were objects of sufficient importance to justify the despatch of an expedition to commence that work in 1875, those objects still exist. The great success of the Arctic Expedition of 1875-76, and the experience gained in it, furnish new strength to arguments in favour of further efforts; while the recent discoveries add fresh interest to Arctic research, and give additional scientific importance to its completion. We also recapitulated the rules for Arctic exploration which have been established by long experience, and showed that, in accordance with those rules, the next work ought to be the discovery of the northern sides of Greenland.

There is, I believe, nothing that is better calculated to produce a conviction of the usefulness of those Arctic expeditions of discovery which have redounded so much to the honour of our country, and have added so largely to the sum of human knowledge, than the contemplation of what has already been discovered in one division of the polar region, such as the known part of Greenland. Apart from the intrinsic interest of such a review it will show the objects of Arctic exploration generally, and the wide field of scientific study, in almost every branch of investigation, that it opens out; as well as the rich and fruitful results that have been, and yet may be obtained from it.

There is an area of many thousands of square miles within the Arctic Circle of which we are in total ignorance. There is also as vast a region respecting which our knowledge is limited, and where an increase of it is very desirable. But there are portions also where investigation has been going on over a long period, has been continuous for some time, and is now tolerably complete. It is to the partially discovered and examined part that most interest attaches. When the curtain is down and all is concealed, there is no food to keep imagination alive. But as soon as it has been partially withdrawn, the portion which is revealed increases the mystery that attaches to the still hidden parts, and gives full scope to a laudable curiosity.

VOL. V.

In such a position are the wild lands discovered by the Austrians, between Spitzbergen and Novaya Zemlya, whose northern shores will some day reveal many of nature's secrets. With similar longing does the intelligent enquirer await the discovery of the north-east passage, of the untrodden Wrangel Land—occasionally seen but never visited—and of the region north of the Parry Islands. Above all do we seek for a knowledge of the northern and unknown half of Greenland; because the portion of that country which has already been revealed to us is so full of interest in every branch of science.

The vast extent of Greenland, which entitles it to be considered as one of the great divisions of the earth, gives it a solid claim to special attention. But it is the position it occupies which secures for it a peculiar interest. In the first place it embraces, owing to its great length, of probably 1500 miles, all the characteristics of three distinct zones—namely, the Sub-Arctic, the Arctic, and the Polar Regions. Secondly, its elevation above the sea produces those stupendous phenomena of illimitable glaciers and ice-streams, which can be studied in no other part of the world. Thirdly, its geographical position between Europe and America has given to investigations relating to Greenland ethnology, history, zoology, and botany, a special value and importance.

It is necessary for the enquirer into these interesting subjects to have the general and characteristic features of Greenland always before his mind's eye. This great division of the earth's surface is in the shape of a triangle, with its apex pointing to the south, and its hypothenuse almost entirely unknown. Its interior is also nearly a closed book to us; it is believed to consist of a vast glacier whence ice-streams find their way to the coast region. But the coast has been pretty thoroughly explored and examined on the western side, from Cape Farewell to Upernivik, a distance of about 800 miles, as well as along the western shores of the channels leading from Smith Sound; and from Cape Farewell to the Danebrog Islands, together with the coasts discovered by Scoresby, Clavering, and the Germans, on the east side. These belts of coast line consist of the most glorious mountain scenery—lofty peaks, profound ravines, long valleys, precipices and cliffs, vast glaciers, winding fiords often running a hundred miles into the interior, and innumerable off-lying islands.

The first subject of interest relating to this wild and beautiful land is the ethnology, the question of how and from whence its coast line was peopled. The



Innuits of Greenland, the small men and women with the oblique eyes, flat noses and straight hair of the Tatar race appear to have lived on those Arctic shores for many centuries, while it is clear that they originally came from some far distant Asiatic cradle. The Eskimo race is the most widely diffused in the world; it stretches over the northern shores of the two continents. Its wanderings must have been of marvellous extent, and when its history is unravelled it will reveal adventures of deep and romantic interest which are now faintly shadowed forth in a few dim traditions. Not only similarity in physical appearance but also in language identify the different tribes of the Eskimo race scattered over thousands of miles from Siberia to Cape Farewell.

In former years, and especially when I was serving in one of the searching expeditions for Sir John Franklin, I paid very close attention to the history of Eskimo wanderings, striving to find the clue which would disclose the road by which Greenland was peopled. I discovered that along all the shores of the Parry Islands, that great archipelago stretching along the northern border of America, and on a line extending from the northern part of West Greenland for several hundred miles in the direction of Siberia there were traces of Eskimo encampments of great antiquity and at very short intervals. Those desolate shores could not support human life for any length of time, but Greenland can; consequently, these vestiges proved that a stream of migration had, in remote times, moved steadily from Asia to Greenland on a line far to the north of the American coast.

I remember once when I was examining the shores of Griffith Island for traces of our lost countrymen I had been out for some distance on the ice to get a shot at a brent goose which I had marked down behind a range of hummocks. Returning to the land at another part of the coast I came to some shingly beaches raised one above the other. In walking across the highest terrace I found a long willow switch lying imbedded in the pebbles and covered with lichens; it was 3 feet 2 inches long. No such thing could grow within many hundreds of miles of the place where I stood; consequently it must have been brought there by some one who had marched for many hundreds of miles long, long ago. I looked about me, and there sure enough, within a few yards of where the switch was lying, were the circles of stones marking the site of an Eskimo summer encampment, but covered with lichens and of great antiquity. I found here two portions of the bone runner of a sledge and a piece of bone cut for use as a funnel to lead down melting snow into a pot or other vessel. Afterwards I found perfect winter huts on the coast of Cornwallis Island with stone fox-traps, stone lamps and graves. Subsequent expeditions found many more, and by collecting all their observations I made out a continuous chain of such vestiges from the westernmost extremes of Melville and Banks Islands to the Cary Islands, within sight of the coast of Greenland. The late Arctic Expedition has completed our knowledge of Eskimo wanderings towards the Pole.

The Icelandic Sagas point to the north as the direction from which the Eskimos first came to South Greenland, and this is confirmed by Eskimo tradition. There is one very remarkable piece of evidence which,

if it is fully substantiated, will be conclusive on this point. In the old so-called "house places" in South Greenland, where arrow-heads and many other curious relics have been collected, iron of a kind never found in Danish Greenland has been met with. But the "Arctic Highlanders," an isolated tribe in the extreme north of Baffin Bay, had iron knives when they were first visited made from an ore full of nickel, which is met with near Cape York. The small rounded flakes of iron were fitted into a bone haft in a very peculiar and ingenious way, each piece of iron slightly overlapping the other, and the security of all depending on a pin at one end. These Cape York bits of iron are identical with the ancient relics of South Greenland; while the only iron there found is meteoric and would crumble into dust if an attempt was made to weld it into any shape. The people who used the iron discovered in South Greenland must, therefore, have originally wandered southwards from Cape York. Thus bit by bit will our proofs be built up of the direction whence the people of Greenland came. There is reason to think that they were *in* Greenland, at least in the northern parts, even before the arrival of the Normans on the coast.

From these ethnological speculations we turn to the romantic history of the colonization of Greenland by the Norsemen from Iceland, which would be little understood if the explorers of fiords and headlands had not discovered ruins and inscriptions which identify sites, and thus illustrate and make intelligible the ancient narratives.

This story of the ancient Norman colonies in Greenland is one of peculiar interest, both as it relates to the wild fiords and headlands on which settlements were formed at so early a date, and because it was from Greenland that America was first discovered.

In a monastery on Flatö Island, north of the Breida Fjord in Iceland, there was found a collection of manuscripts called *Flatöbogen*, from the place where they were discovered, which proved to be copies of ancient Sagas or narratives of the deeds of early discoverers and warriors. Among them was the Saga of Erik the Red, written in the 12th century. It tells how a Norwegian named Thorwald, with his son Erik, fled from Norway to Iceland in consequence of a murder; how Erik, surnamed the Red, was outlawed in Iceland for another murder; and how he then sailed away, with a few followers, to search for a new land which another rover named Gunbyörn had seen some years before, when he was driven out to sea to the westward. Erik set sail on this lonely quest; he found the new land, and passed two winters there. Then he returned to Iceland, and came with his ship into Breidafjord, calling the land which he had found "*Greenland*," because, said he, "people will be attracted thither if the land has a good name."

The Saga then relates how Erik the Red went to colonize Greenland with thirty-five ships from Breidafjord and Borgafjord in Iceland, but only fourteen arrived; and then follows an enumeration of the leading men who came with Erik, and of the settlements they formed. The date of this event is fixed by the statement in the Saga that it took place fifteen winters before Christianity was established by law in Iceland, in A.D. 1000. The first colonization of

Greenland consequently took place in the year 985 A.D.

Erik the Red, we are told, lived at Brattahlid, and he had three sons named Leif, Thorvald, and Thorstein, and a daughter married to a rich man named Thorvard who lived at Garde. Herzielf, another Icelandic Lord, went with Erik and settled at Herzielfsness, and the Saga narrates the events of an enterprising voyage made by young Bjorni, the son of Herzielf, to join his father. In this voyage the youthful Viking discovered the coasts of Connecticut and Massachusetts, of Nova Scotia and Newfoundland, before he eventually found the fjord on the Greenland coast where his father dwelt. This was in 986. Then Leif, the son of Erik, bought the ship from young Bjorni and made another voyage of discovery, and once more the American coast was visited. Other expeditions were undertaken by his two brothers; intercourse was kept up with Iceland and Norway, and in course of time Leif embraced Christianity and brought priests to Greenland. So the aged Erik and all the settlers were baptized. The Saga of Thorfinn tells us of other voyages to America; and from another source we obtain a list of the Greenland Bishops, accounts of voyages far to the north up Baffin Bay, and enumerations of Norman settlements on the Greenland coasts.

But these stories needed life to be breathed into them by the labours of explorers; and I have brought the Sagas and their contents to notice, in order to show you how much the historian is indebted to the exploring antiquary for importing living and breathing interest into his narratives. Without the interest given to the Sagas by the identification and description of the places they mention, which enable us to clothe the bare facts with surroundings of scenery, and to picture to ourselves even the dwellings and the churches of the Norman settlers, the stories they tell would be as dry bones without life or motion.

Modern explorers have thus given life and interest to the ancient Sagas. For centuries it was not known where the Norman settlements had been, and even expeditions were sent to the east coast of Greenland, which had never been settled, to seek for them. Patient research has at length established the sites of the Norse colonies, and the truth respecting them excites our admiration of the prowess and skill of the redoubtable Norman rovers. Erik must have first reached the east coast, where he found a barrier of impenetrable ice. He then sailed southward for 400 miles and rounded Cape Farewell, where again he would have to do battle with the ice-floes before he could reach the coast, and then he must have had a long and perilous search before he discovered the rare little patches of green valley far up the fjords, where the settlements were planted. For the Norse ruins are found in the very best and most fertile situations in all Greenland. No better localities for settlers have since been discovered.

The explorers of the present century have identified the abode of Erik the Red, which he called Brattahlid. It is a lovely spot on an isthmus between two fjords, where there are ruins and foundation walls of seventeen buildings on a pleasant grass-covered plain. Brattahlid means the steep side of a rock, and a smooth cliff has been used as one side of the principal building among the ruins. The other walls are over 4 feet

thick, with interposed clay, and the interior of the house was 40 feet long by 20 broad. Near Brattahlid are the still more perfect remains of the Norman church at Kakortak, and other ruins identify nearly all the places of the Sagas. Then there are fragments of the church bells, and, above all, three Runic inscriptions on tombstones. One, near the old home of Erik, is of the 11th century, and bears an inscription to the effect that the daughter of Vigdis Mars rests there; another on the site of ancient Herzielfsness, near Cape Farewell, is to the memory of a forgotten Norman settler named Hrvar Kolgvinsson.

The Norman colonies did not extend further north than 65°; but in the summer time the bold settlers carried on seal and narwhal hunting in the far north, and also went on voyages of discovery. In 1824 a Runic stone was discovered near Upernivik in 72° 55' N., stating that three explorers named Erling Sighvatsson, Biarni Thordarsson, and Eindrid Oddsson erected a cairn and explored on April 25th 1135. Moreover, a letter has been preserved which gives an account of an expedition that penetrated an unknown distance further into the polar regions in the year 1266, under the auspices of some clergymen of the Greenland bishopric of Gardar. They sailed from a summer station called *Kroksfjardarheidi*, on the north side of Lancaster Sound; ran before a southerly wind for three days; and it was after returning for four days that they described an observation which, according to Professor Rafn, places them in 75° 46' N. Four days' sail from such a position would have taken them a long way up Smith Sound. When we remember the small Runic stone, not larger than a hone, which was found near Upernivik, and the ordinary custom of the Norsemen to leave such permanent records, it will be seen that further research in the polar regions may well throw additional light on these romantic voyages of the Norse Vikings. I even believe that the late Arctic Expedition actually did find vestiges of a former visit of the Norsemen on Washington Irving Island, which is far up the strait leading from Smith Sound. In no other way can the two lichen-covered cairns discovered there be accounted for.

Surely in all this there is a wide field for further investigation; and the old Sagas, thus illustrated by modern research, throw a rich halo of romance over Arctic lands, while the heroes they celebrate are bright examples of courage and indomitable perseverance as discoverers. It is their love of adventure for adventure's sake which is so admirable, and in which they resemble our modern Arctic naval officers. In spite of dangers and hardships the Norseman of old, like the explorers of to-day, always longed to renew their efforts to achieve discovery.

We learn from a brief of Pope Nicholas V., written in 1448, that the Normans of Greenland had built many churches and a handsome cathedral, but that thirty years before, that is in 1418, the settlements had been attacked and destroyed by savages who left only a few survivors. This account is corroborated by Eskimo traditions.

So ends the story of the Normans in Greenland, and there was an interval of three centuries before another permanent settlement was formed on the shores of those lovely fjords. But the coast was visited by Frobisher and Davis, and afterwards by our countrymen in the Danish service, Hall, Knight, and

Cunningham; while Baffin was in two voyages, in the last of which, in 1616, he discovered and circumnavigated the bay which bears his name.

The modern explorer naturally takes a deep interest in reading of the grand exploits of his Elizabethan predecessors who, with such insignificant means, achieved such great results. Reaching the coasts of Southern Greenland was almost as hazardous and adventurous an undertaking for our ancestors as the attainment of the 83rd parallel is for the modern explorer, so great is the difference in the means and appliances. It is therefore with a feeling of reverence that we trace out the tracks of such men as Baffin and Hall and identify the positions of places mentioned in their narratives.

James Hall made four voyages to Greenland from 1605 to 1612, three in the service of Denmark and lastly with some English adventurers, one of whom was Baffin. In these voyages he explored the fiords and islands near the modern colony of Holstenborg, and his descriptions enable us to identify most of the places mentioned. The Danes had carried off some of the Eskimos by force with their kayaks, and when Hall landed on his last voyage he was recognised as having been with these aggressors. A brother of one of the kidnapped people came up and gave him a mortal wound in the side with a dart. This James Hall was an experienced pilot and a gallant seaman.

To me, and I think to most of us, there is a fascination in reading of the brave deeds, the anxieties, the wishes and hopes of these ancestors of ours who lived and worked so long ago, and each in his steadfast honest way strove to do his best to advance the interests of his country. Sometimes a person appears on the scene in whom one gets interested, and who as suddenly disappears. Such an one was Pilot Hall's "boy," named William Huntris, of Scarborough, who was with him in all his voyages, and who evidently had the makings of an able and fearless explorer. In Hall's first voyage we hear of this boy as receiving a wound in defending his master, in the second he was allowed 30% for his skill in navigation, and in the fourth he was grown up and pilot of the 'Heartsease,' when he tenderly nursed his dying master after he had received his death wound. Hall was buried at his own request on one of the off-lying islands near Holstenborg, where no stone marks his grave, but he was the first Englishman who left his bones in Greenland, and the story of his death is told by his companion, the renowned Baffin. The 'Heartsease' parted company in a gale of wind on the voyage home and we hear no more of the faithful young Huntris, who drops altogether out of history. In August 1875 I was on several of the off-lying Greenland islands near the scene of Hall's death, and pictured to myself the sailor's funeral, with William Baffin of imperishable fame and the equally brave young Huntris mourning over the shallow grave.

It is the speculations respecting the first inhabitants, the romantic story of the Norman settlers, and the reminiscences of our own glorious ancestors, aroused by names of bays and headlands, which give such vivid interest to this western coast of Greenland. But this interest is immeasurably enhanced by the magnificent scenery, and by the unequalled grandeur of nature's work; which has been so exhaustively

examined, so far as the coast is concerned, by the learned Danish naturalists.

It was in 1721 that Hans Egede, the apostle of the Eskimos, arrived in Greenland; and since his time the labours of Crantz and Graah, of Fabricius and Rink, and of many other eminent scientific Danes, have shown how vast a field of valuable research is afforded by an Arctic land, how useful are the results of such research, and how utterly incomplete would be our knowledge, in almost every branch of science, if the unknown polar regions were allowed to remain a blank. The Scandinavian kingdoms are richer in literary and scientific men of the first rank, in proportion to their populations, than any other European country; and one of the greatest services they have performed is to demonstrate the numerous valuable results to be derived from Arctic research.

It is to them, especially to Professor Nordenskiöld and the geologist Helland, that we owe our slight knowledge of the Greenland interior—a vast region into which it has been found impossible to penetrate for any great distance. The native Eskimos have a superstitious awe of the ice-covered country which is looked upon as the dwelling-place of monstrous and terrible beings. This interior, exclusive of the inhabited coast line with its deep fiords and lofty mountain ranges, covers an area of 320,000 square miles, the whole of which is one mass of glacial ice, with a few ice streams reaching the coast and breaking off in the form of icebergs.

Professor Nordenskiöld, during his remarkable journey in 1870, has seen more than any one else of the marvellous Greenland glacier. The rocky region of the coast is bordered by an ice wall several hundred feet in height, which in many places cannot be scaled. One peculiarity, in which the Greenland interior differs from ordinary glaciers is the almost total absence of moraine formations. The surface consists of closely heaped ridges and pyramids of ice 40 feet high, with an inclination of from 20 to 30 degrees near the outer edge, but becomes smoother further inland, and is cut up by large bottomless chasms. There is a constant rise, broken, however, by occasional valleys, the centres of which are occupied by lakes and ponds during the summer; and innumerable rivers flow along the depressions.

On the surface of the inland ice there are no stones; but in all directions are vertical cylindrical holes a foot or two deep, nearly full of water, with a layer of grey powder in the bottom of each. This very curious powder is a sandy trachytic mineral, with a composition which indicates that it does not originate in the Greenland granite. Its origin is, therefore, an interesting problem. It may be meteoric, or more probably it comes from an unknown volcanic region far away in the interior.

This minute powder, together with a small brown *alga* which is found in it, is the most dangerous enemy to the stupendous mass of Greenland ice, many thousands of feet thick, and hundreds of miles in extent; for the dark mass absorbs a far greater amount of the sun's rays of heat than the white ice, and thus produces deep holes over its whole surface which greatly promote the process of melting.

The grandeur and lovely majesty of this region are most impressive. No living creature is seen; nothing but a white world supporting a blue vault, while from

far below there comes up a peculiar subterranean hum, proceeding from rivers flowing within the ice. This moaning noise is varied, at intervals, by loud reports like artillery, when a cleft opens in the surface. Here and there the white landscape is relieved by a well-defined pillar of mist rising into the sky, coming from a bottomless abyss, into which one of the numerous glacier rivers is falling. The vast roaring water-mass bores for itself a hole in the ice, probably all the way down to the rock beneath, a depth of at least 2000 feet.

Professor Nordenskiöld penetrated over the inland ice for a distance of 30 miles from the edge, where he was 2200 feet above the sea; and the ice was still gradually rising to the eastern horizon.

The most wonderful sight is one of the glacier rivers, deep and broad, flowing between blue banks of ice to some vast abyss where the whole immense mass of water rushes down a perpendicular cleft into the depths below, forming a magnificent waterfall. A white pillar of mist rises up into the blue sky wherever these rivers disappear over the still bluer cliffs. Such marvellous sights as these can only be seen in the interior of Greenland; and if hereafter the dauntless explorers of unknown regions ever penetrate still further over the mighty glacier, in all likelihood still more of nature's wondrous secrets will be revealed, and sights of equal beauty and grandeur will be witnessed.

The drainage of the great mass of Greenland is partly provided for by the ice streams which, at certain points along the edge of the glacier, issue into the sea, and are broken off in the form of icebergs. These bergs, when in a massive form with a flat top, are about 100 feet high; and when they run up into peaks and ridges they often attain a height of 200 and even 300 feet; and eight times as much of the bulk lies below the surface. They burst asunder and are riven into pieces by the action of the sea, so that they are met with of every size and shape. The glacial stream slowly advances down to the head of a fiord and then out into the sea, where the buoyancy of the water has a tendency to raise the ice-tongue upwards, so that a high tide or any other slight additional movement will break off the outer end and form a berg. In 1875 Amund Helland, a Norwegian geologist, investigated the action of the inland ice on these ice streams. He has carefully measured the rate at which the ice streams are pushed forward from the interior towards the sea. He found one of them to be 300 yards in thickness and  $3\frac{1}{2}$  miles wide; and that it moved at the rate of 47 feet a day during the summer season, which is twenty times the velocity with which glaciers advance in the temperate zone. No motion of ice takes place without an accompaniment of water, which issues forth underneath it, and thus the drainage is mainly effected. On the west coast of Danish Greenland there are twenty of these ice streams or outlets, over an extent of a thousand miles of coast line, and the actual discharge has been calculated from the *data* obtained by Helland. But further observations are needed before there can be a complete solution of this as of many other problems in physical science.

The scenery in the neighbourhood of these ice streams is absolutely unique, and is surpassingly beautiful. One such view is obtained from the summit

of a mountain called the Lyngmarkens-fjeld on Disco Island which overhangs the harbour of Godhavn. The blue expanse of the bay is dotted with innumerable bergs of all shapes and sizes, their dazzling whiteness contrasting with the deep blue of the sea. Far away the great ice stream of Jacobshavn is distinctly visible, whence the bergs were drifting in a continuous stream, first in one serried mass of white, then blue specks appeared in it, which got larger and larger until the blue prevailed with the white masses dotted thickly over it.

Still more magnificent is the scenery in the Waigat Strait, between Disco and the mainland of Greenland. I crossed this strait in an open boat, under sail, in the evening of the 18th of July 1875. It had come on to blow hard, with rain, and threatening dark clouds were banking up across the Disco mountains. The scene was indescribably grand and wild. An army of icebergs was drifting down the Waigat, and occasionally calving or turning over with a loud echoing noise. Some of them were of great height, with their pinnacles 300 feet above the sea, peering over the wild scud and mist. Now and then a gleam of sunlight brought out a peak of the Disco mountains in bright relief. The boat, under a close-reefed sail, scudded before the squall at a brave pace, breasting and dashing through the waves, while the white spray curled round her and flew from her bows. The spray also dashed wildly over the icebergs which were drifting down the strait, rising and falling on the waves, and occasionally coming into collision with a loud report. It was no easy work to steer clear of them, so thickly were they crowded together. In calm weather the scenery of the Waigat is different, but equally lovely. Icebergs rest quietly on the glassy surface of the sea, and the sharp serrated outline of the Noursoak mountains stands out in clear relief against the bright golden sky, while the precipices of Disco have a ruddy reflection on them from the midnight sun. There is certainly no better locality for studying the formation and movements of icebergs, which can be seen drifting in hundreds out of the glacier-discharging fiord, and floating in imposing masses down the strait, grounding and again afloat, calving with loud discharges like the roar of artillery, and breaking up with a noise like thunder.

Glacial action in Greenland is thus a study which offers the most interesting of physical problems for solution, while at the same time it presents the inducement of scenery which is surpassed in grandeur and sublimity in few other parts of the world. Another branch of physical research, namely that relating to the science of meteorology, is in some respects of very special interest as regards Greenland. In the first place there is a great difference between the mean annual temperature of the southernmost station at Julianshaab, and the northernmost at Upernivik, namely,  $20^{\circ}$ , the former being  $33^{\circ}$  and the latter  $13^{\circ}$ . But the difference between the mean summer temperature is only  $10^{\circ}$  (namely  $+48^{\circ}$  and  $+38^{\circ}$ ), but the winter difference is as much as  $27^{\circ}$  ( $-7^{\circ}$  and  $+20^{\circ}$ ). The great influence that currents of the ocean have upon temperature is strikingly illustrated in South Greenland, which has a comparatively mild winter like that of Norway, but an Arctic summer. The reason is that the current flowing from the icy sea down the east coast of Greenland is deflected by the Gulf Stream, and turns north-

wards along the west coast, thus lowering the temperature during the summer.

But the chief peculiarity in the climate of Greenland is the instability of the temperature in the cold part of the year. There is not only a great difference in the mean temperature of each month in different years, but sudden changes from the bitterest cold to a thaw often happen several times in one month. These peculiar and sudden changes from cold to heat take place all along the western coast of Greenland from Cape Farewell to Upernivik, when the winds come from the east or south-east.

This remarkable phenomenon has given rise to much speculation. Some old authors explain it by surmising the existence of active volcanoes, or even that there was a comparatively mild climate in the interior of Greenland.

The true explanation is that Greenland is surrounded by regions which, especially in winter, have extremely different temperatures. Towards the west and south-west, in Labrador and the Arctic western islands, there is intense cold; while towards the east and south-east the Gulf Stream preserves, even in mid-winter, a temperature in the Atlantic of  $32^{\circ}$  to  $41^{\circ}$  Fahrenheit; so that the air above it may generally be supposed not to be much colder than freezing point. As Greenland lies between such different climates, its own must necessarily at all times be dependent on the direction of the winds. All those which come from the east and south-east bring warm weather, although they have to make their way right across the interior glacier. Moreover, the south-east wind is not only a warm, it is also a very dry wind.

Captain Hoffmeyer, of Copenhagen, has pointed out the striking analogy between the warm and dry east wind of Greenland and the *föhn* of the Alps. In the Alps it sometimes happens that a gale of wind from the south rushes down the northern slopes. This wind, which is called the *föhn*, is (although it comes from a snowy region), unusually hot and very dry. But whereas this south wind blows on the northern side of the Alps as the dry and hot *föhn*, it appears on the southern side as a moist wind, often accompanied by a downfall of snow. The explanation is, that as the pressure of the air lessens upwards, and any body of air, forced to rise from the surface of the earth, is exposed to less pressure and consequently expands, while expansion is a process that consumes heat, the air is cold while it rises. So that when a south wind is forced to rise up the Alps, it arrives at the foot, coming from the Mediterranean saturated with moisture. During its rise it will be cooled to its dew point, and will, from that time, only lose  $\frac{1}{2}^{\circ}$  during every 180 feet it rises. When it goes beyond the mountain ridge the air current pours with great force through the Alpine passes down the northern slopes, and is heated  $1^{\circ}$  every 100 feet, becoming drier because it cannot contain much more moisture than corresponds with perfect saturation at the low temperature it had when passing beyond the ridge. In this way the curious qualities of the Alpine *föhn* are explained.

The characteristics of the Greenland south-east wind or *föhn* are just the same. The height of the Greenland mountains is at least 7000 feet, and by passing this ridge a current of air would, if it comes from the sea saturated with moisture, gain  $18^{\circ}$  in heat. Hence there

is a great probability that the south-east wind of Greenland owes its high temperature to the fact that it brings air away from the comparatively warm Atlantic, and that this air must rise over a great height in order to reach the west coast. But there are difficulties in tracing the *föhns* of Greenland. Numerous observations prove their appearance on the west, yet they cannot be followed backwards to their sources by actual observation. But meteorology affords another means of determining the direction of air currents in places where there are no local observations, namely, by the application of the Buys Ballot law which asserts that the wind always blows in that direction in which it has a higher pressure on its right than on its left side, and that the more unequal the pressures are, the greater is the velocity of the air. It would, therefore, be sufficient for the purpose of proving a south-easterly air-current over Greenland to show that the barometer stood, at a given period, higher in Iceland than in Davis Straits. The greater the difference in the barometer readings the stronger and more decided would be the south-east wind blowing between the two places. This test was applied to one of the most unusual instances of a Greenland *föhn* that has ever been observed, which took place in the end of November 1875, and was of 20 days' duration. During the whole period the normal great cold of winter was broken by warm weather with gales from the south-east.

I have mentioned this phenomenon of the Greenland *föhn* as an instance of the very interesting investigations which the Arctic Regions offer for the student of meteorology, and to show how closely these Arctic problems are connected with general meteorological questions. Thus in this, as in other branches of scientific enquiry, polar exploration is essential for the completeness of our knowledge.

This is still more emphatically the case when we cast a glance at the contributions which Arctic research have made to the science of geology. In Greenland alone these contributions are of immense value; and the bare and rugged character of the coast offers unequalled facilities for geological studies. In the deep clefts riven through the Greenland mountain mass, the structure of the rocks is most beautifully displayed, sections being laid bare, sometimes 1000 to 3000 feet in height, with a length of many miles. The predominating rock is gneiss or granite with gradual transitions. The latter rocks are of rare occurrence. There is a bed of compact red sandstone of limited extent, at the head of the Igallikofjord in South Greenland; and in Disco and on the opposite mainland there is an overflow of basalt, overlying beds of sandstone and shale, including coal and other vegetable remains. The trap beds present the plainest indications of their igneous origin, and there is evidence that beneath them there are extensive sandstone and coal deposits, only the outer edges of which are visible. It has been ascertained that the coal proceeded from a previous vegetation in the same sites where it is now found. Trunks of tall trees, now converted into coal or fossil wood, are still standing upright with the remains of their roots inserted in the very soil that gave growth to them; while perfect impressions of leaves have been discovered in abundance in the surrounding rocks, together with fruits, seeds, and the remains of insects.

These forests could only have existed in a climate which now prevails in Virginia or California, while they could not have flourished in a locality where so much darkness prevails during the winter as is now the case in Disco. These facts have been, and will be the occasion of much important discussion before they are fully understood; and discoveries in Spitzbergen, as well as those made by the late Arctic Expedition, have increased the wonderful character of the problem to be solved and the quantity of material available for its solution.

Of great interest, too, is the study of the effect which the overflow of the trap, when in a molten state, has had on the coal which then took the place of the once beautiful forests. On bursting out the trap made its way through the country once clothed with trees and fern thickets, and the coal is distinctly seen to have been altered in various degrees by the heat from the melted masses. In one place a small trap vein crosses and spreads over a thin coal bed for some extent. The coal in immediate contact with the vein was found to be totally deprived of its volatile bituminous ingredients, and changed into coke. In another place a coal bed was found converted into anthracite. There are, I believe, no places where the actual effects of the outflow of igneous rocks in a molten state can be witnessed under such favourable circumstances as in Greenland, while the fossil flora is, for the reasons above alluded to, a subject which will long command the attention of geologists.

To the mineralogist, Greenland is interesting because here only is found the mineral called *cryolite*, which, owing to the discovery of a chemical process in 1856 by which it may be converted into soda and alumina, is of considerable economic value. It is only found in one spot in Greenland, called Ivigtut, where it does not occur in veins or strata, but is imbedded in the granite rock in one solid mass 400 feet long and 50 to 100 broad. *Steatite*, or soapstone, and *graphite* are also found in Greenland.

If we turn from the physical features of this remarkable country to its natural history, it will be found that here also it presents subjects of most interesting inquiry, from the human race to the humblest vegetable.

I have already referred to the deeply-interesting questions relating to the origin of the people of Greenland. The work of Dr. Rink entitled *Tales and Traditions of the Eskimo* shows that an attentive study of their language and folk lore furnishes important aid to such inquiries. These Eskimos are a very remarkable race, one which has found the means of subsistence from generation to generation under circumstances of greater difficulty than any other has ever been exposed to. In these latter years, it is true their continued survival, with a population of 9588 souls, is due to the aid and support they receive from the Danes. This help has had the inevitable consequence of destroying *self-help*; and if the Danes were to abandon their Greenland colonies, the Eskimos would soon disappear. Still this race *did* continue to exist for centuries with no aid but their own skill and bravery in hunting; and there is even now a single tribe, far to the north of the Danish settlements, which has an independent existence. The Eskimos are quite capable of acquiring the arts of civilization, they

make good mechanics, and one young Greenlander with only the instruction that could be supplied during one winter at Copenhagen, has since managed a printing, lithographing, and book-binding establishment in Greenland without any help. The Greenlanders still retain their traditions, they are able now to relate them and even to explain them by illustrations carved on wood blocks, so that the careful study of their folk lore by Dr. Rink has been well repaid.

The natural history of Greenland has been exhaustively treated by many learned men, and has received, as it deserves, very close attention. Otho Fabricius, the Minister at Frederikshaab from 1768 to 1774, published a great work in 1780, in which he described all the mammalia and all the birds, while the number of fishes has been increased since his time from 44 to 78. The mammalia were not, again, described with any care until Dr. Robert Brown took up the subject in recent years, and his treatment is all that could be desired. It is only on the sea and in the narrow strip of land between the shores and the inland ice that animal life is met with. On the land the reindeer, the Arctic fox and the hare alone are found, only a single wolf having been shot in the memory of man. But the sea abounds in large mammals, in whales, seals and bears; and their range and geographical distribution are subjects which have been very carefully elucidated by Dr. Brown. All the mammals are Arctic-European, except the musk ox which is not met with in Danish Greenland. This great ruminant wanders along the shores of the most northern-known lands in the world. It is of American origin, but it was found by the Germans on the east coast of Greenland; and the course it took along the northern shore is one of the curious questions relating to the migrations of large mammals which await solution.

It is, however, the minute life of the deep sea surrounding Greenland which has been most perseveringly studied in recent times, by the use of appliances which were unknown in the days of Fabricius. The 49 molluscs of Fabricius have increased to 216 in the list of Dr. Mörch; and while Fabricius enumerates 333 invertebrate animals belonging to Greenland and the adjacent seas, the labours of Lütken, Schiödte, Mörch, and of Mr. Gwyn Jeffreys have increased the number to upwards of 896.

Sir Joseph Hooker has shown how great an interest attaches to the botany of Greenland and to Arctic botany generally, especially with reference to the distribution of American and European types. Of the 207 species of Greenland plants, all are European except 11, and 57 are absent in Arctic America. There are special peculiarities connected with the Greenland flora. The flowering plants are nearly all natives of the Scandinavian peninsula, and there is scarcely any admixture of American types, which nevertheless are found on the opposite side of Davis Straits; while a large proportion of the Greenland plants are nowhere found in Labrador or elsewhere on the American continent or islands. Another very striking fact is that the part of Greenland south of the Arctic Circle, though warmer than that north of it, and presenting a coast line of 400 miles, has very few more plants. Still more curious is it that several Scandinavian plants not found in Greenland, are nevertheless natives of Labrador and the Parry Islands to the westward. There is yet another singu-



larity connected with the Greenland plants. Some of them, which are nowhere found on the opposite shores of Labrador or the Parry Islands or in Canada, reappear at considerable elevations on the White and Alleghany mountains. Dr. Hooker has observed that no other flora known to naturalists presents such a remarkable combination of peculiar features as this.

Sir J. Hooker has offered a solution which is not yet fully accepted. He suggests that the Scandinavian flora, which is one of the oldest on the globe, extended, during the warm period preceding the glacial, over the whole polar regions, including Greenland and Arctic America. On the arrival of the glacial period, this flora was driven slowly southward to the extremity of the Greenland peninsula in its longitude, and to the latitudes of the Alleghany and White mountains in their longitudes. The effect in Greenland would be to leave there only the more Arctic forms of vegetation, the rest being, as it were, driven into the sea. But the effect on the American continent would be to bring the Scandinavian flora into competition with the American flora that preoccupied the lands into which it was driven. On the decline of the glacial epoch, Greenland, being a peninsula, could be re peopled with plants only by the northward migration of the purely Scandinavian species that had been previously driven into its southern extremity; and the result would be a uniform Scandinavian flora throughout its length, and this an Arctic one, from north to south. But in America a very different state of things would supervene; the Scandinavian plants would not only migrate north, but ascend the Alleghanies and White mountains, and the result would be that, on the one hand, many Scandinavian plants, which had been driven out of Greenland, but were preserved in America, would reappear in the Parry Islands and Labrador, accompanied by sundry American mountain types. This hypothesis embraces all the facts, which point also to an ancient closer connection between Scandinavia and Greenland through intervening land now submerged.

The Greenland flora though scanty is very pleasant to the eye. Vegetation covers the ground in thick masses, forming turf in the level places, while it fills the chinks and crannies of the rocks and creeps over the surface of the stones, giving a bright appearance to a near view of the land in summer. The prettiest thing of all is the club moss, really a *Cassiope*, with its graceful little white bell-flowers like miniature lilies of the valley. With it are generally the dwarf willows and birches, and the whortle-berry with its red berry and glossy little leaves. As far as Disco, but not further north, there are beds of lady's-mantle and angelicas, and masses of holly fern; the erect red blossom of the *Pedicularis Lapponica*, the orange *P. flammea*, bright little red and white saxifrages, the familiar dandelion, potentilla and ranunculus, the Arctic poppy, the sweet smelling *Ledum palustre*, and the showy purple blossoms of *Epilobium alpinum*. Here, too, are the salad-supplying plants, sorrel and scurvy grass, and in the far south the birches and dwarf willows rise to the rank of bushes.

Thus the study of Greenland botany, interesting in itself, derives special importance from the peculiar position of that great continental mass and from the hypothesis which its remarkable character has given rise to. Space will not admit of a more detailed

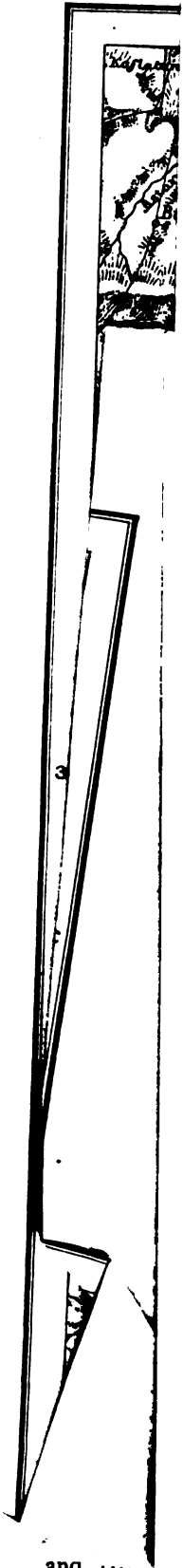
reference to these and other points of interest. My object has rather been to touch generally upon the numerous branches of enquiry which must receive attention when an Arctic region such as Greenland is explored.

This then is the answer to those who raise the question as to the utility of further polar discovery. We have taken into consideration the results of such discovery as regards one polar land. We have shown that, for every enquirer, it has added to the sum of human knowledge as regards each branch of research. The ethnology, the history, the physical aspects of the land and ice, the geology, the meteorology, the zoology, and the botany—all are rich in new facts and in special points of interest. And this is not all. There are many questions, such as glacial action, the existence of ancient forests in a latitude where an Arctic night prevails, the Greenland föhn, the hypothesis of Sir J. Hooker respecting the botany and others, the interest of which is not confined to Greenland. They throw light upon general questions, and without the additional knowledge furnished by Greenland research there would still be darkness where light is now breaking. Thus the results of polar discovery, like all other knowledge, is not confined in its application to a locality, but gives material aid to general research, and its absence would cause a sensible loss. The same truths apply to the other Arctic lands, whether known or unknown. I therefore ask my readers to concur with me in the opinion that, as the knowledge which has already been acquired of Greenland is useful and interesting, so a similar knowledge of the *unknown* northern portion of that vast region would of necessity be also useful and desirable; and that the continuous prosecution of polar research is a good thing to be advocated at all fitting times for the sake of its rich and varied results in all branches of science, as well as for the encouragement of that maritime enterprise to which our country owes so much of its greatness and renown.

CLEMENTS R. MARKHAM.

## AFGHANISTAN.

ABOUT the spring of the present year it was announced in some Indian and other papers that the Governor-General of Russian Turkistan proposed sending a "scientific" expedition into Afghanistan. Shortly after, it was rumoured in London that a publishing firm in the West-end had been commissioned by an agent of General Kaufmann to collect all available information regarding Afghanistan. The sudden intelligence of a Russian Mission, under General Abramof, having actually reached the capital of Afghanistan, about the beginning of August, may therefore be regarded as not having been without some premonitory warnings. It was followed up by an armed "demonstration" to the north of Afghanistan. The main body of the Russian troops, consisting of twelve battalions, besides Cossacks and artillery, were brought from Tashkend to Jam (about 180 miles from the Oxus); the right wing ascended from Petro Alexandrovsk up the Oxus to Charjui, and the left wing proceeded from Margilan in Ferghana to the Alai plateau, and then down towards the Amu. The urgency of the situation made the Government



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The urgency of the situation made the Government

of India aware of the necessity of adopting some counter measures, and this led to the organisation of an English Mission, under Sir Neville Chamberlain, G.C.B., G.C.S.I., a general officer of considerable repute, who served in Afghanistan during the last campaign under General Sale, in 1841-2, and who is personally known to the Amir Sher-Ali. The scientific members, of whose appointments all readers of this Magazine must have been glad to hear, in virtue of their undoubted qualifications, were Dr. Bellew and Major St. John. The former accompanied Major Lumsden in his mission to Candahar in 1857-58; he took part in the Seistan Mission of 1871, to the scene of which he proceeded by land across Baluchistan in company with Major-General F. R. Pollock, and was also a prominent figure in the Kashghar Mission, under Sir Douglas Forsyth. The three works he has produced on these occasions—*Journal of a Mission to Afghanistan; From the Indus to the Tigris*, and *Kashmir and Kashghar*, combine both research and literary skill. Dr. Bellew is also a good Pushtu scholar, and the author of a Pushtu grammar and dictionary, and a Synoptical grammar and vocabulary of the Brahui language. Major St. John's name will be familiar to most of our readers as a valued contributor to these columns. He served in Abyssinia in 1867-8, and took part in the Seistan Mission in 1872, on which occasion his services, though but scantily recognised, were of the highest value. He is an excellent observer, and his exposition of the geography of Persia in *Eastern Persia*, and his map of the same country—the standard one in existence—has established his reputation as a geographer of no mean rank. It will be seen, therefore, that the scientific side of the present enterprise was not unworthily represented. In the face of recent events it is impossible to foresee whether this Mission will be suffered to advance or not. But as the political exigencies of the case are such that they must eventually bring Afghanistan into much closer communion with India, the present may not be an inappropriate time to glance at our existing knowledge of the country.

Afghanistan, in the geographical acceptation of the term, includes a vast area of country which owes to the Amir either a very slight allegiance or else none at all. In this wider sense it includes the whole of that mountainous region between the north-west of India and the north-east of Persia bounded on the north by the Oxus from the Khojah-Saleh ferry to its source in Lake Victoria, and on the south by Baluchistan. But from a political point of view the dominions of the Amir are much smaller, as over the whole of the country of the Yusufzæ clans, of Kafirstan, of Chitral, of the Afridis and Vaziris, and much of the Hazarajat he pretends to exercise no sway at all.

Physically, Afghanistan consists of a star of valleys radiating round the stupendous peaks of the Koh-i-Baba and everywhere bounded by mountains of a very rugged and difficult nature. These valleys receive the drainage of a number of streams flowing in various directions, the more important among which are the Kabul river and its tributary the Kunar, the Argandab and the Helmand, the Hari-rud and the Murghab. Besides these, numerous smaller rivers drain the northern slope of the Hindu-Kush into the Oxus, others flowing in a uniformly south-western direction

flow into the Seistan lake, while others, breaking through the Suliman chain on the east, carry the drainage of the table-land towards the Indus. Throughout its whole extent, Afghanistan is mountainous, and its general aspect is that of a series of elevated, flat-bottomed valleys with some cultivation in the vicinity of the streams and bounded by bare and bleak spurs. Yet scenes of great beauty are met with, the appalling grandeur of some of the defiles north of the Hindu-Kush are not surpassed anywhere, while the soft, still loveliness of many of the little sheltered glens on the southern slopes of that range are spoken of by travellers with rapture. The ranges in the north and north-east are well wooded with pine and oak. The general elevation of Afghanistan, starting from the Koh-i-Baba towards the table-land of Ghazni and the upper valleys of the Hari-rud, Helmand and Kabul river, is considerable. This elevation diminishes towards the boundaries of the country, and as its face becomes lower the rivers become absorbed by irrigation or lost by evaporation, and a belt of very barren or desert-like land is thus formed, bounding Afghanistan on all sides except in its north-east corner.

The most important mountain range of Afghanistan is the Hindu-Kush, a name applied to the whole line of Alpine watershed stretching south-west from the southern end of Pamir and representing the Caucasus of Alexander's historians. The spurs of this mountain chain run out on both sides into the basins of the Oxus and Kabul rivers. Its peaks, though as yet undetermined by the Indian trigonometrical surveyors, in all probability rise throughout to the region of perpetual snow, and the loftiest attain some 20,000 or 21,000 feet in height. This mighty range has formed in all times the chief barrier between the plains of Hindostan and their invaders from the north-west. It is pierced by upwards of twenty passes, of which, with the exception of the Hajiyak, Sar-ulang, Khawak and Chitral passes, we know but little, and which all lead from the basin of the Oxus into that of the Kabul river, of which the Hindu-Kush forms the northern limit. After running south-west for a distance of about 370 miles the Hindu-Kush bends suddenly westward, in which direction it continues for about 80 miles under the name of Koh-i-Baba, and then breaks up into three parallel ranges, which enclose the head waters of the Murghab and Hari-rud rivers. The northernmost of these finally loses itself in the sands of the Turkman desert; the middle one, Koh-i-Sufed, has a westerly and longer course, running north of and past Herat, where it turns northward and also merges into the desert, while the south range, Koh-i-Siah, follows a course pretty nearly parallel with the last-named one, and is supposed by most geographers eventually to unite with the ranges south of Mash-had—a theory which, if proved to be a physical fact would show an unbroken connection between the mountain systems of the Caucasus and the Eastern Himalaya. The southern spurs of this range give rise to the Kash-rud and Herat-rud rivers and to some feeders of the Helmand river. Near the point where the Hindu-Kush changes its direction from south-west to west, a saddle connects it with the Paghman range, which encloses the head streams of the Helmand and Ghorband rivers and runs south-west, forming the water-parting between the Helmand and Argandab and ceasing at their confluence. A

spur of the Paghman range runs eastward enclosing the source of the Argandab and thence extending parallel with the northern chain, bounding throughout its whole length the table-land of Ghazni and the home of the Ghilzaes in the north-west, and ceasing just north of Kandahar. The southern watershed of the Kabul basin is formed by the Sufed-Koh range, which runs due east and west, along the parallel of  $34^{\circ}$  for about 75 miles, when it splits into two ridges. This chain is said to be connected with the Hindu-Kush by the Attakoh range. The main range of the Sufed-Koh, which preserves a pretty uniform level of about 12,500 feet in height, is richly clad with pine, almond and other trees. Its valleys are said to present the appearance of a mixture of orchard, field, and garden and to abound in mulberry, pomegranate and other fruit trees. Macgregor considers that from this range there springs a ramification which runs generally south into the table-land of Kelat and the mountainous system of Baluchistan.

The Suliman range is the name applied by the best authorities to the range or ranges running almost due north and south along the meridian of  $70^{\circ}$  E. of Greenwich, from the vicinity of the Gamul pass to about the 29th parallel of latitude. Raverty describes it as a mighty mountain barrier, containing in its northern section two ranges which increase in number as they run southwards, till at its southern extremity, where the Suri breaks through, there are no less than twelve distinct ridges "like battalions in columns of companies at quarter distance." The ranges increase in height from east to west; the highest called Mihtar Suliman or Koh-i-Siyah being snow-capped in winter. Major C. W. Wilson, C.B., in his recent ably-compiled map of Afghanistan, has adopted a similar view in his delineation of the Suliman range. Macgregor, however, holds a different opinion regarding this range. He considers that it springs from the Attakoh range, between Cabul and Ghazni, and, throwing out spurs to the east and west, proceeds southward without a break, forming the system of mountains of Eastern Afghanistan and Baluchistan. As a range running north and south along the meridian of  $70^{\circ}$ , he holds that the Suliman has no existence at all.

The opinion of the majority of geographers is, however, opposed to this view. One peculiar feature of this range is the manner in which it is pierced by a multitude of streams varying in size, which serve to carry off the drainage of the plateau-like country to the west. Where these break through the mountains a pass usually affords access from the valley of the Indus to the high table-land of Afghanistan, and Major Raverty gives details of no less than thirty-four (exclusive of small ones), between the Kaurah (about  $31^{\circ} 17' N.$  lat.) and the Suri. The most important of these are the Saughar, Chachar and Suri passes.

The most important river of Afghanistan is the Kabul river (the ancient *Kophes*), which rises in the Unai pass near the source of its rival the Helmand, and receiving the drainage of the southern slopes of the Hindu-Kush on the left, and the northern watershed of the Sufed-Koh on the right, joins the Indus at Attok after a course of about 300 miles. Its largest tributaries are the Logar from the south, the Panjshir, Alishang, Kunar, and Lundai from the north, the Kunar or Chitral river being the longest of these.

The lowest ford is a dry season one, just above Jalalabad, and from thence a favourite method of descent into the plains of the Punjab (especially when the Khaiber pass is disturbed) is by means of rafts on inflated skins. A marked change in the character of the Kabul river basin occurs at Gandamak (the scene of the massacre of the last survivors,—forty-five men and twenty officers,—of the disastrous retreat of the British from Kabul in 1842). Here there is a sudden descent from a minimum height of 5000 feet above sea level to one of 2000, and the change is well described by the Emperor Baber, who says of it:—"The moment you descend you see quite another world. The timber is different; its grains are of another sort; its animals are of a different species, and the manners and customs of its inhabitants are of a different kind."

Next to the Kabul river in importance, and probably exceeding it in volume as well as length, is the Helmand\* (*Etymander*), which rises in the angle formed by the inclination of the Koh-i-Baba and Paghman ranges, and flowing first south-westerly, then westerly, and then north-westerly, for a course of altogether over 700 miles, discharges itself into the Seistan lake by several mouths. It loses its previous character of a mountain stream at Girishk, where it enters into a comparatively flat country and begins to be used for irrigation. The whole of the lower valley seems to have been once well cultivated, and the seat of a prosperous population. Ferrier considers that it has water enough for navigation at all seasons from Girishk downwards.

Other rivers of Afghanistan are the Kokcha (famous for its neighbouring mines of lapis lazuli), the Kunduz river or Akseria (both of these being tributaries of the Oxus), the Murghab, which rises in the Koh-i-Baba and Western Sufed-Koh and flows into the Kara Kum desert north-west of Merv, after a course of about 450 miles, the Hari-rud, or river of Herat, which, after a westerly course, diverges northward and breaks into two branches, the larger of which is supposed to lose itself in the desert beyond Sarakhs. The Khash-rud, Farah-rud and Harut-rud, which rise in the southern slopes of the Siah-Koh and flow into the Seistan lake, are all crossed by the different routes between Herat and Kandahar. The Lora, Zhob, Gomul, and Kuram are other streams of importance, the three last draining into the Indus.

Afghanistan and the adjoining tracts, which, though not politically subject to it, are beyond our frontier, make up a region which is still very imperfectly known. To the east, the valley of the Swat river has never been explored, while the valleys of the Chigar Sarai, the Alingar or Kao, and Alishang, comprising the country of the Kafars, are still quite unknown. There are several minor streams flowing down the slopes of the Hindu-Kush to join the Kabul basin, which deserve examination, as well as the various passes and routes above them, leading into the basin of the Oxus, a complete survey of which is very desirable on political grounds. Northward of the great range there is a large blank between the course of the Kokcha, explored by Wood, and the route between Khingan, Narin and Ishkamish, traversed by

\* See our number for January 1874 for a monograph of this important stream.

the Havildar. Of the course of the Kunduz river, a stream probably not far short of 200 miles in length, but very little is known, and the same remark applies to the River of Balkh, which rises in the northern slopes of the Koh-i-Baba, and flows as far as Balkh, where it is used up in irrigation. Of the greater portion of the three ranges forming what is usually called the Paropamisus, or the western extension of the Hindu-Kush, our only information is derived from General Ferrier's narrative. Herat forms a centre from which routes radiate in all directions, intersecting one another freely, and it is only after we turn eastward that the scanty knowledge of the Farah-rud, Kash-rud, and the northern tributaries of the Helmand, all draining the southern slopes of the Sia-Koh, cannot fail to strike an observer. The interesting historical state of Ghor, whose monarchs once ruled over Khorasan, Afghanistan, Sind and Lahore, flourished here in the 12th and 13th centuries. The upper courses of the Helmand and the Argandab are almost entirely unexplored. There is a wide expanse of country (probably desert) from Kandahar southward as far as Macgregor and Lockwood's routes towards Nushki in 1877. This includes the valley of the Lora river, which from the Pishni valley to its mouth in the Lora Hamun is unknown, and greatly needs examination on account of the strategic importance of such a route should the river prove to reach the vicinity of the Helmand. The upper courses of the Arghesan and Kadani rivers are unknown, as well as the greater part of the Khojeh Amran range. Eastward there is an extensive and important unexplored region from the Gomul river southward as far as lat. 29° 40' N., bounded on the east by the Suliman range, and on the west by about the 68th meridian of longitude. There are a few routes running east and west across this tract, but these afford no detailed topography, which is much required in view of its proximity to the British frontier. Northward of the Gomul there is also much to do in the way of exploration. It will be seen from the above that there is plenty of scope in Afghanistan for the explorer and geographer for some time to come.

The climate of Afghanistan is very diversified, but this is due to difference of elevation rather than of latitude. At Ghazni (7730 feet) the winters are most severe, and here, as well as in the Hazarajat, the people stay in their houses nearly all the winter. It may safely be surmised that above the height of 5000 feet the winters are intense. The summer heat is everywhere very great, except in the very elevated parts of the Hindu-Kush and other lofty mountains. During the summer a deadly hot wind blows over the south-western portion of the country, which is occupied by a sandy and almost uninhabited desert. Ferrier remarks that at Herat the wind blows constantly from the north-west, from the beginning of May till the middle of September, and with such violence as to prostrate houses, uproot trees, and cause much devastation. The province of Kandahar is subject everywhere to intense heat. For nine months the sun shines with the greatest possible splendour in Afghanistan, and the nights are even more beautiful than the days; travellers can journey in perfect safety by the brilliant starlight only. The same authority remarks that the atmosphere during the night is much charged with electricity, and the least friction will

draw sparks from almost any object, with a slight cracking noise.

The geology of Afghanistan is but little known. Dr. Lord remarks that antimony, iron and lead are found in the Ghorband valley, and quarries of white marble in the hills near Maidan, which stone has been also worked at Herat from time immemorial. Bellew says that iron is plentiful in the Permuli district; copper specimens are found in various places, but the product is unworked; lead is obtained in tolerable quantity from the Hazara country; antimony largely from the vicinity of Kandahar; sulphur from Pir-Kisri, on the eastern confines of Seistan; and zinc and nitre from the Zhob valley and Herat respectively.

The main wealth of Afghanistan consists in the ordinary domestic animals, such as the horse, the camel—of a more robust and compact breed than the Indian type—the cow, &c. The first named forms one of the staple exports of the country. The horses known as Kabul horses in India are chiefly Persian, Turkman or Uzbek, from Maimana and Mash-had, but there is a useful indigenous species called "Zaboo" or baggage pony—a hardy, active and stout animal of about fourteen hands, which is capable of much work. The breed of horses was improving rapidly under the Amir Dost Muhammad, who took much interest in it. Oxen are kept for ploughing, treading out the corn, and as beasts of burden, and the cows for the milk they yield. The sheep are entirely the fat-tailed variety, but of two kinds, with white and russet-brown or black fleeces. They form the chief wealth of the nomad population, and their wool is exported *via* Karachi and Bombay, to Bradford for broadcloth. Many of the wild animals, such as the wolf, fox, otter, squirrel, &c., are hunted or trapped for the sake of their furs, which are sometimes made up into clothing in the country or are exported to Russia.

The best estimate of the number of the population of the country rests entirely on a series of more or less rough estimates formed by different travellers. These, as collated by Colonel Macgregor, amount to a total of 4,901,000 souls.

The chief nationalities or tribes are the Duranis, the Tajaks, the Yusafzaes, the Ghilzaes, the Eimaks, the Hazaras, Kakars, Hindkis and Jats. The first named inhabit the country south of the Paropamisus between Kandahar and Herat. On the south and west the country is supposed to have been encroached on by the desert, judging from the presence of ruins and old accounts of the fertility of Seistan to which the country is said to have belonged. To the south-east the Durani country stretches as far as the Khojeh Amran range. The people are partly pastoral and partly agricultural, they acknowledge the supremacy of a sort of king or military autocrat, and number in all probability not less than 600,000 souls. The Tajaks are a race found all over Afghanistan. The word, though loosely used, is applied with most correctness to the inhabitants of countries speaking Turki and Pushtu, whose vernacular is Persian. They are a handsome race of the Indo-Germanic stock, and are probably the descendants of the Persians, who after the flight of Muhammad from Mecca mixed with their Arab conquerors and settled in Afghanistan. Their habits of life are settled, they are predisposed to



agricultural, mechanical, and commercial pursuits, and found in most numbers about towns. Their total number is estimated by Bellew at half a million. The Ghilzaes dwell between the Suliman range on the east, the Gulkoh on the west, the Kabul river on the north and Kalat-i-Ghilzae and Poti on the south. They procure their living by agriculture and pasturage, are the strongest of the Afghan clans and probably also the bravest, having, as it is said, been the first to attack us and the last to oppose us, which they did with great fierceness during the events of 1841-42. The old Arab geographers place in the Ghilzae country a people called *Khilijis*, whom they call a tribe of *Turks*, and to whom a family of Delhi kings belonged, but the identity of the two, though probable, has not as yet been satisfactorily proved. The Ghilzaes were supreme in Afghanistan during the beginning of last century and for a time possessed the throne of Kandahar. Lumsden estimates them at 276,000 in number.

The Yusufzaes occupy an extensive tract of hills and valleys north of Peshawar, including part of the Peshawar plain. Those beyond our frontier are independent and are noted, even among the Afghans, for their turbulence. They number about 400,000, according to Bellew. The Kakars inhabit an extensive tract of elevated country in the extreme south-east of Afghanistan. It is intersected by spurs coming down from the Suliman range, and is almost devoid of trees. It is almost wholly unknown; no European, with the exception of Lieut. Marsh of the Bengal Cavalry, having ever traversed it. The whole of the collection of the assafœtida gum from the wild plant, is in the hands of the Kakars. The Kizilbashs are a remarkably handsome, fair-complexioned and manly people, of Persian descent, whose immigration dates from the time of Nadir Shah (1737). They prefer the towns as places of residence, where they for the most part follow the occupations of merchants, physicians, scribes, petty traders, &c., and are justly looked upon as the more educated and superior class of the population. At Kabul they constitute the bulk of the Amir's cavalry and artillery, and many serve in the irregular cavalry regiments of the Indian army. The Hazaras number about 150,000, and they and the Eimaks dwell in the wild mountainous country on the north-west of Afghanistan Proper. This region is an exceedingly elevated one, ranging between 5500 and 10,500 feet. They have generally features of a Mongol type, often to a degree that might be called exaggerated, and authorities are agreed that they are mainly descended from fragments of Mongol tribes, who came from the east with the armies of Chinghiz Khan and his family. Leech says that they are called *Mughals* by the Ghilzaes, and there is further evidence of their Mongol descent. Their language is a dialect of the ancient Persian. The race has an evil reputation for the laxity of its morals, a charge which appears to be true, at least of the Jaguris—a powerful tribe of the Hazaras, dwelling between the head-waters of the Argandab and Turnuk. They are by no means remarkable for bravery out of their native mountains, and though they never pay tribute to the Afghan Sirdars willingly, they are generally coerced without difficulty by the firing of a gun, on the entry of the Afghan force. The chief articles brought by the Hazaras to market consist of the produce of their flocks, the woollen

fabrics being the most prized on account of the fineness of the under wool of their animals. Their religion is the Shiah persuasion, and they consequently hold Afghans, Eimaks and Uzbaks in detestation for being Sunnis. The Eimaks is a name applied to a tolerably numerous people inhabiting the west portion of the Paropamisan mountains near Herat, to the governor of which the greater part of them are subject. Their origin is obscure, though originally they probably formed part of the same people as the Hazaras. Their country is reckoned as less mountainous than that of the Hazaras, and portions of it are cultivated and fertile.

The Hindkis or people of Hindu descent scattered over Afghanistan are occupied in trade, and do all the banking business of the country. The Jats are a Muhammadan race, who probably belong to the same race as the Jats, who form so large a part of the population of the territories now governed from Lahore and Karachi, and whose origin is so obscure. They are a fine, athletic, dark race, but poor, and usually gain a livelihood as farm servants, barbers, sweepers, musicians, &c.

The Kafars are an interesting race, inhabiting the basin of the Chigar Sarai and contiguous rivers and the ridge of the Hindu-Kush running transversely to the general direction of those streams. No European has ever been in the country, but Raverty, Lumsden, Masson, and others, have collected a good deal of information regarding it. Their appearance is said by Burnes, Wood, Masson, Raverty, and others, to be decidedly European; they are noted, even among the Muhammadans, whom they detest, for the faith with which they keep a compact, and they are immoderately fond of wine. Their language is probably of Sanskrit origin. Their country is especially rich in timber; the slopes and ravines of the Hindu-Kush, as well as many of the lower ranges of hills, being generally covered with primeval forests of pine and other trees. The form of government is a sort of patriarchal republic, and it is one of their boasts that they have never been subdued by any nation.

In addition to the above-named races, there are the Baluchis—a fierce and uncultivated people, to the south of Afghanistan—and a variety of tribes in the hill country north of the Kabul river, who, with the Kafars, appear to be remnants of the aboriginal tribes of the Kabul basin.

Afghanistan is under one prince, who acts as a sort of dictator for life over a military aristocracy of *Sirdars*, who govern in their respective districts. The net revenues of Dost Muhammad Khan were estimated in his later years at about £710,000, including what is known as Afghan Turkistan and Herat. This appeared to be the result of a tax on the produce of the soil, both in kind and money. A house tax of about five rupees is paid by all who are not Pathans, and the Hindus pay the separate poll tax. Customs dues at Kabul and Kandahar are only 2½ per cent., but this is a good deal increased by exactions. In many parts, collections of tribute or taxes are made spasmodically by military force. A regular army was first formed by Dost Muhammad, and in 1858 this contained 16 infantry regiments of nominally 800 men, 3 of cavalry of 300 men, about 80 field pieces and a few heavy guns, besides irregular levies.

The vernacular of a large part of the non-Afghan population is Persian, and this is familiar to all educated Afghans. But the proper language of the Afghans is *Pushtu* or *Pukhtu*, an Aryan or Indo-Persian (not Semitic) dialect. The oldest known work in Pushtu is a *History of the Conquest of Swat*, by Shaikh Mali, chief of the Yusufzaes and leader in the conquest (A.D. 1413-24). Their literature is rich in poetry, Abdurrahman (17th century) being the best known poet.

Over the greater part of the country there are two harvests as in India, but the loftier regions have only one. Wheat is the staple food, but rice is also largely distributed, and is most abundant in Swat. Other products of importance, or raised in large quantities, are garden stuffs or vegetables, especially turnips, ginger and turmeric (grown in the eastern countries), sugar cane, the castor-oil plant, madder, assafoetida, tobacco and fruits. Canal irrigation is employed in the Kabul valley, while in the western provinces the *karez*, a remarkable under-ground aqueduct, in vogue also in Eastern Persia, is much resorted to. The industrial products of Afghanistan are not important. Silk is produced in Kabul, Jalalabad, Kandahar and Herat, particularly the last two named, and the best quality is exported to Bombay. It is said to be capable of much improvement. Felts are extensively manufactured at Kandahar, for carpets, cushions, bedding, horse-clothing, &c., and a variety of woven goods are made from the wool of the sheep, goat and Bactrian camel. Rosaries and charms are manufactured at Kandahar, from a sort of chrysolite, and largely exported, especially to Mecca. The manufacture of *postins* or prepared sheep-skin pelisses has also increased very much in Kandahar, Ghazni and Kabul, principally owing to its adoption as a winter dress by the army of the Punjab. Carpets of an excellent quality are made at Herat, and their prices range from 10 to 1000 rupees. There are practically no roads for wheel carriages in Afghanistan, and nothing is done to facilitate communication, none of the rivers being even bridged. The goods are principally carried on the beasts of burden—chiefly camels, along routes more or less perilous and difficult. The chief routes are:—(1) From Persia by Teheran and Mash-had to Herat. (2) From Bokhara by Merv to Herat. (3) From the same quarter by Karchi, Balkh and Khulm to Kabul. (4) From the Punjab by the Khaibar and Abkhana passes to Kabul. (5) From the same quarter by the Ghawalari or Gomul pass towards Ghazni, and (6) from Sind towards Kandahar by the Bolan pass.

The Afghans as a race are handsome and athletic, often with fair complexions, flowing beards, and highly aquiline features. Both the men and women often have features of Jewish cast. The inhabitants are inured to bloodshed and discord from the first, they are unscrupulous, treacherous, vain, insatiable, and passionate in revenge, which they will satisfy in the most reckless and cruel manner. The spirit of their character and institutions was tersely expressed by an old man to Elphinstone, who had urged the advantage of quiet and security under a strong king—"We are content with discord, we are content with alarms, we are content with blood, but we will never be content with a master."

In a brief article like the present, written mainly

from a geographical point of view, a review of the history of Afghanistan would be out of place. We therefore give only the briefest indication of the main facts. The Afghan chroniclers call their people Beni-Israel (Arab for children of Israel) and claim descent from King Saul through a son called Jeremiah and a grandson called Afghana. They further allege that the numerous stock of Afghana were removed by Nebuchadnezzar and found their way to the mountains east of Herat. Alexander's march lay through Seistan and the Helmand valley and he founded a city called Alexandria in the Kabul basin. About 250 B.C. an independent Greek dynasty was established in Bactria, and the Kabul basin formed the starting point of Græco-Bactrian expeditions into India. It is rich in coins of that dynasty. The Pathan dynasties of Delhi form part of Indian history from the 11th to the 16th centuries. The whole of Afghanistan was conquered by Timur, Kabul remaining in the hands of his descendants, and Kandahar being added to it by Sultan Baber in 1522. For the next two centuries Kabul was held by the Mughal Emperors of Delhi, and Herat by Persia, while Kandahar repeatedly changed hands between the two. Nadir Shah the Persian, held the Afghan provinces till his assassination in 1747, after which the different provinces were formed into a single empire under Ahmad Shah Durani, including the Punjab and Kashmir on the south-east and extending to the Oxus on the north. The Afghans first made the acquaintance of Englishmen in 1809, on the occasion of Elphinstone's mission. Burnes visited Kabul on his way to Bokhara in 1832. The restoration of Shah Shuja by the British forces under Sir John Keane in 1838 led to continued insurrections against the new ruler, culminating in the terrible revolt of 1841. The events which followed, the ignominious convention to evacuate, signed by the British, and the fatal retreat from Kabul, are graphically described in Kaye's eloquent pages, as well as the expedition of General Pollock, in which the disasters which had befallen our arms were happily avenged.

Sher Ali Khan succeeded to the throne in 1863, and is now ruler over Afghanistan and Afghan Turkistan, while Badakhshan is tributary to him.\*

C. E. D. B.

#### RICHTHOFEN ON PREJEVALSKY'S JOURNEY IN CENTRAL ASIA.

(Continued from page 227 of our last number.)

ONE of the earliest accounts extant regarding the inhabitants of the Lop-Nor district, is found in the report made by Chang-kien (during the Han dynasty) to the king. He said: "By the Salt Lake are situated the walled towns of Liulan and Kuchi, at a distance of 5000 *li* from Chang-ngan, the then capital of China." They were then under the dominion of the Hiungnu, and immediately to the south was the Tibetan country called Kiang. Shortly after the Hiungnu were driven out by the Chinese, who took possession of the land, and with a short interval held it for more than two-hundred years. Kuchi

\* We must express our acknowledgments to Colonel H. Yule, C.B., Colonel C. M. Macgregor, C.S.I., and Major H. G. Raverty, whose writings have been of material assistance in the compilation of the above article.

was little known, but the kingdom of Liulan finds frequent mention in the earlier and later annals of the Han dynasty. In the first we find it stated that the number of families in Liulan were estimated at 1500; that they got their supplies from the neighbouring countries; and that their customs were similar to those of their neighbours—the Tibetans. Subsequently the little kingdom was called Shen-shen (a change of name used apparently to denote a larger region than formerly) by the Chinese, while the residence of the Prince was called Yue-ni. The lake received the name Pului-hai and Puchang-hai. After the downfall of the sway of the Han dynasty over the west, we hear but little of the small state by Lop-Nor. In 399, Fa-hien, the Buddhist pilgrim, travelled for seventeen days through the desert of Tun-hwang to Shen-shen, which he described as a mountainous and very uneven country. "The soil," he continues, "is poor and unfruitful. The manners of the inhabitants are as rough as their clothing, but still not unlike those of the Chinese. The people are Buddhists, and there are about 4000 priests among them." This proves that the Chinese had left considerable trace of their influence, and that the number of the population had increased. In 607 Pei-kin was sent by the last prince of the Sui dynasty to Kanchow-fu (at that time the central mart of Central Asian trade) to collect information regarding the different routes. He found that there were three routes in use, two of which were identical as far as Lop, after which they split into the northern and southern routes, while the third went by way of Hami. In 645 Hwen Thsang returned from India. He gave only a brief account of the places seen by him in the latter portion of his journey, and gave the name Nafopo (which Stan. Julien has shown to be of Indian origin) to the ancient Liulan. In 940 the Emperor sent an embassy to Yue-tien or Khotan to enfeoff the king thereof as a vassal, a fact showing how far the Chinese power had declined. The wearisome and perilous journey lasted two years, and after a sojourn there of five years the return journey was commenced. On the way thither the old route was followed as far as Tun-hwang, but in the return journey new names of places are given, which suggest the probability of his having chosen a southern route.

The marvellous rapidity with which the Muhammadan religion spread over Central Asia must have been one of the reasons for the complete dearth of information that set in in the 8th century regarding the routes leading to Lop-Nor; then the route by Hami and the southern foot of the Tian Shan came more and more into use. The gradual drying up of the oasis on the south side of the Tarim basin helped to divert the traffic. In Marco Polo's narrative in 1272 we see that he followed the old route, and that the Lop district was then an oasis which broke the desert transit. The embassy of Shah Rukh in its return journey in 1422 past Lake Lop furnished similar evidence.

Turning to modern times we observe that in some geographical works (but few of which have been translated) regarding certain military expeditions under Kang-hsi (1662-1723), and the great conquests under Kien-lung (1736-1796), the lands about Lake Lop are frequently described. The above-mentioned *Hsi-yue-*

*wonn-kien-lu*, written in 1773, says:—"On the lake are situated two settlements each of 500 houses. The inhabitants are neither agricultural nor pastoral, but live by fishing; they make coats out of swan's down, weave linen out of wild hemp, and bring their fish to market to Korla. They eat neither bread nor meat because it is forbidden them, and speak Turki, yet are not Muhammadans." The latter remark, which is incorrect, arose doubtless from the Muhammadans having repudiated the Lop people on account of their scanty observance of ceremonies.

A noteworthy account is found in a later work, the *Hsi-yue-shui-tanki*, written in 1741, during the Emperor Kien-Lung's reign. After saying that Lake Lop is of very large extent, that 40 years before it had taken an army two months to go round it, it says that the land was divided into two parts, Karakul and Karakodsho. The entire region was under three begs. The people had a different language from other Turks, and attained a good old age. There were 2160 men and women there, and 280 were under a banner and rendered military service. It took not quite a month to go from Tun-hwang to the lake. Seventeen years later there were but 600 men remaining out of 2000.

All these scattered accounts, extending over a period of 2000 years, present a pretty consistent picture. A small nationality or tribe, numbering at first some thousand souls and afterwards diminishing to some hundreds, lived, shut out by wide deserts, in the neighbourhood of a great Salt Lake, the chief feature of the place. Physical circumstances, hitherto not quite clear, appear to have made this locality a central point in different trade routes up to the seventh century, but that after that it gradually fell into disuse. The inhabitants followed the changes of religion made by the other people of the Tarim basin, first to Buddhism and then Islam, while politically they were subject to the chief power—at one time under Khotan, at another under China, and, in the interval between, as a dependency of the kingdom established in the oases to the north. In early times they appear to have kept horses, asses and camels, and later on to have lived by fishing. With regard to the position of Liulan, Shen-Shen and Nafopo, the records of the Han dynasty point to the fact that the small kingdom must have been situated south or south-west of the Khas-omo of the Chinese or Kara-kochun of Prejevalsky, and that the immediate vicinity of the great Salt Lake was uninhabited.

Prejevalsky's account of the people agrees in many respects with the oldest Chinese accounts. He found the people divided into two sections, the Kara-Kul and Karakurtchin living on the banks of the lower Tarim and on the lake respectively. Their mode of living, habits, food, religion and dwelling agrees very closely with what we would have expected and combine to make an interesting picture.

*The land of Cherchen.* With regard to this country, Prejevalsky remarks that shortly before reaching the Karaburan lake the Tarim receives a tributary coming from the south-west bearing the name Cherchen-daria, Cherchen, the place whence it comes, being about eleven days' journey for a beast of burthen. Prejevalsky estimates this at 300 versts, which appears too high, 220 versts being nearer in Von Richthofen's opinion. From Cherchen it is ten days' journey to Nai, and three from there to Kiria, or thirteen days in

all, while Shaw gave sixteen. Shaw's informant had lived 12 years in Cherchen and was an inhabitant of Khotan. He mentioned maize, wheat, apples, and pears as growing there, but not cotton and rice, whereupon Shaw inferred that it lay at a higher elevation than Kiria.

Cherchen was first known through Marco Polo, who passed through it on the road from Khotan to Lop, from which latter place it is five days distant. In 1867 Johnson published a route from Khotan to Lop, in which the name *Chachan* occurred, which Yule pointed out was evidently identical with the *Charchan* of the Venetian traveller. Johnson stated that the place contained 500 houses, but as it turns out could get no reliable information regarding its distance from Kiria, which according to him was only nine days' journey. Two days distant from the latter place he placed *Nia*, a village of 50 houses, which is evidently the *Nai* of Prejevalsky, though the latter traveller speaks of 900 houses. It is surprising how little the distances given accord with each other. Were it not for the names of the places identification would be well-nigh an impossibility. It is therefore not surprising that Hwen-Thsang, who preferred the Sanskrit names to the native ones, should not agree perfectly with the other travellers. The extreme points of the route *Yu-tien* (Khotan) and *Nafopo* (Liulan) are fixed. The intervals are as follows: 330 *li* to *Pimo*, probably the *Pin* of Marco Polo, then 200 *li* to *Nijang*, which with regard to the distances from Khotan corresponds with Kiria, 400 *li* to the place of the lost kingdom of *Tuholo*, 600 *li* to *Nimo* or *Chemotona*, and lastly, 1000 *li* to *Nafopo*. The distance of 530 *li* from *Yu-tien* to *Nijang*, and of 2000 *li* between *Nijang* and *Nafopo* corresponds tolerably closely to the distance between Khotan and Kiria, and Kiria and Lake Karaburan, so that *Nijang* and Kiria may be looked upon as identical. *Nimo* remains undetermined and may have since altogether disappeared.

*The Mountainous Region to the South and South-West.*—It is a very difficult matter to ascertain the course and general structure of mountain ranges from natives, particularly where these have only travelled along roads from which the mountains can only be seen at a distance. Prejevalsky had the disadvantage of having inspired mistrust, and of having no qualified interpreter. He learnt that the south-western continuation of the *Altyn-tagh* ran without a break, and as a wall-like escarpment rising above the desert as far as Kiria and Khotan. If we take this as meaning merely that to anyone journeying along the road, mountains are visible at a greater or less distance, the line of mountains running north-east and south-west as a southern boundary to the Tarim basin becomes a very unlikely feature in the face of the authority of the Chinese maps and the information collected by Shaw. Prejevalsky supplements this by information respecting the mountains south of the lake. He ascertained that the *Altyn-tagh* was succeeded on the south by a plateau 50 versts wide (*i.e.* one day's journey), the height of which he estimated at 12,000 or 13,000 feet. Then came a second ridge about 20 versts wide, followed by a plain 40 versts wide, consisting of moors dotted with springs and a mighty range called *Chamen-tagh*. The information given by the native hunters respecting these topographical facts are simple enough to warrant their being consi-

dered trustworthy. They represent that the three ridges or chains extend eastward for an unknown distance, while to the west they unite with the *Tugusdaban* which continues as far as Kiria and Khotan. This name appears to be applied to the mountain range itself, and in that sense it has been accepted by Dr. Petermann. But Von Richthofen remarks that this name (properly *Tokus-dawan*) means "the nine passes," and that Shaw had already heard of it. He spells it *Tokos-dewan*, and places it fourteen days' journey east of Cherchen, and says that a road leads thence to Lan-chow-fu. It may be assumed from this that the *Tokus-dawan* is tolerably well known, and the difference between its position as given by Shaw and Prejevalsky respectively seems to point to its being a frequented route, "the road of the nine passes," and not a particular point. It is not improbably the road leading to Tsaidam, Koko-Nor and Sining-fu on the one side and Khotan on the other.

In addition to the arguments given above, against the theory of a continuous range running south-west and north-east, we have the testimony of Shaw and Johnson that the road from Khotan to Kiria first goes eastward, but afterwards makes a wide sweep and turns northward. Shaw also stated that travellers going from Kiria to Cherchen, in clear weather, could distinguish "black" or snowless mountains on the right, that mountains are not far from Cherchen and Lop, but that from the former place it takes six days to reach the mountains whither hunters, gold seekers, and shepherds go. This may be explained by supposing that waterless spurs extend to the neighbourhood of Cherchen, but that mountains affording water springs and means of support to men and flocks, lie further off. Baron von Richthofen agrees therefore with Shaw, that Cherchen lies in a wide bay formed by the neighbouring mountains.

Viewing Prejevalsky's discoveries as a whole, there is no doubt that they have enlarged our geographical knowledge of Central Asia in an extraordinary degree. The problem of Lop-Nor and its true position is fast nearing solution; that of the reservoir, in which, at least, the greater part of the waters of the Tarim are discharged, is nearly cleared up; the site of the old kingdoms of Liulan and Shen-shen is re-established, explored and described; contrary to received ideas, we have immediately south of the Tarim reservoir, a mountain range, with a precipitous wall-like face rising there to a height of 14,000 feet, and still higher to the south-west, and its probable function as the northern escarpment of the Tibetan plateau defined. Historical events are cleared up by this examination of the physical features of the country, and the isolated inhabitants are made known to us. In addition to this, we are furnished with information regarding the fauna and flora of the country traversed. It is much to be hoped that the expedition of Count Béla Szécsenyi, and the new one on which Colonel Prejevalsky has resolved, will combine to clear up the chief points still awaiting solution in the geography of these regions.

C. E. D. B.

## FELIX JONES.

ONE of the greatest ornaments of the old Indian Navy has passed from among us.

Felix Jones served, when quite a boy, on board the 'Palinurus,' under Captain Moresby, when that distinguished seaman executed his survey of the Red Sea, between 1830 and 1834. Though then a very young officer, the skill and taste of Felix Jones as a draughtsman were already appreciated, and the original drawings of the Red Sea Survey were mostly by him. His next service was in the Gulf of Manar and Palk Strait, under Lieut. Powell, when he again acted as draughtsman to the survey. He also made a journey through Ceylon, fixing Adam's Peak and the Horton Plains, and surveying the Caltura river.

In 1841 Felix Jones was with Captain Lynch when that officer commenced the survey of the Euphrates. He was stationed at Baghdad, in command of the 'Nitocris' steamer, and every year he succeeded in completing some interesting and valuable survey, although for the greater part of the time he was almost single handed. In such a region it was impossible to go in any direction without meeting with work well worth the doing, and Felix Jones made the best use of his opportunities. The country, infested by wild tribes of Arabs, was frequently dangerous, and it was necessary to seize upon any chance that offered for exploring and surveying.

In 1844 Captain Felix Jones accompanied Sir Henry Rawlinson on a journey to collect information respecting the boundary between Turkey and Persia. The results were a memoir and a map of a country but little known. In 1846 he made an ascent of the Tigris from Baghdad to Samarra, on board the 'Nitocris;' and in 1848 he undertook a journey to determine the course of the ancient Néhrwán Canal, and to survey the once fertile region which it irrigated, now a desolate and almost impassable waste. His interesting memoir on the Néhrwán Canal, accompanied by a map, gives the history of the work from the days of its construction in the time of the Sassanian dynasty of Persia, and minutely describes its vast brickwork dams and sluices. In April and September 1850, Captain F. Jones surveyed the old bed of the Tigris, discovered the site of the ancient Opis, and made researches in the vicinity of the Median wall and Phycus of Xenophon. In 1852 he made a trigonometrical survey of the country between the Tigris and the Upper Zab, including the ruins of Nineveh, fixing positions by meridian altitudes of the sun and stars, with chronometric differences for longitude. The results of this work are recorded in the beautiful maps of "Assyrian Vestiges" in four sheets, and in a valuable memoir. During 1853 Captain Felix Jones, assisted by Lieut. Collingwood, completed a map of Baghdad on a large scale, with a memoir on the province full of statistical information; and in 1854 he sent home his maps of Babylonia. They consisted of three sheets, with a detailed memoir, and included the country from Museyb (north of Hillah) down to the north-west end of the sea of Nejf. In 1846 he had compiled a general map of Mesopotamia from Scanderoon on the Mediterranean to El-Básrah, which was based on the surveys by Chesney, Lynch, and himself.

Captain Felix Jones retired from the Mesopotamian

Survey to take up the post of Political Resident at Bushire, in the Persian Gulf, in 1855. He possessed all the knowledge and tact which were necessary for an officer in his position. For the work of the Mesopotamian Survey several acquirements were essential in addition to those of a surveyor, such as an acquaintance with the language and ancient history of the country, tact and judgment in dealing with Arab tribes, and capacity for enduring fatigue and privation. All these were possessed by Felix Jones in an eminent degree.

In 1857, while he was Political Resident at Baghdad, the Persian war broke out. This he had foreseen and provided for by furnishing to the Government of India an elaborate plan for invasion, containing itineraries through Persia, and guides for the Commissariat Departments of the army and navy. This report obtained for him great commendation under Earl Canning's own hand. Assisted by Colonel Malcolm Green, he made a survey of the Shattu-'l-'Arab, including the Karún, which enabled Sir James Outram to attack Muhámmerah.

It will scarcely be believed that for all these great services, extending over a period of thirty years, Captain Felix Jones never received any honorary recognition from his Sovereign.

His geographical papers will be found in the *R.G.S. Journal* (xviii. p. 1), and in the volume of *Bombay Selections* (New Series. No. xliii.), as well as in the *Transactions of the Bombay Geographical Society* (xvii. p. 119). He also published *Narrative of a Journey through parts of Persia and Kurdistan in company with Major Rawlinson*. Bombay, 1849 (8vo).

Captain Felix Jones returned to England with his family in 1858, and of late years resided at a house called Fernside, in Upper Norwood. In 1864 he became a Fellow of the Royal Geographical Society. He served on its Council, and was a valued contributor to this Magazine. He was also a member of the Geographical Club.

The last useful work upon which Captain Felix Jones was engaged, was the compilation and construction of a new map of Western Asia, including the valleys of the Euphrates and Tigris, from the materials accumulated by the surveyors of the Indian Navy and other observers. His services were secured for this purpose by the Secretary of State for India in 1872, and, through the courtesy of the Crystal Palace Company, Captain Felix Jones was provided with excellent quarters wherein to work at his map. It was completed in 1875, and consists of four double elephant sheets. The first (N.W.) includes the range of the Taurus and the water-partings of the Euphrates and Tigris. The second (N.E.) extends from Erzeroum to the frontiers of Russia, Persia, and Turkey around Mount Ararat. The third (S.W.) embraces Syria south of Lebanon to the Suez Canal and Mount Sinai; and the fourth (S.E.) takes in Mesopotamia to the Persian Gulf. This map is a beautiful specimen of draughtsmanship; but it still remains in manuscript at the India Office.

Captain Felix Jones died at his house at Fernside, on September the 3rd, 1878.

## Reviews.

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### ILLUSTRATION OF THE ARCTIC EXPEDITION.—1875-76.\*

It has often been remarked that the Arctic Regions have a great fascination for those who have once crossed the circle and entered the frigid zone, and that officers who have served in a former expedition are generally eager to sail northwards again as soon as an opportunity offers. One reason for this longing is the beauty and grandeur of the scenery, which never fails to make a deep impression upon every observant mind. The gorgeous skies and stupendous ice mountains when once seen can never be forgotten, and their memory ever afterwards is a source of pleasure and delight.

The pictures of Mr. Bradford and of Rasmussen convey some idea of the beauties of Arctic scenery, and gifted artists have not been wanting among the officers of former expeditions. After the return of Sir James Ross in 1849 the water-colour sketches of Lieut. Browne were published by Messrs. Ackermann, and a very striking Arctic Panorama was exhibited in Leicester-square. The expedition of Captain Austin (1850-51) was specially rich in artists well qualified to give permanence to their impressions of the scenery. Lieut. Browne was among them and painted the scenes for the Royal Arctic Theatre, as well as McDougall the artist of the *Illustrated Arctic News*, which was published in facsimile by Messrs. Ackermann, and Mr. W. W. May, who has since won fame as an eminent water-colour painter, and whose Arctic pictures have established his reputation. In the 'Investigator,' with Sir Robert McClure, several beautiful sketches were drawn by Lieut. Cresswell and afterwards published, while, in Sir H. Kellett's ship, McDougall was again serving (1852-54), and illustrated his own valuable work *The Voyage of H.M.S. 'Resolute.'*

The Arctic Expedition of 1875-76, so well supplied with admirably-qualified men for every other branch of work, did not fail in the important business of illustrating the scenery of the newly-discovered region. Two series of photographs were taken by Mr. White on board the 'Alert,' and by Mr. Mitchell in the 'Discovery,' while Dr. Moss completed an excellent set of water-colour sketches. The skill of Dr. Moss as an artist is of a high order, and his countrymen are indebted to him for enabling them to form some idea of the grandeur and beauty of the scenery in the new polar region discovered by the late expedition.

Dr. Moss's sketches have now been published in the form of chromo-lithographic facsimiles. He justly claims for them the merit of being perfectly faithful efforts to represent the face of nature in a part of the world that very few can ever see for themselves. The woodcuts are excellent, and in their way quite as good as the chromo-lithographs, but the latter alone cannot convey any notion of the scenery. Among the

\* *The Shores of the Polar Sea: a Narrative of the Arctic Expedition of 1875-76.* By Dr. Edward Moss, H.M.S. Alert: illustrated by 16 chromo-lithographs and numerous engravings from drawings made on the spot by the Author. (Marcus Ward and Co., Belfast and London 1868), folio pp. 83.

best are No. IX. "The Dawn of 1876," No. X. "From amongst the barrier bergs," and No. XI. "From amongst the floe bergs looking south." These will give a correct idea of the exquisite loveliness of the polar skies. Of a more sombre character, but still admirable in their way, are No. XIV. "The most northern grave," and No. V. "Winter Quarters outside." But it is perhaps misleading to mention special sketches when all are so good. Dr. Moss's work undoubtedly forms a very important part of the record of the expedition, and the handsome way in which this splendid volume has been got up makes it a worthy as well as an essential portion of the history of the most brilliantly successful and important enterprise that has ever reaped laurels in the far and unknown region of the Pole.

### TROPICAL NATURE.\*

MR. WALLACE'S reputation is an ample guarantee for the fidelity of the general picture in the present volume of the essential characteristics of the tropical, as distinguished from the temperate, zones. This subject, with which his twelve years' residence in the equatorial zone has well qualified him to deal, forms the backbone of the work, which is supplemented by a few lectures on kindred topics, delivered originally before the Royal Geographical Society and other bodies. Such are those on "By-paths in the Domains of Biology" and "The Distribution of Animals as indicating Geographical changes." The author details the various causes operating specially on the equatorial characteristics (the most prominent among these being the *uniformity* of the climate as opposed to the variability of the temperate zones), and then proceeds to deal with these characteristics themselves. Beginning with equatorial vegetation, he observes that, with but few and unimportant exceptions, a great forest band, from 1000 to 1500 miles in width, girdles the earth at the equator, clothing hill, plain, and mountain, often to a height of eight or ten thousand feet, with an evergreen mantle. Beyond the forests, both to the north and south, are bands of woody, open and arid, or even country, girdling the earth, except where broken by sea, in successive zones. Of the last, we have examples in the dry plains of Mexico, the Sahara, the Arabian deserts, those of Baluchistan and Western India, and to the north and east those of Western Turkistan and the Gobi. Meteorological causes operating on these belts of arid desert cause a considerable precipitation of moisture on the equatorial zone, and this favours the growth of lofty trees rising to a great height without a branch. Many of these have thin slabs radiating from the trunk like the buttresses of a Gothic cathedral. Other features of the tropical forest are the flowering trunks, the woody creepers, and climbing plants, these last of such mysterious growth that their origin and development have always been a complete puzzle. Probably the palm and the bamboo are the most valuable products of equatorial regions. The Arabs boast, and with justice, that the palm supplies them with food, drink, clothing, and building materials. Besides this, Mr. Wallace cites sago, wine,

\* *Tropical Nature and Other Essays.* By Alfred R. Wallace. London (Macmillan & Co.), 1878.



sugar, bread, oil, salt, fruit, vegetables, hats, ropes, bows, blow-pipes and even fish-hooks as products of the palm-tree. But the bamboo would seem fairly to eclipse the palm in usefulness. From it are made spears (both shafts and blades), ladders, masts, bridges and entire houses, comprising not only the walls, roofs, joists and flooring, but also the chairs, sofas, bedsteads, pipes, musical instruments, cooking-pots, and even the very vegetables to put in them!

It is a common but erroneous idea that the luxuriant vegetation of the tropics is characterised by a grand display of floral beauty, but Mr. Wallace points out that this is a mistake, and that brilliancy and conspicuousness in flowers must be sought for amid alpine regions and near the limits of perpetual snow. Another peculiarity of tropical vegetation is the extraordinary variety of trees in a forest, so that a traveller may often look for a length of time for a second tree of similar kind to one he may have met.

The *fauna* is noticed by Mr. Wallace in the same manner. He observes that the first impression is one of the scantiness of animal life in equatorial forests, but this proceeds mainly from the excessive shyness and retiring habits of the animals themselves. The butterflies are without doubt the most numerous, attractive, and characteristic of the equatorial fauna, and round the town of Para more than 700 species have been found, contrasting both in size, magnificence, and number with the sixty-four species found in Britain.

Other characteristic animals are ants, parrots (most numerous in the Australian region, from Celebes eastward), monkeys, lizards, and frogs. These and other animal forms manifest endless eccentricities of shape and richness of colour, two characteristics probably due to the uniformity and permanence of the climatic conditions found in the equatorial region during long series of ages. A special chapter is devoted to that important family peculiar to tropical America, namely the humming birds, which number no less than four hundred different kinds, varying in size from a swallow to a little larger than a humble-bee.

The remainder of the present volume is made up of the lectures above referred to, with an article, originally published in *Macmillan's Magazine*, on the colours of plants and animals. It follows appropriately on the preceding chapters. Mr. Wallace's little work is certain to be widely read, as displaying the matured observations of a man of acknowledged scientific culture on topics of general interest in the domain of natural science.

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CYPRUS: ITS RESOURCES AND CAPABILITIES. By E. G. Ravenstein, F.R.G.S. With Maps and Plans. London (Philip & Son) 1878.

THIS is certainly the most carefully compiled, as well as the most comprehensive, for its size, of the various works which the British annexation of this island has called into being. Mr. Ravenstein has been careful to go to original works of acknowledged authority, and not as he puts it "to Encyclopædias or Gazetteers" for his information, which he presents to us judiciously condensed within a compass of 55 pages. The most useful part of his work will probably prove to be the hints to travellers, though there is not a superfluous paragraph for any one wishing to gain a preliminary knowledge of the island.

We should have liked to have had rather more information about the antiquities, considering the exceptional interest and beauty of those brought to light. The maps, as might be expected from Mr. Ravenstein's geographical reputation, are excellent, and the best we have seen. As the season for travelling in Cyprus (February to May) will soon be approaching, travellers will do well to purchase this handy little guide.

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## Log Book.

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**A Stout Old Arctic Ship.**—When we were working through the ice floes of Melville Bay, in the summer of 1850, we were in company with a fine old ship and a fine old skipper. The ship was the 'True Love' of Hull. The skipper was Captain Parker, a gallant and experienced ice navigator who commanded her for many years. The 'True Love' was then sixty years old, and year after year she had sailed from Hull, battled with the ice in Melville Bay, and returned with a cargo of whale oil. When Hull ceased to send out whalers, and steamers took the place of sailing vessels, the old 'True Love' no longer sought the icy seas. Still she continued to make voyages in other directions. We have just heard that she was broken up in this year of grace 1878. A strong and well-built ship was the 'True Love' of Hull, and she must have counted upwards of ninety years of serviceable work before her days were all numbered.

**Captain Cameron's Expedition to the East.**—On the 18th of August, Capt. Lovett Cameron, R.N., C.B., left Portsmouth in H.M.S. 'Orontes' for Cyprus, a passage thither having been granted him by Government. After a short stay in our newly-acquired island, the gallant explorer proceeds to Latakiah, Aleppo, Urfah, Mardin, Mosul, Baghdad, Bussorah, and through South Persia and Baluchistan to Karachi, his object being to ascertain the practicability of the Euphrates valley for railway communication with the north-west of India. Capt. Cameron's expedition is not a Government enterprise, and is undertaken on his own responsibility. He hopes to be able to survey the country through which he passes, and has with him the necessary appliances for taking photographs and making a botanical collection. We feel sure that the examination of this important route could not be in better hands.

**Geographical Results of the late Jowaki Expedition.**—The late Expedition against the Jowakis on the North-west frontier of India deserves a passing mention from a geographical point of view. The country invaded belongs to the Adam Kheyl, a section of the great Afridi tribe, and lies to the east of a line drawn from Peshawar to Kohat. Though jutting into our territory like a wedge, and almost enclosed by it, the district had hitherto been unvisited by Englishmen, its reported inaccessibility being naturally exaggerated, and perhaps honestly believed in by its possessors. The expedition was in every way successful; the casualties, owing to the long range of our rifles, and the advance of the troops being always covered by artillery, were very few, and the impossibility of a defence was clearly demonstrated to the tribes. Lastly, a difficult piece of country, some 16 by

13 miles in extent, was traversed by the force in every direction, and this, as well as the Kohat pass itself and neighbouring heights, has been accurately surveyed, making a timely and important accession to our knowledge of the frontier. A description of the country, with a map and a full account of the expedition and its bearing on various problems of hill warfare, from the pen of Captain John Mowbray Trotter, D.A.Q.M.G., attached to the force, appears in the *Proceedings of the United Service Institution of India* for July.

**Vegetation of Asia Minor.**—Herr A. von Schweigerfeld contributes to the Vienna Geographical Society's monthly *Mittheilungen*, a carefully-compiled map of Asia Minor, showing the variations of height both on the map and by sectional views. He also indicates the character of the vegetation of the country by dividing it into three zones—the Black Sea, the Mediterranean and the Anatolian. The southern coast region of the Black Sea is remarkable for the profusion of its fruit trees, while to the west the same region is characterised by a prevalence of forest vegetation. In further Asia Minor the dense forests which in former times covered the hilly land have now disappeared for some distance from the coast. The Black Sea region, as marked out by the author, extends from the Dardanelles to Trebizond; the Mediterranean region from the entrance to the Bosphorus round to the coast of Syria; while the interior, east of the 29th meridian of longitude, a tract with a comparatively deficient rainfall, is called the Anatolian steppe region. Each of these zones is characterised by a certain peculiarity in its vegetation, which is detailed with clearness by the author in some explanatory notes. The map shows the gradations of height throughout Asia Minor according to Dr. Petermann and Dr. Kiepert's maps.

**Russian Map of Central Asia.**—The most recent edition of the Map of the Turkestan Military Circuit, prepared in the Turkestan Topographical Department, 40 versts to an English inch, differs but slightly from the one noticed in our number for September, 1877. We then drew attention to the considerable extension of the Russian frontier line to a point south of the Kara-Kul lake on the Pamir steppe, and about 150 miles removed in a direct line from the northernmost point of the Maharajah of Kashmir's dominions. This new frontier line is much more distinct on the present map, owing to the colouring, and shows clearly that the "no man's ground" between the Asiatic possessions of England and Russia is considerably less than is assumed in the recent telegram from the Calcutta correspondent of the *Times*. The map we are speaking of is based on Colonel Walker's excellent map of Turkestan (the 1875 edition), but there is a great deal of new material. Eastward, Prejevalsky's discoveries are shown (not over neatly). Southward, the details are all taken from Walker's map, but north of the Oxus there is a great deal of fresh information chiefly derived from the results of the military expedition to the Alai. The course of the Murghabi, or Bartang river, is considerably altered, as are also those of the Muk-su and Kizyl-su, while in Karateghin, Hissar, and Ferghana the topography is far more detailed than on the English map.

**Scientific Expedition to Socotra.**—The British Association have sanctioned a scheme for the despatch of an expedition to study the natural history of the island of Socotra. The most important of the vegetable productions of the island appear to be the Sokotrine aloes (the finest in the world), the dragon's blood gum and date palm. The terrestrial fauna appears scanty, but the sea swarms with fish, while amber, ambergris and pearls have been exported, and fisheries of the latter are still worked.

Dr. Schweinfurth has written to the *Esploratore* on the subject of travelling in the Sudan, accusing the Government officials in that province of obstructing travellers by every possible means, and stating that the slave trade still goes on, contrary to the repeated asseverations of the Government, but that instead of being conducted along the principal routes, the slaves are driven along byeways and thus exposed to much greater suffering.

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## Correspondence.

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### CIRCULATION OF THE OCEAN.

*To the Editor of the "GEOGRAPHICAL MAGAZINE."*

SIR,—This subject has been touched on lately, and no law is as yet laid down for the action. Nothing cosmical can be done without law, but we find in reading the Address of Sir C. Wyville Thomson, F.R.S., in the Geographical Section E, British Association, Dublin, that he has alluded to certain phenomena on which a few observations may not only be interesting in the abstract, but may eventually lead to a more perfect comprehension of this vast problem. Sir C. W. Thomson has come to the conclusion that the great water movements are from a "cold source," and certain facts "indicate the southern position of that source."

This is called a very unexpected phenomenon, and its explanation is thus attempted:—

"For some cause or other, as yet not fully understood, evaporation is greatly in excess of precipitation over the northern portion of the land hemisphere, while over the the water hemisphere, and particularly over its southern portion, the reverse is the case: thus one part of the general circulation of the ocean is carried on through the atmosphere, the water being raised in vapour in the northern hemisphere, hurried by wind currents to the zone of low barometric pressure in the south, where it is precipitated in the form of snow or rain, and welling thence northwards in the deepest channels on account of the high specific gravity dependant on its low temperature, it supplies the place of the water which has been removed." This grand reciprocal movement of air and water falls in with the give-and-take system of the elements so long insisted on by me, and so visible to any one who watches their actions and reads their records from observing pens. There is, however, something wanting in these few lines quoted from the *Geographical Magazine* for September 1878. There is no actual proof that the evaporation exceeds the precipitation in the north, or that the precipitation of the south is supplied by the evaporation, of the north. Nature does not demand these actions

and yet there is a greater amount of precipitation into the waters of the southern hemisphere than into the waters of the north. We have no proof that the evaporation is greater in one hemisphere than in the other, unless a larger water surface in the south gives an easier supply than the smaller water surface of the north. Under all circumstances the waters maintain their general level, and we have seen by the researches of the 'Challenger' there are surface and under currents all round the world. It has been a received opinion for some time that tropical warm currents run on the ocean surface to the frigid zones, and return in a cold and a heavier condition as sub-currents to the tropics. The supply is therefore kept even: no current can run into a full space, and full places must empty themselves, in consequence of a never-ceasing pressure into the for-ever-moving space. There is then a constant demand and a constant supply, both regulated by heat and cold, or, in other words, by sunshine and its absence.

As the largest rivers on dry land tell us of the most copious supplies, so the great ocean currents tell us not only of the most plentiful supplies, but point to places where they go to as having a constant demand. As long as the ocean keeps its general level the demand and supply must be equal, and as the water gets warm and light in the tropics, cold and heavy in the frigid zones, the sub-current must flow from them to equalise the warm light supplies taken from the tropics to the poles. As far as ocean currents go there seems no necessity for northern water to flow beyond the equator, or for southern water to run into the north in their relative cold conditions. When the unavoidable change takes place within the tropics, when the once cold streams of the bottom rise in their lightness and their warmth to the surface, then they point to the north in the great Gulf stream as the region where they find the greatest demand.

Under the process suggested by Sir C. Wyville Thomson, we are led to imagine that this demand in the north is caused by the removal from thence of a portion of its evaporated moisture by the winds to the southern hemisphere. Under the natural condition of these regions such a labour is uncalled for, and as all the works of nature are done by law, we must look to the elemental actions to comprehend why the demand for more water is for ever prevalent in the Arctic ocean. The subject divides itself into two heads—currents and evaporation. Evaporation falls into two parts, the direct and indirect. Taking the latter first, it embraces all that evaporated moisture which falls upon the surface of dry land. This again is divided into that which sinks into the soil, and that which runs off the surface into rivers. This latter returns to the ocean or the lake without much loss of time, the former has much duty to do before it reaches that destination; some of it runs into springs to supply the perennial rivers, some percolates the subterranean world, and is found at varied depths in wells, and other excavations by man. A vast quantity is absorbed by vegetation and by animal. The quantity of fresh water that has been evaporated, precipitated, and thus used, is literally beyond computation. The greatest portion of dry land is in the northern hemisphere; nearly all of this is covered with vegetation and water-using organisms, all of this and all the subterranean water is withdrawn from the ocean for in-

definite periods. The volumes of water returned by our great rivers have been calculated, but as the Psalmist says—"Unto the place from whence the rivers came thither they return again, yet the sea is not full,"—so as they empty themselves in all directions, and many of them far away from the scene of demand, they and the other causes absorb unknown quantities of precipitated rain, some of which was evaporated from the ocean. Thus it happens that unknown quantities of water are perpetually withdrawn from the ocean by evaporation, and that only a part of this is precipitated direct as rain, or indirect from the dry land back to the great waters. As these uses for water are perpetual, as most of it comes from the sea, there must be in it a perpetual demand, especially in the northern hemisphere; while in the south, where the dry land has a smaller area, the greater proportion of its evaporated moisture falls directly on the ocean surface.

The southern hemisphere thus gets its own returned again, so that its volume is not materially decreased, and as the warm surface currents for ever flow towards it, it has of necessity a surplus of cold water, which, as Sir Wyville tells us, perpetually "wells northwards." The ocean currents are known and charted on the surface, but the sub-currents are still undefined; till they are we cannot say that currents from the South Pole run to the North Pole, or that the evaporated moisture of the north is used to supply the demands in the south. There are laws for water and air currents; those laws can not be broken. The ostensible law-giver is the sun; the centre of his rule on earth is within the tropics. From these regions he extracts the gases; there his laboratory expands the air and the water, and from thence each element moves calmly or forcibly as the law demands. This law may move air and water from pole to pole, but in the journey both must pass through the gates of warmth and love—gates which usher in both elements to do their cosmical duties, which could not be done by a cold transit from one extremity of the earth to the other.

We have no intention of disputing the facts as laid down by Sir Wyville Thomson, but there are certain laws which materially interfere with the system laid down in the above quotation. The same end is reached by a different route; it is possible that Sir Wyville may include it in what he says is not yet "fully understood."

H. P. MALET.

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## Proceedings of Geographical Societies.

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BRITISH ASSOCIATION.

GEOGRAPHICAL SECTION (E.)

(Continued from page 246 of our last number.)

"But little progress has been made during the last quarter of a century in the actual investigation of the conditions of that vast region which lies within the parallel of 70° S. Some additional knowledge has been acquired, and the light which recent inquiries have thrown upon the general plan of ocean circulation and

the physical properties of ice, have given a new direction to what must partake for some time to come of the nature of speculation.

“From information derived from all sources up to the present time, it may be gathered that the unpenetrated area of about 4,700,000 square miles surrounding the South Pole is by no means certainly a continuous ‘Antarctic Continent,’ but that it consists much more probably partly of comparatively low continental land, and partly of a congeries of continental (not oceanic) islands, bridged between and combined, and covered to the depth of about 1,400 feet, by a continuous ice-cap, with here and there somewhat elevated continental chains, such as the groups of lands between 55° and 95° W., including Peter the Great Island and Alexandra Land, discovered by Billingshausen in 1821, Graham Land and Adelaide Island, discovered by Biscoe in 1832, and Louis Philippe Land by D’Urville in 1838, and at least one majestic modern volcanic range discovered by Ross in 1841 and 1842, stretching from Balleny Island to a latitude of 78° S., and rising to a height of 15,000 feet. It seems, so far as is at present known, that the whole of the Antarctic land, low and high, as well as the ice-cap of which a portion of the continuous continent may consist, is bordered to some distance by a fringe of ice, which is bounded to seaward by a perpendicular ice-cliff, averaging 230 feet in height above the sea-level. Outside the cliff a floe, which attains near the barrier a thickness of about 20 feet, and in some places by piling a considerably greater thickness, extends northwards in winter to a distance varying according to its position with reference to the southward trending branches of the equatorial current; and this floe is replaced in summer by a heavy drifting pack with scattered icebergs. Navigating the Antarctic Sea in the southern summer, the only season when such navigation is possible, it has been the opinion of almost all explorers, that after forcing a passage through an outer belt of heavy pack and icebergs, moving as a rule to the north-westward, and thus fanning out from the ice-cliff in obedience to the prevailing south-easterly winds, a band of comparatively clear water is to be found within.

“Several considerations appear to me to be in favour of the view that the area around the South Pole is broken up and not continuous land. For example, if we look at a general ice-chart we find that the sea is comparatively free from icebergs, and that the deepest notches occur in the ‘Antarctic Continent’ at three points, each a little to the eastward of south of one of the great land masses. Opposite each of these notches a branch of the equatorial current is deflected southwards by the land, and is almost merged in the great drift-current which sweeps round the world in the Southern Sea before the westerly anti-trades. But while the greater portion of the Brazilian current, the East Australian current, and the southern part of the Agulhas current are thus merged, they are not entirely lost; for at these points of junction with the drift-current of the westerlies, the isobathytherms are slightly deflected to the southwards, and it is opposite these points of junction that we have comparatively open sea and penetrable notches in the southern pack. But we have not only the presumed effect of this transfer of warmer water to the southwards; we were able to detect its presence in the ‘Challenger’ by the thermometer. Referring to the result of a serial temperature sounding

on February 14, 1874, with a surface temperature of 29° F. at a depth of from 300 to 400 fathoms, there is a band of water at a temperature of more than half a degree above the freezing point. That this comparatively warm water is coming from the north there is ample proof. We traced its continuity with a band at the same depth gradually increasing in warmth to the northward, and it is evident that its heat can be derived from no other source, and that it must be continually receiving new supplies, for it is overlaid by a band of cold water, tending to mix with it by convection.

“It is, of course, possible that these warm currents may by coincidence be directed towards those notches already existing in a continental mass of land; but such a coincidence would be remarkable, and there is certainly a suggestion of the alternative that the ‘continent’ may consist to so great an extent of ice as to be liable to have its outline affected by warm currents.

“In high southern latitudes it seems that all the icebergs are originally tabular, the surface perfectly level and parallel with the surface of the sea, a cliff about 230 feet high bounding the berg. The top is covered with a layer of the whitest snow; now and then a small flock of petrels take up their quarters upon it, and trample and soil some few square yards, but after their departure one of the frequent snow showers restores it in a few minutes to its virgin whiteness. The upper part of the cliff is pale blue, which gradually deepens towards the base. When looked at closely the face of the cliff is seen to be traversed by a delicate ruling of faint blue lines, the lines being more distant from one another above and becoming gradually closer. The distance between the well-marked lines near the top of a berg may be of a foot or even more, while near the surface of the water it is not more than two or three inches, and the space between the blue lines have lost their dead whiteness and have become hyaline or bluish. The blue lines are very unequal in their strength and in their depth of colouring; sometimes a group of very dark lines gives a marked character to a part of a berg. Between the stronger blue lines near the top of the cliff a system of closer lines may be observed, marking the division of the ice by still finer planes of lamination; but in the narrower spaces near the water-line they are blended and lost. The blue lines are the sections of sheets of clear ice; the white intervening bands are the sections of layers of ice where the particles are not in such close contact—ice probably containing some air.

“The stratification in all these icebergs is, I believe, originally horizontal and conformable, or very nearly so. In many, while melting and beating about in the sea, the strata becomes inclined at various angles, or vertical, or even reversed; in many they are traversed by faults, or twisted, or contorted, or displaced; but I believe that all deviations from a horizontal arrangement are due to changes taking place in the icebergs themselves.

“I think there can be no doubt, from their shape and form, and their remarkable uniformity of character, that these great table-topped icebergs are prismatic blocks riven from the edge of the great Antarctic ice-sheet. I conclude, therefore, that the upper part of the iceberg, including by far the greater part of its bulk, and culminating in the portion exposed above the surface of the sea, was formed by the piling up of successive layers of snow during the period, amounting perhaps to centuries,

during which the ice-cap was slowly forcing its way over the low land, and out to sea over a long extent of gentle slope, until it reached a depth considerably beyond 200 fathoms, when the lower specific weight of the ice caused an upward strain which at length overcame the cohesion of the mass, and portions were rent off and floated away. The icebergs when they are first dispersed float in from 200 to 250 fathoms; when, therefore, they have been drifted to latitudes of 65° or 64° south, the bottom of the berg, the surface which forced itself glacier-like over the land, just reaches the layer at which the temperature of the water distinctly rises; and is rapidly melted, and the pebbles and land *débris* with which it is more or less charged are precipitated. That this precipitation takes place all over the area where the icebergs are breaking up, constantly and to a considerable extent, is evident from the fact that the matter brought up by the sounding instrument and the dredge is almost entirely composed of such deposits from ice; for diatoms, foraminifera, and radiolarians are present on the surface in large numbers, and unless the deposit from the ice were abundant it would soon be covered and masked by the skeletons of surface organisms.

"The curious question now arises, what is the cause of the uniform height of the southern icebergs—that is to say, what is the cause of the restriction of the thickness of the free edge of the ice-cap to 1,400 fathoms? I have mentioned the gradual diminution in thickness of the strata of ice in a berg from above downwards. The regularity of this diminution leaves it almost without a doubt that the layers observed are in the same category, and that therefore the diminution is due to subsequent pressure or other action upon a series of beds, which were at the time of their deposition nearly equally thick. About 60 or 80 feet from the top of an iceberg, the strata of ice a foot or so in thickness, although of a white colour and thus indicating that they contain a considerable quantity of air, are very hard, and the specific weight of the ice is not much lower than that of layers three inches thick nearer the water-line of the berg. The upper layers have been manifestly produced by falls of snow after the berg has been detached.

"Now it seems to me that the reduction in thickness cannot be due to compression alone, but that a portion of the substance of the lower layers must have been removed. It is not easy to see why the temperature of the earth's crust, under a widely extended and practically permanent ice-sheet of great thickness, should ever fall below the freezing point; and it is a matter of observation that at all seasons of the year vast rivers of muddy water flow into the frozen sea from beneath the great glaciers which are the issues of the ice-sheet of Greenland. Ice is a very bad conductor, so that the cold of winter cannot penetrate to any great depth into the mass. The normal temperature of the surface of the earth's crust, at any point where it is uninfluenced by cyclical changes, is at all events above the freezing point, so that the temperature of the floor of the ice-sheet would certainly have no tendency to fall below that of the stream passing over it. The pressure upon the deeper beds of the ice must be enormous at the bottom of an ice-sheet 1,400 feet in thickness—not much less than a quarter of a ton on the square inch. It seems, therefore,

probable that under the pressure to which the body of ice is subjected a constant system of melting and regulation is taking place, the water passing down by gravitation from layer to layer until it reaches the floor of the ice-sheet, and finally working out channels for itself between the ice and the land, whether the latter be sub-aerial or submerged.

"I should think it probable that this process, or some modification of it may be the provision by which the indefinite accumulation of ice over the Antarctic continent is prevented and a certain uniformity in the thickness of the ice-sheet maintained—that, in fact, ice at the temperature at which it is in contact with the surface of the earth's crust within the Antarctic regions cannot support a column of itself more than 1,400 feet high without melting. It is suggested to me by Prof. Tait that the thickness of the ice-sheet very probably depends upon its area, as the amount of melting through squeezing and the earth's internal heat, will depend upon the facility of the escape of the water. The problem is, however, an exceedingly complex one, and we have perhaps scarcely sufficient data for working it out."

The PRESIDENT concluded his address with a brief reference to the fauna of the deep sea.

Captain VERNEY proposed a vote of thanks to the President, which was seconded by Sir RAWSON RAWSON, and passed with great acclamation.

The Rev. F. W. HOLLAND, M.A., F.R.G.S., then read a paper

*"On a Journey on Foot through Arabia Petraea."*

Mr. HOLLAND said the objects of his expedition were (1) to examine the sandstone district in the peninsula of Sinai, lying between the ancient Egyptian mining stations of Wady Mugharah and Sera-bit-el Kadim, with the view of the possible discovery of further Egyptian ruins or inscriptions; (2) to trace out the various routes that the children of Israel might have taken on their journey northwards from Mount Sinai to Kadesh Barnea, so as to institute a just comparison between the facilities or difficulties which attend them; (3) to explore Jebel Mukrah and Ain Kadeis, in the hope of throwing some additional light upon the disputed questions of the site of Kadesh Barnea and the boundary of the ancient kingdom of Edom; and (4) to follow the road from Wady el Arish, by the ancient Lake Sirbonis, to Kantara. With these objects in view Mr. Holland left Suez on the 31st of March, attended by only three Arabs of the Jowrah tribe. After describing his route, he proceeded to give the results of his journey. He found extensive turquoise mines, worked by the Arabs, between Wady Mughara and Wady Nusb, but no further Egyptian mines or inscriptions. He traced and mapped out the course of the Wady Sahore, an important valley previously unexplored, and found that it formed the upper portion of Wady Skellah, which takes its name—"The Valley of Cataracts"—from the water which flows down it. He does not agree with the identification of Ain el Huthera with Nazareth, nor does he believe it possible for the Israelites to have journeyed that way. Following up the course of the Wady Murah, he explored the passes of Jebel Thallah and the plateau of Teranile, afterwards

descending near Zelleger, Wadies Edria and Boigan, and the pass of El Mirad. He finally came to the conclusion that the only available route for the children of Israel to have taken was that by Wadies Zellyer and El Atiyeh, which afforded the most direct, the best watered, and by far the most easy course from Jebel Musa northwards. The position of Jebel Mukrah was found to be far from correct as shown on existing maps, and after carefully exploring the Wady Kadeis, Mr. Holland came to the conclusion that its position militates strongly against its identification with Kadesh Barnea. Jebel Mukrah shows traces of ancient habitation and cultivation, and extends eastwards only about as far as long. 35, where it ends abruptly in a steep cliff, and is separated from Jebel Jerafeh by the head of Wadies Garaigeh and Jerafeh. Kadesh Barnea Mr. Holland would place at the south-east point of Jebel Mukrah, but he was unable to descend into the plain. His intention of following down Wady el Arish to the coast from Wady Noweilah was given up on account of the bed of the wady proving a very bad road for travelling, and also because he learnt from the Arabs of a more direct road westwards to Ismailia, and which appeared a very important one for exploration. He had not found it marked on any map, but it was described to him as easy, direct, and well watered, which he found to be correct. The discovery of this road Mr. Holland regards as one of the greatest importance, and, as far as he is aware, was not previously known. He arrived at Ismailia on the 23rd of May.

In the discussion which followed the reading of the paper, Canon TRISTRAM and Major WILSON spoke in high terms of the importance to geography of Mr. Holland's journey.

Lieut. H. H. KITCHENER, R.E., F.R.G.S., next read a paper

*"On the Survey of Galilee."*

He described at length the manner in which the survey had been carried out, and gave some very interesting descriptions of the manners and customs of the peoples encountered, and the chief places of interest throughout the country. Having informed the meeting what had been done, he briefly referred to the proposed new work. If funds were available an expedition would start to explore the sites of the most sacred scenes of the New Testament history—the northern shores of the Sea of Galilee, where undoubtedly Capernaum, our Lord's own city, and Bethsaida, still exist. In addition to this, the expedition would make a thorough survey of the unknown country forming the eastern shores of that sea, on the same scale and with the same accuracy as the present survey. One more task they had set themselves, which was to rescue from the hands of that ruthless destroyer, the uneducated Arab, one of the most interesting ruins in Palestine—the synagogue of Capernaum, which was rapidly disappearing, owing to the stones being burnt for lime.

Major WILSON and the Rev. Canon TRISTRAM bore testimony to the importance of the survey, and the PRESIDENT, in thanking Lieut. Kitchener for his interesting paper, trusted that it would be continued under the excellent guidance of those gentlemen who had had it in charge. He considered it their absolute duty to lose no time in preserving those landmarks that still remained, and to this effect representations should at once be made to the Government.

*Meeting of August 16th 1878.*

Sir C. W. THOMPSON in the chair. The business of the second day commenced with a paper by J. S. PHENE LL.D., F.S.A.,

*"On Notes on Some Geographical Variations on the Coast of France."*

The author drew attention to the new and most

important field of research adopted by the geographers of France, in investigating matters of great interest in the localities of their own country, without the necessity of piercing the Arctic ice, or penetrating the torrid regions of Africa. Mons. Ernest Desjardins was foremost in the new researches, and had published the first volume of a handsome work, entitled *Gaule Romaine, Geographie, Historique et Administrative*, in which littoral comparisons were given of the forms and dimensions of the coasts from the oldest sources obtainable, often going as far back as the first century of our era. In one particular case Mr. Phene, who had for several years past been examining the coast of northern France unsuccessfully in quest of a place not included in Mons. Desjardins's work, which was only published two years ago, at once searched his work, but to his disappointment found the district he wanted not included in the maps published in the work. However, the broad insight given by Mons. Desjardins's work into the alteration of coast line encouraged him to go on, and calculating by ancient maps the former littoral of this part of France, he soon discovered the island he was in quest of, which was no less a place than Avalon, the reputed place of King Arthur's burial, though from the island having been severed into two by the sea, and the name retained only by the smaller portion, it had been overlooked, and even in the neighbourhood no one knew of it but local fishermen. A dolmen unlike any other in France or Britian on the larger portion, and the traditions of the locality, seemed to put the matter out of doubt.

The PRESIDENT said he had listened with great interest to the remarks of Dr. Phene. The condition of these little internal seas was of very great interest, and the subject was one of much difficulty and complication. The difficulty was of even greater note in such a case as that of the Mediterranean Sea, where there were no definite tides, which occasionally explain the natural phenomena. He did not know that sea himself, except from reading. Dr. PHENE spoke of the wonderful changes which have taken place in various places in the formation of land within comparatively recent times. In some cases the sea wears hollows in the land, in others the land appears to have extended into the sea. Of course these changes were due to a variety of causes, the most influential and marked being geological changes—elevations and depressions.

The next paper read was by Capt. J. WATERHOUSE.

*"On Processes of Map-producing by Photography."*

The object of the paper was to describe the advantages presented by the use of photography in producing maps; and Capt. Waterhouse explained how perfectly plans, maps, and delicate work of the kind could be by that process reproduced for publication. He entered into a lengthened explanation of the different modes adopted, and said the descriptions must be to a great extent unintelligible without specimens for illustration, and he regretted very much that he had not been able to bring them together for exhibition. By the kindness, however, of the curator of the map collection, he was enabled to show some maps reproduced by the aid of photography.

This paper was followed by one by Mr. E. DELMAR MORGAN,

*"On Richthofen, Prejevalsky and Lake Lob."*

He said the region on which he proposed to dilate was situated in the midst of the vast plain or depression known to geographers as Central Asia. It was walled in on the south of the great mountain ranges which under different names extend in a direction of nearly west to east, along the 35th or 36th parallel of latitude, across the whole continent from the southern shore of the Caspian Sea to China Proper, and separated from



the Russo-Siberian plain on the north-east ranges of less magnitude, but which in some places attain the limits of perpetual snow, such as the Altai or Tien-Shan.

A brief discussion followed the reading of this paper, and the meeting then adjourned.

*Meeting of August 19th 1878.*

Sir C. W. THOMPSON in the chair. Capt. R. BURTON read the following paper

*"On the Land of Midian."*

"To those who read their Bibles," he remarked, "the land of Midian is a household word. 'Vexing the Midianites,' and 'Midianitish women' are familiar sounds. But perhaps you do not know how hazy upon the subject of the grand old land before my trip to North-Western Arabia in the spring of 1877 were the literati, the Press, and the reviewers who lay claim to a few biblical points. For instance, Midianite merchantmen bought Joseph from his brethren and sold him in Egypt. Moses, flying from Pharaoh, dwelt in the land of Midian, or the East country, and there married the daughter of Jethro the priest. Despite this alliance, there was war between the kindred peoples, when, led by the great Lawgiver (B.C. 1452), the people burned 'the cities and the goodly castles' of Midian, and carried off a splendid spoil of gold, silver, brass (copper or zinc), tin, iron, and lead, with vessels of gold, chains and bracelets earrings and tablets. After a lapse of two centuries, B.C. 1249, the Midianites again grew powerful, and their revenge upon their terrible kinsmen ended in the second Midianite war. I need hardly tell you how the sword of the Lord and of Gideon slew two kings, with some 135,000 warriors, and won great quantities of gold. After this crushing blow the Midianites fade out of Holy Writ, and you hear of them only in the effusions of Hebrew prophets and poets. It is referred to by ancient historians; and coming down to our modern day, Voltaire, the noble Frenchman who created religious liberty, and who had, *de l'esprit comme tout le monde*, made Midian a 'sandy region which may have contained some villages.' His description of its geographical position was quite erroneous. Later still, some of our popular body changed Midian into Sinai, whilst others knew it not or projected it into impossible places. Even those who had visited the seaboard gave no certain sound. The modern Midianites on the one hand, and the Bedouins who now hold the soil, give a precise geographical definition of its limits, and, as some of them have held it during the days of the Byzantine Empire, I claim high authority for their catholic and constant tradition. The 'Arz Madyan' of the Arabs begins with the fort of Akhabah (N. lat. 29° 28') at the head of the dangerous gulf so named. It extends south to the fort of El Munnylah, and its great watercourse, the Wady Sim (N. lat. 27° 40'). These frontiers absolutely fixed would give the Egyptian province a latitudinal length of 213 miles, which the extensive sinuosities of the coast might prolong to 300, and the depth varies between 24 and 35 miles. The first glance which the voyager casts upon the land of Midian is a sight to be remembered in after years. That majestic scene, at once grand and simple, was right well suited to the heroic race of Bedouins who once held the soil. It reflects to a certain extent the Sinaitic peninsula that faces its shores. However, there is a sharper contrast of the flat and the high, the low and the tall, the horizontal and the perpendicular of the well-watered lowlands, with a luxuriant vegetation of emerald green, and of rolling uplands, sterile as a moon landscape; of the cloud shadows flecking the mountains, and of the serene sky, so remarkable in the regions of downs and plains." Captain Burton gave a glowing description of the first sight of the land of Midian as seen from the deck of the corvette, and described, as from a bird's-eye

view of the country, the physical characteristics of the interior and the appearances of the maritime line. He then gave an account of the two expeditions which he commanded to explore the land. Those expeditions were at the sole expense of his Highness the Khedive Ismail I., a prince to whom the future will be more just than the past had been. To the Viceroy alone were they indebted for their present knowledge of this neglected and almost mythical country. In the spring of 1874 his Highness forwarded, in his little steamer 'Erin,' Dr. Charles Beke, who, at the ripe age of 74, gallantly went forth to find "the true Mount Sinai." In the early part of 1877 the Khedive was pleased to place the two expeditions in his (Captain Burton's) charge. The first consisted of a single squad of Egyptian officers and men, with a French geologist, and an English gentleman who acted as commissariat officer and accountant. This preliminary visit lasted little more than a fortnight, but it gave him a fair general view of the country. The second expedition, which was more extensively organised, landed on December 19th 1877. They explored, first, the northern, then the middle, and afterwards the southern district. He described the disused gold and silver mines that were explored, and spoke highly of the wealth of the country as regards these and other metals. He also gave an interesting account of the natives, and of the scenic features of the country. They now knew as much of Midian as he did. Instead of being a mystery, it had become to them a thing of reality. They would join him in lamenting the contrast between what it had been and what it is. Pathetic, indeed, was the view of its desolation. Once the flower of Arabia Felix, it had now become a Petræan desert. The incubus of destruction had sat for centuries on its glorious mountains and luxurious water basins. The wild man, the father not the son, of the wilderness, had done, and was still doing its worst. When the Roman ruled Africa and Propria Numidia, the Regency of Tripolis numbered some 20,000,000 souls; the population, then thick as that of Belgium, was now reduced to 2,000,000. He believed that the Anglo-Turkish Convention placed England, in reference to Arabia, nearly in the same position as that occupied by Rome after the days of Augustus—that a full and perfect faith that Midian will presently awaken from her trance, from her sleep of ages. She offered to the world not a mine, but a mining region some 300 miles long, with an inner depth as yet unknown; and what the ancients worked so well the moderns could work still better. Let them look forward to the development of her mineral wealth under the fostering care of European—and especially English—companies, so they might expect to see the howling wilderness, like Algeria before 1830, become the rich and fruitful province of Algiers in 1878.

The PRESIDENT said they must all feel deeply indebted to Capt. Burton for his admirable paper. When speaking of all that Capt. Burton had done, they should not, however, forget how much he was indebted to Mrs. Burton.

Dr. LEARED then read a very exhaustive paper "*On a Journey to Fez and Mequinez*," which Sir WYVILLE THOMPSON followed by one

*"On the Progress in the Official Report of the 'Challenger' Expedition."*

He said as a period of about two years had now elapsed since the return of the 'Challenger' Expedition, he might reasonably be expected to give some account of the progress which had been made up to the present time in the reduction and classification of the observations which were made in the different departments. The voyage of the 'Challenger,' he observed, had been undertaken for a very definite purpose—the determination of the physical condition of the ocean. While the

ship was at sea their time was entirely devoted to registering observations, and cataloguing, and labelling, and storing specimens. Owing to the great liberality of the Government in supplying abundantly all the necessary materials and appliances, both for procuring specimens and preserving and storing them, an enormous collection has been sent home from time to time in wonderfully good condition. He proposed to the Government that for the present it should be brought together and placed in rooms which were given them for the purpose in the University of Edinburgh, and that for the first year their attention should be chiefly directed to preparing an outline of the general report and going on to the collection, securing its safety, and arranging it as nearly as possible in zoological sequence, and that during this period the services of the scientific staff on board should be retained. He proposed also that as soon as possible arrangements should be made to invite gentlemen who were recognised as authorities in different departments, and who had sufficient leisure at their disposal, to undertake the description of the zoological series, group by group, and that a sufficient sum should be granted to defray the expense of full illustration, and to compensate them to some extent for their expenditure of time. With regard to the destination of the collection, he proposed that, in the first place, each specialist should be requested to set aside all unique specimens, and the most complete series possible of all species of which there were duplicates should be sent to the British Museum. From what he saw at present this difficult report of the voyage of her Majesty's ship 'Challenger' would extend to from fourteen to sixteen quarto volumes of 500 or 600 pages. The whole would be illustrated by about 1200 plates and many woodcuts and photographs. The MSS. of the first volume was nearly completed, and the charts of the ship's course and the sections showing the natural distribution and ocean temperature. The volume in course of preparation would be illustrated by photographs and woodcuts. The second volume would consist chiefly of tables, and would include a report on the magnetic observations made during the voyage, drawn up under the superintendence of the Hydrographer to the navy, and a detailed report on the meteorology prepared by Capt. Tizard. Most of this volume is already in print, and he had there a copy of the magnetic part in proof, and on proof paper, which would give them some idea of the appearance of the book. Another volume would contain the discussion of the nature of the bottom of the sea, the composition and specific gravity of sea water and the composition of its contained gases, and a number of other general matters, and the remainder of the book would be occupied by a series of memoirs by different authors on the various groups of animals which constitute the deep-sea fauna. A large number of these monographs were in progress, and he held in his hand a series of about 150 plates, and they had there the first few of a series of beautiful plates by Mr. Hollick, illustrating mostly the pelagic genera. These plates represented several forms of a remarkable little group, to which they had given the name of the "Challengerida," as they seemed to have hitherto escaped observation. There were probably from 20 to 30 specific forms of these. Next they had a rapidly-growing hill of plates illustrating a splendid memoir on the Radiolaria, by Professor Haeckel. Anyone acquainted with Haeckel's classical work, *Die Radiolarien*, will have some idea of what may be expected of the memoir. The next series of plates represented the deep-sea corals, and were being prepared under the direction of Mr. Moseley, and the next series, also by Mr. Moseley, represented a most remarkable little series of coralloid forms, of the Hydrozoa, which Mr. Moseley had named the Hydrocorallinal, and on their structures and relations Mr. Moseley's careful work during the voyage and since their return had thrown quite unexpected light. The ordinary

hydroids are in the hands of Professor Allman, and they had already secured for different departments of the work the services of nearly all the available British artists. Professor Haeckel would describe the few deep water Medusæ, which were brought home, and would be found of the highest interest. The Pelmatozoa would be described by himself. About twenty plates were on the stone, illustrating the structure of the stalked crinoid. Professor Alexander Agassiz was going on rapidly with the Echinidea, and his memoir, exquisitely illustrated, would be amongst those first published. Mr. Lyman was working at the Ophiuridea, which, he said, were almost all new; and he expected Mr. Theel, of Upsala, to come over to examine the Holothuridea, which he was going to describe under the general superintendence of Professor Loven.

A paper was afterwards read by Mr. W. H. DALE, "*On the Characteristic Features of Alaska, as developed by the United States' Survey.*"

Mr. J. S. PHENE, LL.D., F.S.A., &c., read a paper "*On the Acquisition of Cyprus, and Observations on Some Islands in the Levant, with References to Recent Discoveries.*"

The author, who had recently made a prolonged and careful voyage of research in the Levant, described the physical features of the islands of Chios, Mytilene, Lemnos, Imbros, Thasos, and Samothrace; the relation of the Cyclades to the great range of Pindus, in lateral off-sets, of which the Cyclades appear to be the summits of former ranges, now (except as to these summits) submerged. Reference was made to the great aqueous stratification in Asia Minor and Southern Thrace, which, being undisturbed, could not (geologically speaking) be remote; and to a remarkable tradition given by Diodorus Siculus that the Euxine had at a far distant period burst its bounds and rushed westward to the Mediterranean Sea, that in this convulsion some of the islands had become submerged, and that the champagne country of the island of Samothrace was permanently so; and that even indications of cities, by the recovery of parts of buildings from the sea, were sometimes made. It was possible, the author thought, that this convulsion represented the sinking down of the mountain ridges, of which the summits were now represented by the various islands stretching south from the several headlands of the Peloponessus. The author selected Samothrace for ascent, and was, so far as he could learn on the island, the only European, not being a native, who had made the ascent, which was very difficult. He had taken a professedly competent guide from the island of Tenedos, but neither he nor the several natives who first volunteered would make the ascent, and he could only get a mountain shepherd to go with him. The height was only slightly over 5000 feet, but it was the whole climb of this from the sea level, and after 1500 feet of ascent all deserted him but the shepherd. He continued the ascent with the latter, and they surmounted, after great labour, the highest peak, which, from its deeply interesting and extensive view—described by the reader as the most interesting in the Mediterranean—Homer selected as the poetical seat of Neptune to view the fight before Troy. The climates, culture and salubrity of the different islands were dwelt on; Mytilene, from its splendid views of Bergamos, the gulf of Adramytium, and the distant Mount Ida, the rich gardens, good roads and delightful air being, with its splendid and secluded harbours, considered by the author more adapted for British occupation than Cyprus. Chios had also its advantages. Cyprus had a variety of climate, so that the debility produced by the heats in the south could be relieved by a retreat to the northern coast which is cooled by the breezes coming from the Karmanian mountains, while in some inland parts were rich woods abounding with game and objects for the chase. He considered the occupation of Cyprus would open up new sources of commerce on the mainland. It was

interesting to us as being nearer the Holy Land, and curiously enough the only island of note near the coast of ancient Phoenicia. It was also our first acquisition towards the tactics of the ancient commercial nations, both the Phoenicians and the Venetians having occupied Cyprus and all the other islands of which he (the author) had given a description. A number of very curious articles which had been discovered, and which were illustrated by photography, were then described. These opened up the old geographical routes from Samothrace to Britain by coast, and the old road of tin traffic mentioned by Strabo from Britain to the Mediterranean giving examples of recent discoveries of Oriental relics in Britain, Ireland and Gaul.

A vote of thanks was passed to Dr. Phene and the meeting adjourned.

*Meeting of August 20th, 1878.*

Capt. VERNEY, R.N., in the chair Dr. J. RAE read the first paper at this meeting

*"On the best Route to attain a High Northern Latitude, or the Pole itself."*

He reviewed the progress and results achieved by previous polar expeditions referring more particularly to Nares's Expedition. Sailing vessels found difficulty in penetrating beyond latitude 82°, the current being from the north, unless when there was a gale of wind from the south. Calm weather was best for navigating through the ice floes. Arrived at the point reached by Perry, further advance might be made by sledges. Mr. Gordon Bennett, of the *New York Herald* was sending out two ships next year to attempt to reach the Pole, and those expeditions would start from opposite directions, one going by Spitzbergen and the other by Behring Straits; and so, perhaps, they might meet at the Pole. Admiral Richards in a letter to the *Times* had said he would not be surprised to see Captain Adam, of whaling notoriety, go in his Arctic ship right through Smith Sound and out at the other side. But the speculation was made before Nares saw the ice. Previous to his expedition a very great many very wild notions were expressed by men who ought to know better. It was a mistake to say that there was not the least difficulty in going to the Pole with sledges, as was apparent to men who studied anything about Arctic surveying. It should be borne in mind that the journey was about 1400 miles. Sir Leopold M'Clintock, had done good service among the Parry Islands, using sledges with great advantage, but he did not go beyond 500 miles from his ship. Dr. Rae's object was to show that a broad channel was a better route to reach a high northern latitude than the narrow channels such as Smith Sound, which had been tried, because in the narrow channels, though leading northward, the ice almost invariably impinged on one point or another, influenced by the action of winds or currents, or both combined. The danger of navigating narrow channels was illustrated by the loss of no less than nine ships, including those of Parry, Franklin, M'Clure, Belcher, and Hall. Whilst the attempts made to reach a high northern latitude by Smith sound had been made by Nares, Hall, and Kane in steam-vessels, no properly equipped steam ships had ever attempted, as far as he knew, to push to the north along the west coast of Spitzbergen. The German expeditions that went in that direction crossed to the eastern coast of Greenland, where, as Arctic explorers knew, there was a constant stream of closely-packed floe ice driving southward, not a bit of which passed to the eastward of Iceland. Therefore, he considered it essential for a fair test of the Spitzbergen route to have a properly-equipped steamship sent in that direction, because here, if anywhere, steam power was requisite, owing to the constant drift already mentioned. The thick ice spoken of by recent explorers, instead of being a danger to a ship, was rather the reverse, as, by drawing much more water than the ship

did, she found an easy passage between the ice and the sea.

The next paper was by Dr. MOSS, "*On the Geographical Significance of the North Polar Ice,*" which was followed by Mr. J. STEVENSON by one

*"On Livingstonia."*

He stated that the object most prominently in view in founding settlements in the interior of Eastern Central Africa was the Christian civilization of the natives. The special means to be used to this end was the introduction of industrial missions, which had been tried with success among the cognate tribes of Southern Africa. To prove the success with which the Kaffir tribes had been dealt with he need only quote from the despatches of Sir Bartle Frere, addressed to Her Majesty's Secretary of State for the Colonies, in which he says "that nothing would do more to prevent future Kaffir wars than a multiplication of institutions like those of Lovedale and Blythwood." In selecting a position in Central Africa (Eastern) where the experiment should be tried, various considerations present themselves. The Nyassa region had the advantage of being accessible by the only considerable rivers of Eastern Africa, and the attempts of Livingstone to place steam-vessels on those rivers had been so successful as to indicate that such a mode of transit offered no physical obstacles likely to be insuperable. On the other hand, the obstacles which might be placed in their way by the policy which had hitherto characterised the Government of the Portuguese provinces rendered it very doubtful whether any advantage could be derived from the existence of those rivers in doing anything considerable in opening up the country. Trusting that the Portuguese would see that the opening up of the country would be of real advantage to them as well as to the natives, we decided to place our settlement behind their provinces. The immediate results in establishing the settlement were eminently discouraging, for a hostile tariff was issued and the exclusive right of steam navigation on the rivers of Zambesi and Shire was offered to a Portuguese subject, the concession being for thirty years. While saying this they must acknowledge the liberality of the Portuguese in remitting the duties chargeable on the goods sent for consumption of the first mission party, although it was not continued on the second year. The slave trade, under treaty obligations, terminated in 1877, and domestic slavery was abolished somewhat earlier. General interest came to be taken in the details of African misery, and their responsibility for the unhappy state of that quarter of the globe was brought before the Portuguese legislature. No one who had read the debate which subsequently took place in the Cortes could avoid the conclusion that the tone of the discussion was creditable to those who took part in it. Their feeling was that the honour of the country should not be responsible for what had happened in regions where it had no real control. Having discussed the questions of the tariff and the concession of exclusive steam navigation Mr. Stevenson described at length the navigation between the Zambesi and Lake Nyassa, describing also the lower and upper Shire valley and the manners and customs of the tribes inhabiting that region. After further dealing with the subject of the undertaking to promote the civilisation of South-Eastern Africa, mentioning many interesting facts, Mr. Stevenson concluded by stating that, through the kindness of the Governor-General in Council at Madras, Wardian cases, containing plants of chinchona, tea and coffee had been sent to Livingstonia and Blantyre, along with an assortment of various seeds. He also pointed out the necessity of pursuing geographical research with due reference to its most important ends.

Major WILSON afterwards read a paper

*"On Cyprus."*

In the course of his interesting observations, he said that each year had seen the vineyards of Cyprus run to

waste, cultivation decrease, and a hopeless state of dependency settle down on the people, until at last the most beautiful and fertile of islands had become in parts almost a desert. For years the land had lain fallow, but with the influx of British capital and energy the island was capable of again becoming the garden and granary of the East. A very short time would see the plain again covered with golden corn, but to replace the vineyards, the olive groves, and the forests, which were once the glory of Cyprus, would require time. Major Wilson then gave the extent of the island, which he said was chiefly occupied by two mountain ranges, having a general east and west direction. He also described its geographical formation, mentioned the heights of its mountains, and the position and character of its valleys. He mentioned that there were three separate peaks—the highest being about 6160 feet; there were no vines on the summit, which was quite bare, the rock being broken up by the action of the weather. A short distance down the mountain is the large monastery of Troodissa. The level ground is covered with gardens and fruit trees, the valleys are green with pasture land, whilst along the coast line one village follows another in quick succession. It is the richest part of the island, and the fresh sea breezes from the north, and the numberless rapid streams from the mountains make it the healthiest. There are no good natural harbours. The chief places of trade at present are only open roadsteads. Salamis and Famagusta were artificial harbours; the latter could easily be made a good one. Tyrinia, on the north coast, was a very small and bad port, but the only one on that side of the island. Larnaca, which is built on the site of ancient Citium, now the chief place of trade, and contains 5000 or 6000 inhabitants. Limasol is the principal export town for wine. Paphos, the residence of Sergius Paulus, where Elymas was struck with blindness, is celebrated for the worship of Aphrodite or Venus, who was fabled to have there risen from the sea. Salamis was called by the Greeks a good harbour—Jews had synagogues there. The population of the island is about 144,000, of whom 44,000 are Moslems. The Cypriotes are dull and stupid, but are very docile and sober, and their love of home and family is a most favourable trait in their character. The Cyprian peasants themselves have so little skill and forethought that the most careful Government would have some trouble in getting them to work harder and more intelligently. "Cyprian ox" was the term of old used to describe this race, so stubborn, so wanting in intelligence, and, even at the present day, the true Cypriote squats in his native village surrounded by filth, sticks to his ancient habits, and goes no further than he can help. The climate had been affected by many causes. The forests, which were the glory of the island, had disappeared. During the period of the Turkish rule everyone cut down what he wanted, no one ever thought of re-planting. The poorer the people became the more the forests disappeared, and the finishing touch was given by Mehemet Ali, who cut down nearly every tree, partly for sale, partly for shipbuilding, partly for use in Egypt. When the people were asked about the deforesting they said, "It has always been so in our country," and when the consequences were pointed out they said, "The Government wishes it;" so accustomed were they to abuse the Turks for their own shortcomings. The climate was good, but there were fevers just such as attacked visitors to Malta, which lasted only two or three days. Near the end of the great plain there were large swamps into which the rivers divided themselves, and were thus prevented from reaching the sea. He recommended the introduction to Cyprus of the eucalyptus, or Australian gum tree, a plant which had the effect in swampy districts of producing beneficial results, as was the case in Algeria. It was also the only green plant which after it had grown for one year locusts did not attack, because of its astringent properties. This was also the more important because the island was sometimes visited by a plague

of locusts. There were also seasons of great drought, but the heavy dews might be said to a great extent to counteract their effect. As to the mineral products, Major Wilson mentioned that copper mines had been extensively worked in the island by the Romans. The principal ones were situated near Tamassus, about three hours' ride from Dali (Idalium). Coal, or shale, had been found near the ancient Soli. Besides copper, Strabo mentioned that the island produced silver, and Pliny records the existence of precious stones, probably rock crystal. In saying that light fevers attacked those who visited the island, he did not wish to convey that the climate was what could fairly be described as unhealthy. It arose from the absence of so much wood, and from the circumstance which he had described, which prevented the rivers reaching the sea. It would also occur to them that the place could scarcely have been unhealthy when the Greeks adopted it for the worship of Venus. He hoped that they would not be led by their acquisition of Cyprus into a military Government. There was no occasion in Cyprus for the employment of a large number of troops. The number employed by the Turks was exceedingly small, and did not exceed half a regiment, and the most of the soldiers used were a sort of militia raised in the island, who never went beyond its limits. He hoped that one of the first things that the Government would do would be to send over a properly organised scientific expedition to survey the island. They had no proper topographical survey. The maps they had were by different itineraries who had crossed the island from different directions. They had no scientific map of the mines either, and he thought a geological survey should be also made, for he thought they would find in the limestone rocks cave deposits. The whole country required to be excavated, for there must be a great number of inscriptions there which must be most valuable. As an instance of what might be discovered he mentioned the bilingual inscription in Phœnician and Cypriote upon marble found by Mr. Lane at Dali, the ancient Idalium, in the British Museum, and the discovery by Mr. Lang, British Consul at Cyprus, and the late Mr. G. Smith, the lamented Assyrian scholar, or word king. He had no doubt that the energetic High Commissioner, Sir Garnet Wolseley, would so deal with the administration of the country that in a few years Cyprus would set an example to the whole country of rich produce; and he would like to see the old castle of Buffamento some day the seat of the High Commissioner of the Island of Cyprus.

SIR RAWSON RAWSON congratulated the section on the fact that a gentleman so well acquainted with Eastern life, and whose fame was world-wide, because of his experience in the excavations in Jerusalem, should have treated this subject. As to the question of fever in Cyprus, there was not a single colony in her Majesty's possession in which a new-comer was not generally stricken down by fever. It was commonly called colonial fever, and it lasted for two or three days or a week, and left no traces behind. It attacked the inhabitants of islands in the West Indies who went to visit other islands in the same region. Therefore, let those who had friends in Cyprus think nothing of what they read—it was the mere natural effect of the change from one temperature to another. The absence of rains need not alarm them, as the dews supplied the moisture of the soil that was necessary. He regarded the acquisition of Cyprus as one of the most glorious exertions of the present generation, which might be the means of regenerating, not merely the whole of Cyprus, but vast territories in Europe and Asia. They would then be able to value that great achievement the more by the light of the information which they had received from Major Wilson.

The PRESIDENT said, as a naval man, he had studied the chart of Cyprus in order to get what information he could. He had been greatly struck with the absence of

harbours, as far as he could see, and of the great difficulty in making new harbours. This objection had been made against Cyprus many times, but they were met with the observation that the harbours could be made. That, however, was a general observation. If they wished to put as much money into the sea as made Holyhead breakwater they could have breakwaters; but the question was whether that would be worth the money. His opinion was that it could not be done; but he spoke with great diffidence, and with small knowledge except what was taken from the chart. He did not himself see how they were at a reasonable cost to make a harbour at Cyprus that would be of real use to the country.

The last paper read at the section was by Mr. A. BURRELL, M.R.A.S., F.S.S.,

*"On the Geographical Distribution of the Tea Plant."*

Tea, as a beverage (Mr Burrell observed) was known in Europe in the beginning of the sixteenth century, became a regular article of consumption in the seventeenth, formed one of the largest imports from China in the eighteenth, and was now the special beverage of all English-speaking peoples, both in the New World and the Old. The botany, method of culture, and modes of manipulation were, however, little known here till about forty years ago. The Jesuit missionaries in China and Japan were our first informants of the virtues of tea. The Portuguese and the Dutch, who, long before our East India Company was established, traded with these countries, introduced it commercially to Europe, and there was evidence of its use in England in 1610, during the reign of James I. Dr. Johnson was quite wrong in dating its introduction after the Restoration, for it was in common use during the Commonwealth, and the first Act of Parliament when the "King came to his own again" was passed to levy a heavy duty on tea. Oliver Cromwell's teapot, which the elder Disraeli had heard of, had now turned up, and there was no doubt but it was a favourite beverage of the Round Heads, and so hated by the Cavaliers, who were more given to wine and other potent liquors. The tea plant at first reached Europe in 1763, when the great botanist Linnæus received a seedling which, however, notwithstanding the most assiduous care, soon perished. The earliest plant that had really flowered and produced seed was at Zion House, near London, in 1768. In China the plant was in common use from the seventh century; in Japan from the eighth. It grows in these countries up to 42° of North latitude, and was capable of being grown as far of South latitude, though the best tea is produced in China between 27° and 30° North latitude. Up to the first quarter of the present century all the tea consumption of the world was supplied from China, with a very little from Japan. In 1827 the culture was introduced by the Dutch in Java, and has ever since proved a successful undertaking. In 1834, immediately after the abolition of the East India Company's monopoly of trade to the East, tea was introduced from China into India, not at first becoming a profitable business. But next year the plant was discovered growing wild in Assam. Mr. Burrell here described the history of this important discovery, and paid a well-merited compliment to Dr. McClelland the only survivor of the group of eminent men, scientific and practical, who inaugurated what has since proved to be one of the greatest staple industries of India. Tea, both from the China plant and from this Assam kind, was now grown throughout all India, and with the result that, for variety of strength, pungency, and flavour, our great dependency was now producing tea which China in her more palmy days, and less so than ever now, could not rival, and that, great and growing as the demand was, India throughout the vast extent and variety of her soils and climates, was destined to be the great tea producer of the future. He adverted to the fact that, beginning with a pro-

duction of only four pounds in 1840, she now sent into this country forty millions of pounds—as great a quantity as was consumed in the whole of the United Kingdom in 1837. The author then took up the distribution of the tea plant in other countries. These were:—In Asia: the Corea, Tonquin, Cochin China, Annam, Ava, and Burmah, where the tea plant was cultivated to some extent, but only for native consumption. It had been introduced to Brazil in 1827. The French had attempted its cultivation in 1841. It was now growing in Mauritius, the Isle of France, St. Helena, at Singapore, in Ceylon, and our Australian Colonies. In the West India Islands it had also been recently introduced, and the last year's report of Kew gave a good account of its condition in Jamaica. Nor had our American cousins neglected it. They had sent to China in 1857 for plants, and tried the culture near Washington, in Virginia, and Carolina: quite recently they have tried it in California, and near Baltimore. Lastly, Mr. Burrell took up the question of the original home of the tea plant. In Japan it was admitted on all hands not to be indigenous. In China it was long held to be native to the soil, but more recent researches have thrown doubt on this point, and the balance of evidence seems to point to the Assam Valley of India, along the course of the Brahmaputra, as the original seat of the plant. This is supported by the fact that, while in China the tea plant is never found thoroughly wild away from man's habitation, and is more of a bush than a tree; in Assam, on the other hand, and in the hill ranges surrounding that valley, it is found everywhere growing wild, and attaining great height as a tree, usually fifteen to twenty feet high, and even by a report just received from India, sixty to eighty feet high, and of the girth of three to four feet, among the secluded Naga hills. Mr. Burrell concluded by citing a long list of authorities—from Marco Polo and his learned editor Colonel Yule, the Jesuit missionaries, and more recent travellers, down to the quite recent works of Richthofen, Margary, Baber and Gill, all tending to show throughout the vast stretch of country intervening between the frontiers of India and China, and on either side, evidence of the tea growing wild, and constantly of smaller dimensions as it approached to China, thus affording ground for his contention, which was further supported by the legends of China and Japan, that the tea plant was introduced there by a Buddhist missionary from India.

A discussion ensued, in which Sir GEORGE CAMPBELL, M.P.; E. W. COOKE, R.A., F.R.G.S.; Mr. MARCUS MOSES, and other gentlemen took part.

A vote of thanks to the Secretaries closed the business of the section.

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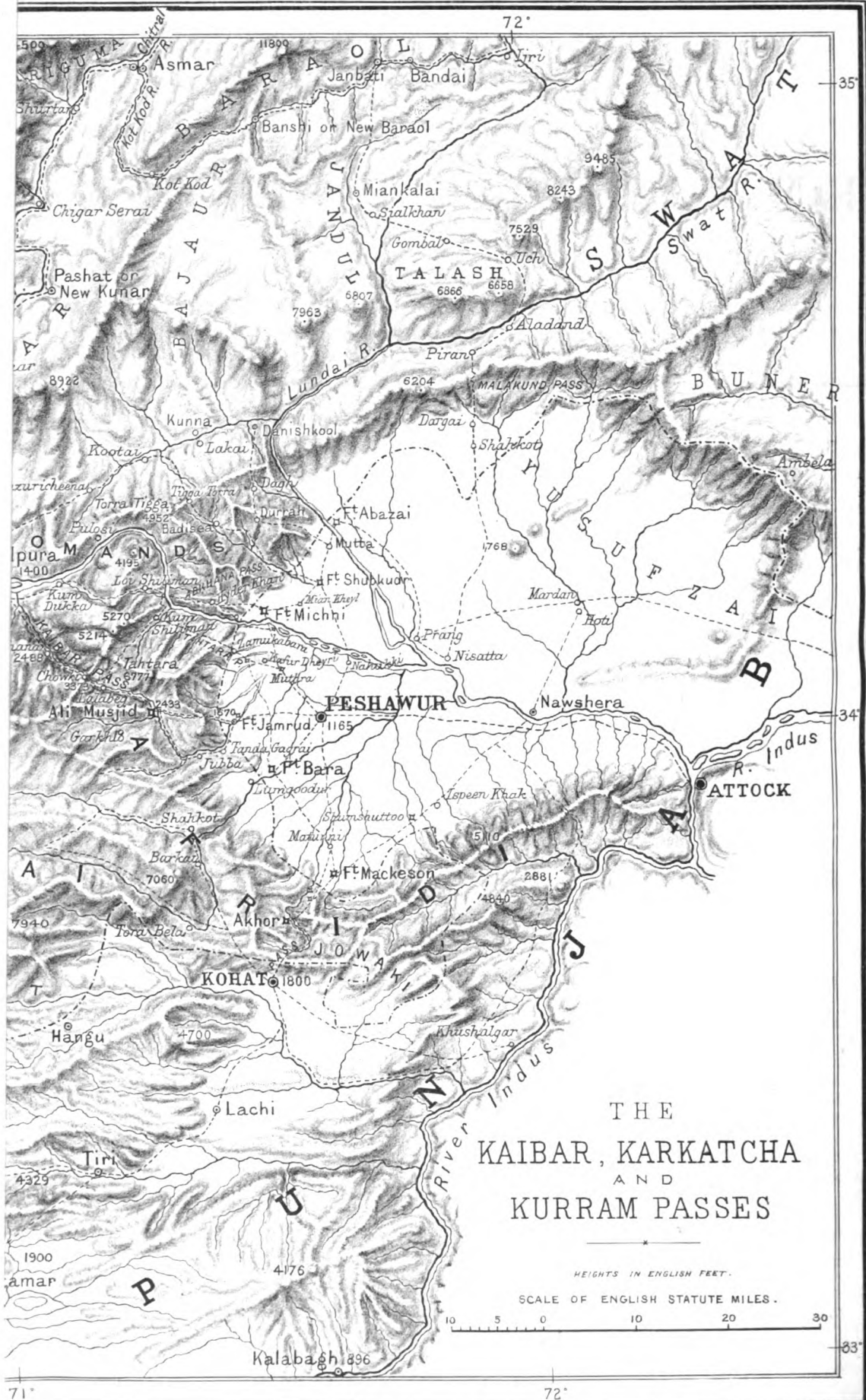
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# THE GEOGRAPHICAL MAGAZINE.

NOVEMBER, 1878.

## THE AFGHAN PASSES.

SINCE 1874 we have endeavoured to draw attention to the north-western frontier of India, to the tribes which inhabit the bordering mountains, and to the considerations which should have weight in adopting measures for ensuring the establishment of order and safety where rapine and murder now reign supreme. In February 1874 we gave the statistics of that extraordinary Povindah trade which flourishes in spite of all obstacles, and we indicated the obvious policy which its existence seemed to demand. In April 1874 we brought together all the geographical data that exist respecting the basin of the Helmund. In February 1876 we read a paper in which some new information was presented, and attention was called to the numerous important *desiderata* in Afghan geography. Last January we again drew attention to the subject.

The question of our relations with Afghanistan has now become so pressing that attention will certainly be secured for a subject which, a year or two ago, could only excite a languid interest. We, therefore, propose once more to dwell briefly upon some of the salient features of our position along the north-western frontier of British India.

The great River Indus flows along the base of a range of mountains rising abruptly from the plain and forming the escarpment of table lands, which, on the inner side, slope more gradually to the valleys of the Helmund system and of the Kabul. This Sulaiman range, with its northern continuation to and beyond the Safid Koh, is penetrated by upwards of fifty passes leading from Afghanistan to the Indus, and its ridges and valleys are inhabited by a number of fierce and predatory tribes. Since our rule was extended to the Trans-Indus districts of Peshawur, Kohat, Bannu, \* and Derah Ismail Khan, after 1849, we have come into contact with these tribes, and a frontier policy of some kind became necessary, as well as the selection of a frontier. We fixed a line at the foot of the mountains, and at the mouths of the passes. So long as the plundering operations of the hill tribes were confined to the hills beyond this line, they were left by us to make what income they could in any way they liked. We merely prohibited the sacking and burning of villages within our border, and the kidnapping of our subjects, and we established fortified posts near the mouths of the principal passes, connected by military roads. As regards the savage

tribes beyond the frontier a system of conciliation and forbearance has been pursued, with occasional expeditions to make examples and inflict chastisement for a long continuance of outrages. These duties are performed by the "Punjab Frontier Force," which is composed mainly of Sikhs and Pathans, and musters 12,000 fighting men, including 3000 cavalry.

This system of frontier defence is not progressive. There is nothing in it to alter the ways of the hill tribes, or to lead them to desist from pillage and murder beyond our limits. Yet it is alike the interest and the duty of the rulers of British India to secure the safety of peaceful merchants who approach their dominions, while the permanent adoption of a frontier, the other side of which is inhabited by lawless and aggressive savages, will perpetuate the evil.

Let us pass briefly in review the tribes inhabiting the border mountains from Peshawur to where the Pathan or Afghan race ends, and the Baluch begins. First, there are the Hill Momands from the borders of Swat and the Kabul river; where their capital, Lalpura, stands on the left bank, so that they dominate both sides. Their hills overhang British territory within 25 miles of Peshawur, and they muster about 16,000 fighting men. Their ordinary raids and robberies are chronic, but occasionally, as in 1850-51, they commit a series of audacious outrages. In 1851 they were chastised by Lord Clyde, and the Michni fort was established to overawe them, where, in 1873, Major Macdonald was brutally murdered. Next to the Momands come the more widely-spread Afridis, on the west frontier of the Peshawur valley, in the Kaibar pass, and in the hills between Peshawur and Kohat. They are independent, fierce, and treacherous, and muster 24,000 fighting men. The Afridi is a tall athletic highlander, lean, but muscular, with long gaunt face and high nose. Those of the Kaiber are held to be the most treacherous, and the clans are constantly at feud with each other. Their hills intervene between Peshawur and Kohat, and are crossed by two passes, the Kohat and Jewaki. In 1849 our Government arranged to pay the Afridis an annual sum on condition that they protected these passes; but their outrages obliged Sir Charles Napier to inflict punishment upon them in 1852. Proceeding south we next come to the Arakzais who had their villages destroyed in 1854, and have been tolerably quiet since. In the Kurram pass are the Turis and Jagis, who are said not to be Pathans. Their neighbours, the Zymukht Afghans, are friendly with the Arakzais, but are not numerous. Further south

\* Separated from Derah Ismail Khan in 1861.

are the formidable Waziris, the robbers of the Gomul pass, numbering 43,000 fighting men. They are divided into the Mahsud and Kabul Khel Waziris, and it has been necessary more than once to send expeditions against them, though a portion of the Waziris, with whom Herbert Edwardes made a settlement, remained quiet for some time. Speaking generally, all these tribes continue to rob and murder wherever there is a chance of impunity.

Now, it is important to bear in mind that they are all, Momands, Afridis, Arakzais, Turis, Jagis, and Waziris, confined to the outer escarpment of the mountains. On one side of them is the British frontier line below, and on the other the Afghanistan plateaus beyond, which are owned by Ghilzis and others, but not by any of the robbers of the passes. Consequently, if the same power held the plateaus above that now occupies the line of forts below, the intervening tribes would be constrained to refrain from pillage and murder in the passes, as well as on the plains. Those plateaus, with the inner valleys and slopes, are chiefly in possession of the great Ghilzi section of the Afghan nation. At the beginning of the last century the Ghilzis were supreme from the Kaibar pass to Kerman, and in 1722 they overthrew the Sufawi Dynasty of Persia. But they were conquered by Nadir Shah in 1737. In 1802 they suffered a crushing defeat from Ahmed Shah Durani, at the battle of Sajawan, and have ever since been kept in subjection by the present ruling tribe of Duranis. Yet the Ghilzis are the hardiest and bravest of the Afghans, and showed desperate valour in the war of 1839.

There are two principal divisions of the Ghilzis, Ibrahim and Turan, the former divided into thirteen and the latter into three *khels* or clans. They extend from the northern slopes of the Safid Koh and the neighbourhood of Kabul to Kandahar. Some are engaged solely in agriculture in the valleys, while others are purely pastoral, and move their flocks and herds from the summer resorts on the plateaus to the more temperate slopes in the winter. The Ghilzis occupy the Logar, the Tarnak, and the Arghasan valleys, the country round the Abistadeh lake, and the plains round Ghazni and Khilat-i-Ghilzi. Their approximate number is placed at 100,000 souls, or 30,000 fighting men; but their endless feuds prevent combination.

At the head of the Bolan pass, to the south, there are three tribes. The Achakzais are a branch of the Barakzai or ruling faction of the Duranis. They occupy the water-parting between lake Abistadeh and the Argandab basin, including the Toba mountains, a rugged and desolate region, and number about 14,800 families. The Kakars are in an elevated and unexplored region south of the Ghilzis, which is drained by the Zhub river. All the asafoetida trade is in their hands, and they send down several thousand people annually to Nadully-derrak to collect the gum from wild plants. The Kakars number about 20,000 fighting men, and are on friendly terms with the Ghilzis. Lastly, the Tarins are divided into Safed and Tur Tarins, the former pastoral and independent and the latter agricultural and subject to Kandahar.

We are separated from these traders and producers of the Afghan plateaus and valleys, the Ghilzis, the Povindahs and the Kakars by the formidable passes

and ridges of the outer escarpment, and by the wild robbers who inhabit them. The natural difficulties, though not to be despised, are easily to be overcome. If some of the passes are difficult, many others present but slight hindrances to traffic. In the Kaibar pass, leading from Peshawur to Kabul, the road winds through narrow defiles in the mountains. At Ali Musjid, 5 miles within the gorge, the cliffs on either side rise to a height of 1300 feet, slaty and bare, and the defile, though a mile long, is nowhere more than 25 paces broad. Its use is necessary because the gorge of the Kabul river itself is quite impassable. There are, however, two parallel passes of Tahtara and Abkhana. In the extreme south, the Bolan pass, leading from Sind, by Quettah, to Kandahar, is even more defensible than the Kaibar, so that the occupation of Quettah at its head is a wise precaution. The Bolan runs for ten miles in a tortuous course with not sufficient breadth for a dozen horsemen to ride abreast, with rocks rising like walls to a great height on either side. Ahmed Shah Durani invaded India by the Bolan pass.

But between the Kaibar and Bolan passes there are a great number which are more or less frequented, and which do not present the same difficulties. The best known are the Gomul or Ghwalari, which is infested by Waziri robbers, and the Kurram or Paiwar. Both have been explored and described, the former by Captain Broadfoot and the latter by the Lumsden Mission. We are thus enabled to form some idea of the nature of the region which separates the Indus valley from the plateaus of Afghanistan.

The Kurram pass is historically interesting, for it has been used by invading armies on several occasions. The River Kurram, after draining a considerable area in the mountains, flows down to the Indus, and the frontier station of Thal is on its banks. Advancing up the pass the road first crosses a wilderness of stony hills, and then enters the Kurram valley. Here the clear and rapid river, rising on the pine-clad slopes of the Safid Koh to the north and west, rushes in a winding, rocky bed down the centre of a deep fillet of cultivation, sprinkled with villages, each having its magnificent clump of plane trees. The distant view is bounded by lofty mountains clothed with forest. The fort of Kurram is a square enclosure with round towers at the angles, and in the centre of each face, with an inner square forming the citadel. It is occupied by a Naib or Governor, with a garrison, who collect the land tax and transit duties for the Amir. The fort is 118 miles from Kohat by the road, and 80 from Ghazni, as the crow flies. Kurram was the original seat of government of Ilduz, the lieutenant of Muhammad Ghorî, who ruled Hindustan from 1193 to 1205 A.D. Ilduz coined money at Kurram,\* which was an important post as being on the main line of communication from Ghazni to the Indus; and from Kurram, Ilduz marched to and conquered Ghazni. The valley is inhabited by Turis and Zymukht Afghans, and higher up are the Jagis, all great robbers, but apparently also industrious cultivators. Rice is the principal crop, the grain being stored in caves, and there are clumps of plane trees of great height and beauty. But while one man tills the soil, three are on the sharp look out for enemies.

\* See Thomas's *Fathan Kings*, p. 27.

The Turis are Shiah, and the Jagis hold the Suni creed, so that feuds and bloodshed are continuous.

Proceeding from the open valley, the Paiwar pass is an ascent about 1000 feet above it, up a steep stony road through pines and cedars to a height of 7500 feet. The villages consist of a few fortified houses in secluded little glens, but on commanding eminences, with towers of observation. From this point there is another narrow, winding defile, called Hazardarakht, to the summit. The limestone heights on either side are clothed with pines and cedars, arbor vitæ, and a few oaks, while dog roses and wild laburnum, with sweet *labiate* form the undergrowth. This leads to the summit plateau of Hazar, which is under snow half the year, and during the other half forms the summer grazing ground of the Ghilzis. It is covered with short, sweet grass, and a stunted growth of *Artemisia*, orchises and lilies. The height above the sea is 9400 feet. The defile of Hazardarakht forms the boundary between the Ghilzis and the Jagis. From Hazar the route descends to the fertile Logar valley, where is the high road between Kabul and Ghazni. The Logar is a tributary of Kabul.

The rapid advance of a force up the Kurram pass to this high road would cut Afghanistan in two, and sever communication between Kabul and Kandahar, while it would threaten Kabul on the flank and turn the Kaibar pass. It would form a rallying point for all Ghilzi clans, Kakars, and Povindahs, who are disaffected, and who think that the Barakzais have held sway over them long enough. The plain of Sajawan, near Ghazni, where heaps of Ghilzi skulls mark the place where the tribe was crushed by the Durani, would not be an inappropriate rendezvous.

The Gomul or Ghwadari pass, to the south of the Kurram, which is used by the gallant Povindah traders, and infested by Wazari robbers, apparently offers very much the same features as the Kurram pass.

We have described the positions of the predatory tribes in the passes, and of the more settled Ghilzis on the plateaus beyond them. It remains to refer to the very remarkable tribe of soldier merchants which fights its way up and down the passes in spite of all obstacles. Its existence seems to point out to us a duty, and also an improved policy as regards this north-west frontier. The story of the Povindahs is as extraordinary as it is interesting.

The Povindahs are a tribe of merchants numbering about 12,000, with 35,000 camels. Their caravans assemble at Ghazni in the autumn, and from the time of Akbar they have been accustomed to fight their way through the Gomul and other passes to the plains of India and back again twice every year. Each autumn sees great kafilahs of these warrior merchants pour down from their distant homes, armed to the teeth, and prepared to do battle with Waziris or other robbers of the passes. They leave their families and herds in the Derajat, and spread themselves over India. In March they again assemble, fighting their way up the pass to the Ghazni and Khilat-i-Ghilzi districts. Thence they send caravans to Kabul, Kandahar, Herat and Bokhara, and all return in time to accompany the tribe down again in the following autumn, moving in three divisions at stated intervals. There are four clans of Povindahs, called Lohanis, who number 1010 families, and pay 600 Rs. a year

to the Amir for the right of grazing at Ghazni, besides transit dues; the Nasars, numbering 1850 families, and paying 3000 Rs. to the head of the Turan Ghilzis at Murgha, for rights of pasturage; the Neazis of 6000, and the Kharotis of 1500 tents. Captain Broadfoot accompanied them by the Gomul route in 1839. Their trade is now estimated at 1,000,000*l.*, and its statistics will be found at page 445 of our number for February 1874.

The fact that, in spite of all obstacles, these people should have continued to carry on a trade, year after year, is a proof of its vitality and importance; and that it is capable of vast extension if unimpeded and left to its natural course. The Kakars, with their asafetida monopoly, and the Ghilzis would equally welcome the opening of the passes. These facts seem to point to the true frontier policy. If as well as the line of forts at the foot of the hills, similar positions were taken up on the inner slopes of the plateaus, with strongly fortified posts at Ghazni, Khilat-i-Ghilzi, Kandahar, and Ghirisk, the predatory tribes would be between two fires. They would have to learn that plunder and murder must not only cease beyond, but also within the hills; and they would be forced to settle down as well-to-do graziers and farmers. The development of the Povindah trade would then proceed without drawbacks, and the Ghilzis and other inhabitants of the Helmund basin would be secured in the possession of their rights. All cause of anxiety from Russian intrigue would also be at an end. Whether this change of frontier policy, which is necessary for the security of British India and for the welfare of all who have occasion to use the passes, can be made with the assent and co-operation of the present or a future Amir, or whether it will only be effected after the Barakzais have ceased to be the predominant clan, depends on the course of events. But that some such change ought to be made and is now foreshadowed, seems evident from the experience of the past.

#### THE KULDJA QUESTION.\*

THERE is good reason to believe that the sudden collapse of the Muhammadan State of Kashgar in the course of last year was a matter of bitter chagrin to Russia, inasmuch as it opened the way to the reinstallation of the Chinese in Eastern Turkestan, *i.e.* of the least conciliating, the most stubbornly unyielding power with which Russia is directly contentious in Asia. The Chinese Government has never been known to cede a point but under fatal and irresistible pressure, and if she possibly could she would doubtless abrogate every treaty under which she is bound to European powers. But while China frets under the obligations imposed upon her by the Europeans in her seaports, she still cherishes a strong rancorous animosity to that other northern power, whose friendship towards her has been a mere hollow mockery—a power which under various insincere pretences has robbed her of large slices of outlying territory, and which has absorbed vast countries and enormous populations, once, in the days of China's unique prosperity and glory, paying homage at the

\* *Vide Geographical Magazine*, July and August, 1874.

foot of the Celestial throne of the Great Bogdokhan or Brother of the Sun. There is no doubt that China is still imbued with the tradition of her past glories, and indulges in the hope of recovering all she can of that authority which once extended over all the states nestling in the Tian-Shan mountain system away almost to the Caspian. Let China, however, once be perfectly assured of the tenacity of that hold which the civilized States of Europe have upon her or her seaboard, that that hold rather offers guarantees of inviolability from the side of her maritime provinces, and she will of necessity abandon all idea of first dissolving a bond which in reality proves to be her mainstay, and at last direct her main efforts against that disguised enemy who has assumed her rights and prerogatives, and who has as much cause to fear the exhibition of her rancour as she is apprehensive of provoking her wrath.

With reference, for instance, to the present Russian possessions constituting the province of the Amour and the maritime province of the Oussouri, China has never really reconciled herself to the transfer of those regions filched by Russia at periods when the Celestial Empire either lay prostrate at the feet of the allies or was convulsed with intestine disorders. She has repeatedly made, albeit unavailing, protests against their illegal appropriation, and she was only cajoled into their cession under conditions which were never fulfilled by Russia. In order, however, to mark her appreciation of the acquisitive and fraudulent nature of Russia she has ever forbidden Russians to overstep her frontier except at places specially provided for traffic in Russo-Chinese conventions, while her frontier officials, with a jealous and uncompromising defiance, have closed every other avenue from the north, imposing penalties on all Chinese subjects who surreptitiously deal with Russians from across the borders. On the Sungari, for instance, every Russian attempting to pass up that river has been turned back with contumely. We find, indeed, that while filching from China morsels of evacuated or unguarded territory Russia has endured at the hands of the Chinese next to insufferable indignities, which, supposing her, by a great stretch of imagination, capable of doing so, it has not been her policy openly to resent.

It is worthy of special observation that from the period of the first Russian Mission to China in 1864 to the present day, the Sovereigns of Russia and their representatives in Asia have ever been referred to and treated by Chinese, from the highest "Urvan" to the meanest frontier official, with a red ball in his hat, with studied contempt and insolence. Nor has Russia ever measured a sword with China and given the Great Bogdokhan a physical proof of her right to a higher consideration and respect.

We began by saying that the re-establishment of Chinese authority in Central Asia has in all probability been a source of great regret to Russia. We shall endeavour to show cause why: we shall, however, at the same time try to persuade ourselves that in given circumstances Russia may find in China a coadjutor in her designs whensoever she may again have occasion to create a diversion against us in the East.

Along her immense line of frontier in Asia, Russia really and practically confronts Persia, the British possessions in India, and China. With respect to each one separately, and to all collectively, she

pursues a policy dictated both by the exigencies of her weak position at each section of her distended line, and by the prospective aspects of her situation over the western half of its length: the reverse of this may also be maintained, that she shapes her geographical and military positions in Asia, according to her relations with the powers she so confronts. Thus the one circumstance creates a policy and the other moulds it.

But it is time we touched upon Kuldja. Kuldja is situated in the valley of the River Ili. It was the capital of Chinese Dzungaria, which, with this valley comprised Tarbagatai, Kobdo and Kur-Kara-Ussu, and was the residence of the Chinese Governor-General of all the eastern dependencies of the Celestial Empire in Turkestan. In the month of January, 1860, that is two years after the establishment of the late Amir Yakub's authority in Kashgar, and while the latter was besieging the Tungan rebels of China at Urumtsi, Kuldja, with the only remaining Chinese garrison in Dzungaria, was captured by the Taranchis and Tungsans, after fruitless Chinese supplications to the Russians for aid. In July, 1871, Kuldja and the Ili valley were snatched from the rebels by the Russian forces.

The pledges and assurances of the Tsar, and Prince Gortchakof's avowed disapproval of annexations of territory are already matters of world-wide notoriety, but we have taken note of those only which we ourselves have readily received on application. In 1871 the Government of Peking received its own share of Russian promises in an official declaration made to it to the effect that the occupation of Kuldja was only a temporary measure, and that it should be restored to China whenever a sufficient force could be brought there to hold it against attacks and to preserve order.\*

At the same time, General Kaufmann, addressing a deputation of Taranchi and Kirghiz elders at Kuldja, declared to them that "the Russians had not come there for a day, but for ever.† The condition for its surrender are now all fulfilled; the Chinese have numerous forces in the country; they are again absolute masters in Eastern Turkestan, and Dzungaria, having been partially depopulated in the wholesale massacres and emigration which took place during and after the rebellion, there are no people left from whom the Chinese need apprehend any resistance or attack.

It will be remembered that the Russian Government affected to ignore officially the title and authority of the late Amir Yakub of Kashgar, and that under various pretexts a force was at one time assembled on the Naryn to invade his territories. It happened, however, that we sent an Embassy to Kashgar, that Yakub paid up the claims upon him of Russian traders, and that at that particular time the

\* Schuyler's *Turkestan*, vol. ii. p. 188.—"The authorities of St. Petersburg were not overpleased at the occupation of the new territory; and although General Kolpakovsky received the St. George, he did so, not as is customary by the will of the Emperor, but in a still more complimentary way, on the vote of the Chapter of the Order. The Foreign office immediately informed the Chinese Government of the occupation of the province, and declared its readiness to restore it to China whenever a sufficient force could be brought there to hold it against attacks and to preserve order."

† *Turkestan Gazette*, 1871.



Chinese were giving full proof of their determination to recover Kashgar in their persevering measures for its re-conquest. These circumstances among others deterred General von Kaufmann from prosecuting his designs upon Kashgar; moreover, it was deemed indispensable in the first instance to provoke hostilities with Kokand, in order to effect the absorption of Ferghana, through which communications with Kashgar were an essential condition of its invasion and tenure. At the same time every preparation was being made by the Russians at Kuldja for attacking Yakub in the rear by securing the passes leading from the Kunges and Tekes valleys, or head-main sources of the Ili river, to Kharashar and Turfan. The geographical position of the Ili valley is such that a moderate force holding it with a command of the southern passes completely turns the flank of an army in Kashgar. On this point Colonel Veniukof has observed that it was considered of immediate primary importance, after occupying Kuldja, to ascertain the number and the practicability of the various passes leading from the Tekes and Kunges valleys into Altysahar; hence, as he said, this section of the Tian-Shan was explored by Russian officers in 1871, and the four passes, namely, the Muzart, the Kok-su, the Dagyt and the Narat, were examined and reported upon. The Muzart pass was found to have been correctly described as next to impracticable by ancient Chinese travellers, but the other three were all available as gateways into the Yuldus valley, and so directly to Kharashar. In the first instance it was necessary to guard these passes against any attempted invasion by Yakub's troops, who were successfully operating against the Tungans at Urumtsi. In the second place a control of these points of ingress into Kashgar, together with the roads from the Naryn and from Ferghana, would in time have led to the extension of Russian dominion over the lune-shaped territory of Kashgar, and to the erection of a strong Russian outpost in its south-west angle where it impinges on Cashmere. It is true that with the sanction of the Russian authorities Russian merchants were supplying large quantities of grain to the Chinese army gathering for the re-conquest of the lost provinces; yet this service was rendered not with a view to materially aiding the Chinese in their endeavours to recover their lost possessions, but with the object of propitiating them and of making them more amenable to terms in respect to the claim which, in course of time, they were expected to urge. We have for the last half year heard of various unpleasantnesses in the relations between the Russian authorities in those parts and the Chinese Generals and Commissioners in Kashgar. The Russian Governor-General has received communications of a nature which would have merited chastisement had they come from any Muhammadan ruler within the sphere of Russian interests. He has been called upon peremptorily to surrender certain natives responsible to the Chinese for parts played by them in the original rebellion; he has been menaced with an irruption of Chinese troops, in pursuit of such fugitives in no terms of flattery; and ever since the re-occupation of Kashgar by the Chinese, he has been obliged to send scouts and spies amongst them to ascertain their real intentions and to strengthen the Russian forces on the frontier. At the same time the

Chinese have called upon the Russian Government to act up to its pledge in regard to Kuldja, and to surrender that place; while, seeing that the Russians show no inclination to act up to their promise, the Chinese have been concentrating their forces at various points on the military road from Urumtsi, through Manas to Takianze, drawing them up in large numbers under the passes into Ili, immediately north of that valley.

We read very little about it in the Russian papers, but we are assured that the Kuldja question is one upon which depend the future relations of Russia and China, and if it is settled amicably it will probably be adjusted *by means of a treaty between them calculated to create no little surprise*, and to afford additional evidence of superior genius in Russian statecraft.

The difficulty, however, of an adjustment of this matter would at first sight appear to be next to insurmountable, for, in the first place, China is claiming a surrender of territory in fulfilment of Russia's solemn pledge.

In the second place, Russia not only desires to retain Kuldja, but she also desires to obtain from China a right of way to the north-western provinces of China proper, and to obtain possession of the valley of the Yuldus up to Kharashar, for the sake of the superior cotton which that district, as well as Turfan, yields in great abundance.

The well-known Russian sinologist, Professor Vasilief, as well as several other Russian authorities on the question, strongly advocate a non-performance of the engagement entered into with China in respect to the cession of Kuldja, on the grounds of the many and incessant insults offered to Russia by China. The Chinese, however, might well insist, and with great prospects of success; they might also safely refuse to open their north-western and western provinces to Russian trade without fear of invoking retribution for their past and present behaviour. It is not, however, so certain to us that they are aware of the weakness of the Russian position on the line which confronts them from the Pacific to the Ili, or to the Russian fort on the Naryn; and they have but to realise to themselves the fact that Manchuria, with its millions of Chinese inhabitants—a country which has not been affected by internal revolution or by famine—affords them an effective support to any argument which they may advance at St. Petersburg.

The Chinese Embassy at St. Petersburg may have been negotiating on these grounds, and it may well be that the Russian Government have come ere this to the conclusion that in the matter of Kuldja it were preferable to adhere to their pledged word, and so in some degree redeem their character.

They might then bracket this fulfilment of a pledge with the much-vaunted retrocession of Shahr-i-Sebz to Bokhara in the year 1870.

#### ERRATA.

In our article on Afghanistan in last month's number we inadvertently stated that Major O. B. St. John, R.E., was engaged in the Seistan instead of the Perso-Kelat Mission of 1872. We take the opportunity to correct the following misprints in the same article:—

Page 259, 1st col., line 26, *for* Pishni valley *read* Pishing  
 " 2nd " " 24, " zaboo " yábú  
 " " " 40, " Tajaks " Tájiks



## EXPLORATIONS IN GREENLAND.

At the beginning of the spring of 1878 the Danish Government sent a small party of three gentlemen to Greenland, with the object of exploring and trigonometrically measuring the land between the colonies of Godthaab and Fredrikshaab generally, and especially to explore the inland icefields as far as this was possible with the limited means and the short time at the disposal of the explorers. A report, dated Fiskernæs, August 9th, is now published in the official Government organ, according to which the expedition has obtained very valuable results. Herr Dalager,\* who, in 1751, had reached "Nunatak," a mountain which rises out of the ice north of Fredrikshaab, reported that far to the east he observed a series of mountain peaks, which he supposed to be the east coast of Greenland; but although this was generally accepted as true, the question had not hitherto been solved. An exploring party, under the command of Lieut. Jensen, R.D.N., has now succeeded in reaching these mountains, which were situated about fifty miles from the border of the icefields, after infinite toil and no small amount of sufferings. The expedition, consisting of three Danes and one Greenlander, entered the icefields on the 14th July, dragging provisions and instruments on three small sledges; but on the second day the accumulation of loose snow on the ice became very dangerous, and the explorers repeatedly fell into crevasses. The surface of the ice was generally uneven, interrupted with deep crevasses, and in the valleys the rapid streams and small lakes made the route very circuitous, while the danger was increased by heavy fogs, and on the 23rd by a violent snowstorm. On the 24th the foot of the mountain range was reached, but all the toil and sufferings of the explorers appeared to have been useless, as it appeared impossible to ascend the mountains, the fog having again become intense. This was followed by a violent gale from south-east, accompanied with heavy falls of snow, which lasted six days, and as provisions and fuel began to run short, and several of the party felt symptoms of snow blindness, notwithstanding the snow spectacles, it was decided to return, when, fortunately, on the 31st July, the weather moderated and the sky became clear, and on this day the highest mountain was climbed. The height of this mountain was ascertained to be about 5000 feet above the level of the sea, and on the other side of the mountain ridge the icefields were observed without interruption as far as the eye could see, the plateau apparently gradually rising higher and higher. It is now consequently proved that this mountain ridge is not the east coast of Greenland.

To the preceding paragraph—for which we are indebted to the Copenhagen correspondent of the *Scotsman*—I have very little to add. The exploration is highly interesting in so far as it proves that I, in common with all other Arctic geographers, was wrong in believing that the mountains seen by Dalager 117 years ago were those of the east coast. But otherwise it does not materially alter our generalisation regarding the glaciation of Greenland. It only proves that there are peaks in the interior so high that the great ice-sheet has not been able to cover them, as it has covered the rest of the country. This could not

be otherwise, if the "Nunatak"—a general name for any spot surrounded by the inland ice—is 5000 feet over the sea, as this will give it an elevation of at least 3000 feet over the level of the surrounding ice out of which it rises. We must also remember that at this point Greenland is comparatively narrow. There are no grounds for believing that the inland ice of Greenland comes, as do glaciers under ordinary circumstances, from mountain ranges, for no moraine comes over the ice, which could not have been the case if the glacier ice-cap slid down the sides of mountains, or in any way came superiorly in contact with land. That the inland ice rises towards the east was already known. This indeed we might have presaged from the fact that there are comparatively few icebergs pouring out of the east Greenland fjords, showing that the "ice-streams" do not find an outlet on that side of the country.

ROBERT BROWN.

## ORDNANCE TRIGONOMETRICAL SURVEY.

## II.

## PRIMARY BASE MEASURED ON HOUNSLOW HEATH.

DURING the preliminary operation of tracing the Base and clearing the line on the heath, Colonel Roy, Sir Joseph Banks and the Council of the Royal Society, made enquiry into the kinds of apparatus used by the French and other continental states in measuring Base lines. On this important point they reported that the bases which had hitherto been measured in different countries with the greatest appearance of care and exactness, "have all, or for the most part, been done with deal rods of one kind or another, whose lengths, being originally ascertained by means of some metal standard, were, in the subsequent applications of them, corrected by the same standard." Having thus had many precedents serving as examples to guide them in their choice, it was natural enough that they should pursue the same method in the measurement to be executed on Hounslow Heath. As some difficulty was found in procuring well-seasoned wood of sufficient length, and perfectly free from knots, for the purpose, Sir Joseph Banks applied to the Admiralty for assistance in this respect. The result was that he went to Deptford, where an old New England mast, and one of Riga pine was cut up, and deals of the latter chosen as the best, from their extreme smoothness.

Those deals of Russian pine were placed in the hands of Mr. Ramsden to construct measuring rods on the French model. However, that ingenious mechanic had not much confidence in wood for determining out-door measurements with accuracy, and Colonel Roy was dubious on the point, thinking that metal would be less liable to changes of temperature. Accordingly it was arranged that a steel chain should be made and used experimentally, while the rod apparatus progressed slowly and carefully in its manufacture. This instrument was executed in time to be on the field when the track for the Base was two-thirds cleared. This chain was constructed on the same principle as that for winding up the mainspring of a watch on the ratchet, or unwinding on the barrel. It consisted of a hundred links, each one foot long, and

\* *Arctic Papers of the R.G.S.* (1875), pp. 7-9.

comprised three parts, namely, one long plate and two short ones, with circular holes at the extremities, for steel pins to join the links together. It was so accurately constructed that when stretched out on the ground all the long plates lay edgewise, so that if a person took hold of the brass handle and gave it a jerk the motion was communicated in a few seconds to the other end, thereby describing a beautiful serpentine line.

It is not necessary to enter into any details of this experimental measurement with the steel chain. Suffice it to say, that five soldiers were required for the proper management of it—two at each end, and one towards the middle, to bear it up in any particular place over rough ground. At the commencement a steel arrow was placed in the handle at the forward end, and the chain strained to the rear; then it was drawn on until six chain lengths, or 600 feet, were measured off. In this manner the first measurement of 7800 feet was completed in three and a half hours. This length was again measured both forwards and backwards, and the two measurements only differed one inch and a half in the distance, which was considered a good test of accuracy to prove the excellence of the chain. But it was not intended to rely on that mode of mensuration for this primary trigonometrical Base line as the future standard, for, not only inaugurating the triangulation between Greenwich and Paris, but the survey of the British Isles.

Although the locality of Hounslow Heath in the year of grace 1784 was more notorious as a haunt for rogues than scientific men, nevertheless there was a goodly assemblage of the latter on the field to witness the novel operations. There were present on the 16th June, when this experimental measurement began, Colonel Roy informs us, Lieutenant-Colonel Calderwood, of the Horse Guards, who had from the beginning promised to assist in the operation; Colonel Pringle, R.E., obligingly became a volunteer on the occasion; while Ensign Reynolds of the 34th regiment, who had been employed in surveying the environs of the heath, continued that work during the mensuration. Besides these distinguished military officers, Messrs. Blagden, Cavendish and Lloyd, of the Royal Society were present, with Smeaton, the famous engineer of the Eddystone Lighthouse. But the chief civilian was Sir Joseph Banks who had recently returned from the antipodes with Captain Cook the renowned circumnavigator, when the nation and a generous monarch showered honours upon him, showing that he deserved well of his country and king. Not only was he watchful of the survey proceedings, but he improved the occasion by acting the generous host to all comers of note on the heath, including the king and queen who honoured the camp with their presence. For this purpose he had a separate camp of his own, consisting of marquees fitted up in elegant style, and tents stored with all the accessories for cooking, and serving up refreshments.

On this interesting feature of amenities attending the inaugural operations on Hounslow Heath, Colonel Roy expressed himself in the following terms, while reading his report before the Royal Society:—"Before I proceed further, I think it here incumbent on me very gratefully to remark that your very worthy President, ever zealous in the cause of science, had repeatedly visited the Heath, to offer aid, if such had

been necessary, while the first and rougher part of the operations were going on. Now, that others of a more delicate nature were to commence, and where it was of importance that those entrusted with the execution should meet with as few and as short interruptions as possible, he not only gave his attendance from morning to night in the field during the whole progress of the work; but, also, with that liberality of mind which distinguishes all his actions, ordered his tents to be continually pitched near at hand, where his immediate guests, and the numerous visitors whom curiosity drew to the spot, met with the most hospitable supply of every necessary and even elegant refreshment. It will be easily imagined how greatly this tended to expedite the work, and how much more comfortable and pleasant it rendered the labour to all who obligingly took part in it; but more especially to him, who being a volunteer at first, considered himself as bound to persevere in his best endeavours to bring it to a successful issue."

From the foregoing we obtain, within six years of a century ago, a glimpse of the non-scientific accessories of the Ordnance Survey on its first field days; and it is to be regretted that the early annals do not supplement the technical details by more information of a similar description. No doubt the newspapers of the day, though few and far between in publication, contained notices of the progress of an encampment for a purpose so peaceful and novel. The proximity of Hounslow Heath to London brought numbers of metropolitan visitors, and as the highway from Staines passed through the track for the Base, vehicles of all descriptions could drive close up to the line of operation. Indeed, from a passage in the diary of Colonel Roy, their number interfered with the measurement as it approached and crossed the embankments of the road. Many of the nobility and gentry, especially large landed proprietors, evinced considerable interest in the undertaking, as it would ultimately affect the boundaries of their estates, some beneficially, others the reverse. The general public—who probably had only a vague conception of the importance of measuring five miles of a barren heath with a fine steel chain and wooden rods—flocked to Hounslow on fine days as they would go now to see a volunteer encampment on Wimbledon Common. Altogether, this inauguration of the Ordnance Survey was the topic of the day, from the king down to his meanest subjects in the vicinity of the metropolis, and stamped it from the first field day, as a great national undertaking.

In designing the wooden rods it was intended that they should be twenty-five or thirty feet long, but these lengths being rather unwieldy, twenty feet was thought better. Accordingly, three such rods, about two inches square, were made of Riga red pine, and enclosed within strengthening apparatus to protect them from injury. Their extremities were tipped with bell-metal two inches deep, and one inch and a quarter broad. Being trussed laterally and vertically, they were thereby rendered perfectly—at least as to sense—inflexible. A standard deal rod was also made to correct any diminution or increase in the length of those in use. Besides that, Colonel Roy had a brass standard scale, the same length as one held by the Royal Society, for the purpose of marking the rods in feet and fractions, and testing them after each measure-

ment. At every inch there was alternately a dot and an arc; and the three rods were numbered by marking on the surface of the metal at each end, 1'2; 3'4; 5'6—that being the order in which they were to be applied in actual measurement. Including the bell-metal tips, the total length of each rod was 243 inches, and terminated in flat curves of  $3\frac{1}{2}$  inches radius. From opposite points the trusses expanded at the middle to 12 inches from the rod. One of them when finished with all its subsidiary apparatus was found to weigh twenty-four pounds.

When in use the rods were not laid on the bare ground, like the chain, but placed upon movable stands, of which seventeen were provided, from two feet to about two feet eight inches in height, some with screws so as to suit the irregularities of the ground, and bring the rods to an exact level. By this means the distance was measured *through the air*, as if the Base line might be seen between its extremities by a telescope, without any intervening object whatever. These stands were also adjusted by a spiral level, with scrupulous accuracy, at a uniform height above the mean level of the sea, according to geodetic curvature. On this delicate adjustment Colonel Roy remarks:—"From the extraordinary levelness of Hounslow Heath, the ascent from the south-east towards the north-west being little more than one foot to a thousand feet in a distance of five miles, it was easily seen that the computed Base line, or that forming a curve parallel to the surface of the sea, at that height above it, would fall so little short of the hypotenusal distance, measured on, or parallel to the surface of the heath, as scarcely to deserve notice. But it was thought necessary, to show how much one end of the Base was really higher than the other, and to convince the world that in an operation of this sort, where so much accuracy was expected, no pains were spared, nor the most trivial circumstances neglected." From this last remark we gather that there were some captious critics at the time—as there generally are on great occasions—who were probably casting reflections on the slowness of the operations. Be that as it may, the grand results of the initial mensuration, as vouched for again and again in the Ordnance Survey annals, are a sufficient refutation of any supposed remissness on the part of the operators.

At length the measurement with pine rods commenced on the 16th of July by Colonel Roy, and Mr. Isaac Dalby—one of the most eminent practical geometers of his time—while the President and Council of the Royal Society were present to assist if their services were required. They began at the south-east extremity where a hollow wooden tube, or pipe was sunk six feet in the ground close to Hampton Poor House, so that the exact point could be referred to on any occasion which might arise of correction or repetition of the work. A flagstaff in it having been removed, a brass cup filled with water was put in its stead, and all necessary precautions taken for denoting the horizontal line of direction by a rope stretched along the first hypotenuse, and the vertical elevation by means of boneing rods or staves to assist in bringing irregular surfaces into the same plane, by means of a small telescope. The end of the first rod was then brought by a plummet to coincide with the centre of the cup, in which position, being clamped, it marked the *commencement of the Base*. The second

rod was next applied to the first, and then the third to the second, one end of each being brought sideways or in coincidence, and the other in direct contact, and thus the exact distance of sixty feet was ascertained. Then the clamps fastening the first rod to its stands being detached, it was carried by two soldiers and laid on the alternate side at the end of the third, and so on in succession, until fifteen rod lengths were measured off. This was the first half of the hypotenuse of a triangle, measuring 600 feet, of which there were forty-five in the whole length of the Base line. Owing to the confined nature of the apparatus for moving the rods into coincidence which required such nicety in adjusting the stands, the time occupied in measuring this short distance of 300 feet was not less than five hours. At that slow rate it would have taken more than a month, to measure the five miles. All the executive people were, therefore, of opinion that it would be proper to discontinue the mode of side measurement, and bring the rods into contact. This being done, rapid progress was made, so that by the close of the day they reached the middle of the fourth hypotenuse, a distance of 2100 feet.

A considerable fall of the barometer between the evening of the 17th and the morning of the 19th portended rain, Sunday having intervened, when the operation was suspended. These had scarcely been resumed when it began to rain, and the rods were carried to the camp, where they were severally compared with the standards, and found to exceed them by one thirtieth of an inch, occasioned by the excessive humidity of the atmosphere. The untoward occurrence of wet weather not only checked the progress of the operations, but prevented Colonel Roy exhibiting the *modus operandi* to the King and Queen, who had come from Windsor on purpose to witness the mensuration. During the whole week the weather continued wet and unfavourable; and when the measurement was resumed, the wooden rods were found still to exceed the standard length by the thirtieth part of an inch. This was ominous of uncertain mensuration, which disheartened the operators and their colleagues, and they had to make allowances accordingly in the lengths already measured. The temperature of the air being taken into consideration it was found that it also affected the rods. When the thermometer stood at  $61^{\circ}$  in the morning with the rods  $\frac{1}{30}$  of an inch longer, this excess was reduced to  $\frac{1}{37}$  in the evening, with the temperature at  $54^{\circ}$ . As the operation progressed, the expansion and contraction of the rods continued, according as the temperature rose and fell, and the air became more or less humid. Minute details of the results are given in his papers read before the Royal Society by Colonel Roy. From these it appears that the total expansion of the deal rods, 1370, in measuring, amounted to 24 inches, or 2 feet in 27,404 feet, the estimated length of the Base. Other experiments were subsequently made at Spring Grove, the residence of Sir Joseph Banks, to test their expansion after the exposure to heavy dews at night. The result was, that in a space of time, not exceeding fourteen hours, the excess amounted to  $45\frac{1}{2}$  inches on the whole line. Under these circumstances no reliance could be placed in them to determine the length of the Base with implicit accuracy; consequently they were discarded as a failure, notwithstanding their apparent success in foreign countries.

At this juncture a general feeling of disappointment prevailed throughout the camp, when the results of the measurement by pine rods proved to be a failure. It seemed as if all their anticipations of a speedy successful mensuration of the Base were not only checked, but the project was on the verge of being abandoned, for the season at least—especially in the face of weather so inauspicious for so delicate an operation. There was a kind of commotion in the camp, like that of an army defeated in the battle-field. A "council of war" was held to consider the matter, and to devise a new scheme for attacking the atmospheric enemy, who had literally swamped the plans of the indefatigable Colonel and his colleagues. Various devices were proposed to penetrate the entrenchments by stronger material than wood, and less liable to change of temperature and moisture. Colonel Roy himself conceived that metal rods of some kind or another, whose expansion could always be determined by experiment, seemed to promise a result that could safely be relied on. Cast-iron rods he considered would be least liable to expansion, from experiments he had made by Cummins's pyrometer. The cumbersomeness of their weight appeared indeed objectionable; but that inconvenience was either to be submitted to, or the reduction of their length, which was always, if possible, to be avoided.

In this dilemma a happy suggestion for solving the difficulty came from a quarter outside the camp. Lieutenant-Colonel Calderwood of the Horse Guards—who had been prevented by his military duties from being present on the field—came down from London. He informed Colonel Roy that having heard all about the failure of the deal rods, he had been thinking the matter over, and he was of opinion that glass rods would be greatly less liable to expansion, and much lighter than iron. The idea was at once entertained as the most feasible for the occasion, especially as they could be provided much sooner than any metal rods, and the saving of time was a point of consequence. Accordingly, Colonel Calderwood was requested, on his return, to order a trial glass rod at a manufactory of that material. On enquiry he ascertained that solid glass rods of the same dimensions as those of deal could not be made, it being impossible to take at once a sufficient quantity of the melted glass on the irons made for drawing them at the glass-house. But a glass tube could be drawn, as about half the weight of material would do. A trial tube was produced, eighteen feet long and an inch in diameter. This was shown to Mr. Ramsden, who, being averse to the use of a material so brittle, became convinced by Colonel Roy and his colleagues, that there seemed to be no doubt of glass tubes suiting the emergency; and consequently he was ordered to have a sufficient number made and mounted in the most careful manner. This was speedily effected, when it was found that hollow tubes were better for the purpose than solid rods, as they were lighter, and their evenness could be judged by looking through the open part, while it came in handy for devising a new ingenious method for preventing the ends coming in contact without concussion.

When finished and brought on the heath the brittle rods were so enclosed in protective apparatus that only the extreme ends, not more than an inch in length, were visible. They were separately enclosed

in deal cases twenty feet in length, eight inches deep, of the same width at the middle, and tapering in a curvilinear manner towards each end, where they were two inches and a quarter broad. Across the bottom of each case, at the middle part and half-way between the ends, three mahogany braces were fixed, on which the tube rested. To the centre brace it was firmly fastened, but free to move through the others towards both ends—to allow of expansion and contraction—which were ground perfectly smooth and at right angles to the bore. Into these, corks, three inches long, were nicely fitted, each holding fast a brass tube, closed at the inner end and opening outwards. Here a steel pin was screwed into the thick part, at one end, with a neck of bell-metal and a button outside; and at the other end it was free, acting by a collar on a spiral spring to soften the contact, like the buffer of a locomotive—which, perhaps, was copied from the crystal measuring rod design.

When this ingeniously-devised apparatus was brought on the Base-line track, the ends of the cases were carefully laid upon the movable stands, which could be raised or depressed by lever screws. Then, as if to complete our comparison of an engine buffer to the brass buttons with spiral springs, each rod had two wheels at the ends, two inches in diameter. By these the three sets of apparatus, each weighing 60 lbs., could be moved slowly and delicately on the top part of the tripod stands, until the ends of the crystal tubes came into contact, the buffer buttons preventing any sudden movement which might increase or diminish the measurement. There were numerous other appliances to this intricate, yet perfect, apparatus; such as ivory scales finely graduated; microscopes to read off the decimal fractions, and thermometers to ascertain the temperature of the glass as well as the air—but these and other details it is not necessary to enter into more particularly.

All the several parts being adjusted the apparatus was set up, as we have sketched it, at the north-west extremity of the Base ground near King's Arbour; being the opposite end to the previous starting point; and the weather proving propitious on the 18th August, the successful measurement was commenced. The method of shifting the glass rods was similar to that with the wooden apparatus, and they were tested by the same brass standard after the measurement of sections. To the great satisfaction of the operators there was no perceptible variation in the lengths, and the execution of the task was effected more speedily than on the first occasion. On Thursday the 19th, five hypotenuses of 600 feet each were measured, and calculations made to compare them with the pine-rod mensuration. On Saturday the 21st operations were resumed under favourable circumstances as to weather, which had induced King George III. to visit Hounslow a second time, as Colonel Roy remarks:—"To honour the operation by his presence for the space of two hours, entering very minutely into the method of conducting it, which met with his gracious approbation." During the week following rapid progress was made towards completion.

It having been circulated among the scientific community in London, that the concluding measurement with the crystal rods would be made on Monday the 30th August there was an increased assemblage of

visitors at the camp. In addition to those already mentioned, Colonel Roy informs us that "The gentlemen who were present at and assisting in the last day's operation, were Captain Bisset, Mr. Greville, Sir William Hamilton, Mr. Lloyd, and Dr. Usher, Professor of Astronomy in the College of Dublin. This last gentleman was so obliging as to observe, with the most scrupulous attention, throughout the whole operation with the glass rods that the contact of the second with the first remained undisturbed while that of the third with the second was completing." In other words, while the measuring rods were placed one after another, there was no sensible concussion when the ends were brought into contact. Altogether there were 1370 measurements with the 20 feet rods; and when the extremity of the Base at Hampton was reached, the last rod overshot the centre of the fixed pipe at the south-east termination, by nearly a foot and a half. This registered the hypotenusal length of the Base as measured, to be 27,402·8204 feet. However, there were certain minute additions and subtractions to be taken into account, which augmented the total. "Hence the true or ultimate length of the Base, reduced to the level of the sea, and making a portion of the mean circumference of the earth, becomes 27,404·0137 feet," or in round numbers about 5·2 statute miles.

Thus came to a satisfactory conclusion, after four months and a half of arduous mental and physical fatigue to Colonel Roy and his assistants, the fundamental measurement of a Base for all future triangulation of the British Isles. From the 16th April 1784, to the 30th August, the party had been encamped on Hounslow Heath during inauspicious weather, which we have seen seriously interfered with their field operations. We have also noted that when the extreme humidity and heat of the season affected the wooden measuring rods, the operators lost all faith in their accuracy, and abandoned them. Though disappointing at the time, this was so far fortunate that had the pine rod measurement been executed under more favourable circumstances it might have marked the primary Base, which was avoided. Had this been done it would, both figuratively and literally speaking, have caused the subsequent triangulation to "lean upon a broken reed." The amount of trouble, vexation, and re-measurements, necessary to correct the discrepancies that might have ensued are incalculable. On the other hand the glass rod measurement has been tested again and again by separate bases of verification throughout England, Wales, Scotland and Ireland, and all of them attest the accuracy by triangulation and computation, of Hounslow Heath Base, to inches and fractions. Moreover, with Colonel Roy and his colleagues' experience of the doubtful value of bases measured by wooden rods, which had been copied from continental usage, it caused British geodists to be dubious of their accuracy. But when the English Base was founded on almost infallible mensuration, the triangulation of our national survey was prosecuted with confidence, and hence the trigonometrical details will bear comparison for accuracy with any other country in Europe.

SAMUEL MOSSMAN.

#### ST. GERMAIN-EN-LAYE.

ONE of the prettiest spots within easy reach of England seems to be but little known. St. Germain is reached from Paris, Gaze St. Lazare, Chemin de Fer de l'Ouest, where the Dieppe, Rouen, and Cherbourg lines arrive. Trains leave Paris and return every hour, the fare—1st class, 1f. 65c.; 2nd, 1f. 35c.; return tickets, 3f. 30c. and 2f. 75c. The journey is done in about forty-five minutes. The line of rail crosses the Seine three times, and enters St Germain through a short tunnel, that runs beneath the great terrace, a mile and a half long. Passing up a flight of steps inside the station, the traveller enters an open area with the great church on his right and the Château on the left. This is one of the royal palaces of France; it has been used for various purposes for the last hundred years or so, and is now partly undergoing repairs, and partly used as a museum. The Palæolithic department is very rich in stone implements and cave bones. There are dolmens with the remains of things found in them; many of the flint weapons are curious and in a good state of preservation, but there are many that have been collected from various places that were probably formed by nature, and are no evidence of man's art. Bone lance and arrow-heads, needles, and other things, tell of ancient art, hunting, and fighting, and the iron utensils tell us of unrecorded husbandry. Old weapons of bronze and hard wood, with bracelets, rings, and necklaces tell of industry and an early love of ornament. Statues, jewels, bronzes, flags and standards tell of historic times, and in another part of the building indifferent pictures tell us of present art. Not far away is part of the old Château, now called the Hotel Pavillon Henri IV., where ancient terraces tell of the architectural skill of Royal France; where yew-cut cradles still keep royal memories for ever green; and where the eye of the visitor wanders over the rich valley bounded in one point by the fortress-covered hill of St. Valerien. Beyond this, when the weather allows it, the top of the Arch of Triumph is visible, and even that on calm days is to be seen the great Captive Balloon slowly rising from the haze of Paris into the clear atmosphere, with its human burden of thirty or fifty aerial inhabitants. Some one remarked the other day that some of these craters would some day increase the population of the moon. On a clear day the buildings in and beyond Paris tell, as we gaze from the Forest Plateau, of the vast extent of that great city; and taking the Epsom Downs as a similar distance from London, we can contrast the dusty haze of Paris with the black smoke atmosphere of our own capital. St. Germain hanging over the Seine may be compared with our Richmond hanging over the Thames, only the scene is very different; there the river is full of life, though scanty barges ply their trade; here there are but few pleasure boats, no steam launches, but strings of three and seven barges, heavily laden with hundreds of tons, are constantly passing up stream towed by steam-tugs. Some of these have ordinary screws or paddle-wheels, some have wheels on the stern, while one set of powerful boats have no outside propelling power—a chain cable laid along the river bed, passing over the bow, is worked round two drums, in the centre of the boat, turned by steam. This cable is the tow: it

passes round curves in the river for long distances, but how it is fastened at either end, or where the boats cast off from one and take up another, I have not yet heard. The pace of the boat is better than that of a horse-towed barge, and in its passage through the water no wave is raised to wear away the banks or to upset the small canoe. A good road runs along the terrace, with branch roads into the forest, some hard, some in their original sandy condition, all pretty, and most of them shady. Oak, elm, beech, birch vary the monotony a little; sometimes a pheasant, a rabbit, or a deer will cross the road or run amongst the bushes; but in no part of this wide forest does game seem abundant, though I am told that a large sum is given for the right of shooting.

At the present moment one of the great *fêtes* is going on. It began on Sunday, September 1, and is very much like Greenwich or any other suburban fair in England. There are eating and drinking booths. Fowls and legs of mutton roasting before extempore fires; long tables laid out for hungry folk and, somehow there are always such. Gingerbread and lollypops may be gambled for, and this is a European fashion: they pay 10, 50, or 100 cents, and as the numbers turn up in many a varied wheel, the lucky body takes the pick of cake, doll, vase, glass, &c. &c., all arranged in French taste under certain prices; then the passer-by is tempted by the brass ball hung by a chain ready to knock off the head of a doll for a trifle: that done, some little thing rewards success. Then there is the hydraulic gallery, where a ball is supported on a water jet, now rising now falling, to be knocked off by a rifle ball at 15 feet distance—crack, crack! but the ball, of tennis size, still potters on the top of the fountain, and the shooters try again, and laugh and slap one another on the back when one knocks the ball away. Then there is a grand lottery, where we buy several slips of wood with numbers painted on them; when the lottery is full—that is when all the slips are sold—the director rings his bell and twirls his wheel. Spectators watch its circling speed with anxious gaze, it slowly stops, and the number pointed to by the index is called out. The slips are quickly examined—“*Voilà la!*” and the paltry prize is won. An old woman pays her 10 cents, and pulls out a wooden handle, a small marble runs round a ring, and tells, when it stops, the blank that belongs to the player; she goes on contented. Billiards, bagatelle, metal tops knocking down little pegs, balls to pitch into big mouths, rabbits and poultry to be shot for, swings, and merry-go-rounds, with fifty seats, little theatres, a cow with a man's arm, monsters of sorts, a circus with its horses crowding on the platform; the Punch and Judy with a tremendous stick—all have their open-mouthed spectators as they have at our fairs. There was one thing here I never saw before, a Mont. Russe had on it a chair holding four people. It was on a frame which ran on rails with four wheels; in the centre of this frame was a pivot on which the chair rested. As the frame ran down the incline the chair spun round on the pivot; one of the women passengers looked as if she would much sooner not have been there; it was in fact a very sensational amusement. Squall goes a pipe close to one's ears! a basket full of French snail shells, each with a tin tube stuck into its back; we buy two for 2½d., and do as the former proprietor did—blow the tube—and

oh! if the snail had known the use to which his house was put, would he have built it? The noise was not sluggish.

We were getting so. Evening was drawing on, the lamplighters were trimming the lamps by the thousand. It is a night festival; the fireflies fill the trees and oil lights perfume the tainted air, clowns and harlequins act their old buffoonery, drums beat, trumpets blow, and cymbals clang, and as we slowly get to the skirts of the fair, armless and legless, blind and maimed humanities beg for the halfpence they trust you have not spent; and so at last, with our winnings in our pockets, we dive into the forest paths, for a two-mile stroll back again to Henry IV. We descant on fairs in general, and think that it is a silly thing to put up all those tents, to expose all those gingerbread goods, to endanger so much exuberant health, in the first week of September, after a month in which this locality had only three dry days. But in rain or in sunshine the world must move on, these forest *fêtes* are old institutions, things date from them as they do from Greenwich fair and the Derby Day; and if the folk are drowned by the rain of heaven it is better than being swamped by the liquor of earth. This I will say for the French, their crowds are orderly and quiet, I saw no drunkenness around me; their fun, when it does ooze out, is not uproarious as English fun is: with us it is continuous, here impulsive and spasmodic.

St. Germain follows Paris at present; it is not cheap, lodgings and food are dear. I got four rooms in London lately for less than I pay here for two, but it is Exhibition year, and London did the same, so did Vienna, and so will future cities do.

The climate of St. Germain is very pleasant; since the middle of August we have had no hot day, though it has been steamy in Paris; there it is noisy through the entire twenty-four hours, here the quiet is delicious, the flowers perfume the air, the swallows flit before the windows and around your paths; but there are few small birds, two crows, one magpie, one hoopoe, and a cat and some squirrels frequent the terrace trees, the bark of which is at present infested with a very beautiful but nasty-smelling insect of the bug kind; its black and red coat leads one to soldiers. Their nether garments are crimson and the upper clothing grey, the lower legs are black leather. It is a cavalry regiment, mounted on small, well-bred, light-limbed, bony-headed entire horses that would, in good condition, go through much work—they struck me this morning as being generally in poor condition: the general appearance of each troop would be improved by sorting the colours of the horses better than they are. The men are fair in physique, but sit their saddles like sacks: some of the officer's seats did credit to their school.

There has been an English Church service here till lately, in a useful little church, built and maintained, I am told, by an English lady; it is now closed for the season, and I conclude the visitors will be going soon. As a temporary place of abode it is pleasant, the climate and the forest, the lovely views, and the quiet are delights; there is no reading-room, no library, but Galignani, with a heavy circulating subscription, is in Paris; the English papers reach us on the day after publication; and if the place gets too quiet, or if one has not enough to do, we can get into Paris, and



crossing the streets gives some people a very serious occupation. In London the timid walkers find policemen to help them, in Paris there are none visible; in London the vehicles travel by rule of road, here they seem to travel in all directions; the streets are broad, and not even Lord Dundreary could understand the thing.

A good deal is said as to the economy of the French, but they are beaten by the Italians. It is usual in both countries to throw the refuse of the house into the streets; in Italy these heaps are ransacked for paper, broken glass, and rags; here all is carried off by street carts, as in London by the dust carts, and possibly the refuse yards are picked over; in Italy we see it done, here we do not.

There seem to be several English families residing here; the terrace is a delightful place for children—clean, cool, and shady. I hear nothing of doctors, though a travelling gentleman shook our passage with his coughing for some nights. Fruit has been and is plentiful, grapes are coming in, too; as the season is late in England, so it is here; but St. Germain-en-Laye is a pretty place, delightful to those who are content to breathe the pure air of heaven, to smell the flowers of the garden, and to walk in the shade of the terrace or the forest; it is easy to get at and easy to leave. As in other places on the Continent it is well to make your bargain for all things.

H. P. M.

#### M. UJFALVY'S TRAVELS IN CENTRAL ASIA.

M. UJFALVY, whose recent travels in Central Asia have already been noticed in our columns, has furnished some interesting notes on the subject of hunting in the regions he has visited. He observes that his researches were mainly ethnological, but that hunting is so interwoven with the daily life of the inhabitants of Central Asia, and plays so important a part therein, that it is worthy of attention even from a scientific point of view. Many hunt as a means of subsistence, and are trained to the occupation from childhood, while the nomads hunt as well for the purpose of protecting their flocks from the ravages of wild animals as of supplementing their food-supply during years of bad pasturage. The hunters of Central Asia are thus divided into mountaineers and pastoral tribes: the inhabitants of towns are too much engrossed in their commercial pursuits to have any leisure for the chase, and, in fact, have no taste at all for it. The chief hunters are the Kirghiz, who frequent the immense plains between the sea of Aral and Lake Balkash, and the rude highlanders dwelling on the confines of the Pamir plateau. The tracts adjoining the banks of the Syr Daria or Jaxartes are favourable grounds for the hunter, as wolves, foxes, badgers, wild goats, and grey hares are to be found; the bushes alongside of the river are frequented by pheasants; water-fowl of various kinds haunt the river itself, and sometimes tigers are found lurking in the reeds. The borders of Lakes Aral and Balkash afford scope for the sportsman, while the province of Ferghana is compared by M. Ujfalvy to an English park, where stags of an unusually fine description, called *Maral* are found, and waterfowl are to be seen in

profusion. The banks of the Kara-Daria, an affluent of the Syr, abound in herons, cranes, ibises, geese, wild ducks and with a bird not unlike a flamingo. On the road one meets with crows and a bird like a blackbird, but of bright blue hue, a colour which M. Ujfalvy observes seems to pervade everything one comes across or sees—the sky, the birds, the stones and the very walls of the monuments.

North of Ferghana, the Semirechensk, or seven rivers' province, with the mountainous slopes encircling Lake Issyk-kul are particularly rich in stags (*maral*), foxes and bears, which lurk in the extensive forests on the northern Tian-Shan, the vegetation and fauna of which often partake of an Alpine character. The Ili basin is also rich in game, and the plains around Borokhudzir covered with thickets are frequented by an elegant gazelle, which is found in herds of five or six and is very tame. The mountains north and south of Kuldja, the grassy valleys of the Tekes, the Kunges and the Kach are inhabited by maral stags, wolves, foxes, bears, wild goats and all sorts of waterfowl.

The Zarafshan valley east of Samarkand has also many attractions for the hunter. Besides wolves and foxes, lynxes abound, and are much sought after for their furs, while eagles and vultures of a large size are commonly to be seen.

Turning to the hunters themselves, we find that the Kirghiz nomad is the hunter, *par excellence*, and his habits of life are identical with what they were when pictured by the envoys of Saint Louis of France. He is of medium height and vigorous frame, his eyes set obliquely in his head; he has a snub nose, a large mouth, with beautiful teeth, and passes his existence in a felt tent, shaped like a cheese, with his wives, children, horses, and cattle. In a tent close to the Sea of Aral, M. Ujfalvy found a young camel, a goat, and several sheep living most contentedly in company with the owner and his family. The chief weapon of the Kirghiz is a small-bore matchlock, which is usually rested on a fork so as to ensure a steady aim. An arquebusier of the time of Francis I. would have certainly despised such a weapon. Yet, with this primitive affair the Kirghiz shoot birds on the wing, hares, wild goats, and tigers, of which last M. Ujfalvy was shown a splendid stuffed specimen in the residence of General Kaufmann, the animal having been shot by a Kirghiz, by a bullet lodged between the eyes.

The Central Asian horses are of three sorts; the *argamak*, or Turkoman horse, a horse of Arab breed, but rather longer and longer legged than the pure Arab. It is believed to have some English blood in its veins. It is scarce and dear, and found only in the possession of the Kirghiz chiefs. The indigenous Kirghiz horse is small and mean in appearance, but, like its owner, capable of enduring considerable fatigue. The *karabair* is the result of crossing the two breeds; it is less hardy than the Kirghiz horse. This latter animal covers 80 kilometres in a day; it is never put under shelter at night, it picks up what it can find to eat alike during the extremes of winter and summer.

The Kirghiz dog, or *tazi*, is a species of greyhound of medium size with pendant ears; it is intelligent, bold and remarkably swift of foot. Those of Samarkand are small but shapely; those among the Kirghiz of the Emba near the Caspian have very long hair on

their ears and legs, while those of southern Siberia are long legged and very active. Grey is the most esteemed colour for the tazis, and a good tazi often fetches more than a horse. This dog has never as yet been acclimatised in Russia in Europe, but Mr. Ujfalvy has been fortunate to bring home three of them, which are doing well on the Jardin d'Acclimation. In the Upper Zarafshan valley, and near the Pamir, the dog is called gurdja. In these tracts there are no roads or means of communication beyond narrow paths and rickety bridges. The highlanders who inhabit these valleys are called Galtcha. They are an Aryan race, and probably descended from our ancestors, who are supposed to have dwelt in these valleys in remote ages. They are fond of their country, are excellent pedestrians, sure footed and keen sighted. Their hunting companion is the gurdja, a species of basset with pointed ears. This dog is both strong and intelligent, readily ascends the mountains over snow and ice. It is savage and difficult to tame, and when brought to Samarkand always takes advantage of the first opportunity to escape to its native mountains.

The Kirghiz make use of eagles and falcons with which to hunt wild geese and ducks. The Kirghiz of western Siberia train their falcons and eagles themselves, while those on the banks of the Aral buy their birds ready trained from the Bachkirs, half-nomad, half-sedentary people, who since the time of Herodotus have inhabited the valleys of the Ural Mountains. The Kirghiz goes a-hunting on horseback, armed with his matchlock, a whip with wire woven into the lash, a falcon on his wrist, and a tazi following him. Pheasants, which are exceedingly numerous along the banks of the Syr Daria, are usually caught in snares. The wolf is pursued by the Kirghiz on horseback, who attacks him with his whip and usually kills him without difficulty, the animal being (in the Aralo-Caspian basin at least) a most cowardly beast. M. Ujfalvy adds that the Central Asian wolf is usually of a yellowish grey colour, small in size, and afraid of man whom he never attacks. The tiger, on the other hand, he states is larger than that of India (!) and particularly fierce. At the time of the first Russian expedition, more than twenty years ago, the thick vegetation on the marshes swarmed with them; along the banks of the Chu river they are not infrequent, and it is stated that they are found on the shores of Lake Balkash. They are, however, much rarer than they were; and Prince Dolgoruki, who was sent to Turkestan in 1876 to inspect the Central Asian forces, was unable to find one. Tigers are caught by the Kirghiz in pit-falls, with a sheep for a bait. The Russian authorities give a reward of ten roubles (about 17.) for every tiger killed, and the skin usually sells for double that sum. General Kaufmann relates to M. Ujfalvy a story of a Kirghiz having lain in wait for a tiger, which had been committing depredations on his flock, and had even killed some armed men, and having actually killed the beast, with nothing but an axe in his hand. M. Ujfalvy concludes by strongly recommending Central Asia as most eligible hunting ground for sportsmen, and he adds that the security of property and life in the parts subject to the Russians is an additional consideration of importance. Like the late M. Fedchenko, M. Ujfalvy was accompanied in all his excursions by his wife, who traversed

over 8000 kilometres in the course of their travels in these regions.

A subsequent paper by M. Ujfalvy enters more particularly into ethnological information on Central Asia. The Galtchas are a people which he specially noted. These are usually confounded with the Tajiks, but though the former, as well as the inhabitants of Karateghin, Darwaz, Shignan, &c., are of Aryan origin, there are points of difference between the two, the Galtchas intermarrying only with themselves, while the Tajiks do not object to ally themselves to Uzbek and even Kirghiz women. They are hyperbrachicephalic, rather tall in stature, their skin is white, but often bronzed where exposed to the sun, hair dark chestnut, occasionally red and often fair, beard flowing, eyes close-set in the head, brown and often blue in colour. The nose is well shaped and slightly arched, the face oval, the frame vigorous, and they are excellent pedestrians and horsemen, being capable of enduring great fatigue. The Galtchas say that their name signifies "The hungry raven which repairs to the mountains to find means of subsistence." They all speak dialects of Persian, they are of sedentary and agricultural tastes, and their constitution is democratic, the popular assemblage being the supreme authority. Every village has an *aksakal* or white beard, a sort of mayor. As a rule the Galtchas are monogamists, although some of those who are better off have two wives.

M. Ujfalvy contributes a variety of notes on the other ethnological types which he came across in Ferghana, Kuldja, and other districts of Russian Turkestan, and descriptions of the places he visited, which supplement the writings of Fedchenko in many interesting particulars.

#### A SICILIAN TOUR.—PALERMO.

MORE than two hours had crept by since the one positively fixed for the departure of the Calabrese steamer for Palermo, and, sooth to say, the steamboat officials were guiltless of the delay. The steam had been blowing off long since, the steward had long ago taken his post on the top step of the gangway, ready, as is the wont of his kind, to clutch from passengers' hands their tickets and give them thereafter beds—or not, as the case may be—the foredeck was piled high with furniture so rickety and wretched that it was difficult to imagine how it could possibly pay for, or survive its journey; the afterdeck overflowed with passengers looking as though they owned the furniture; we were ready to move altogether, yet moved not at all. At length some stir was visible among the crowd of red-capped spectators who proposed to witness our departure. Their brown limbs which had hitherto clung to the rough stones of the quay, like the *tentacula* of the polypi a few feet below them, were gathered up lazily as a grey-haired, gold-laced general stepped on board, and close behind, under the form of a quiet portly gentleman in plain clothes, but with the gaudy velvet waistcoat dear to Italians, even in glowing spring weather, came the awful avatar of the paternal police of Naples. Great exertions were now made to get into line a large body of recruits from the Abruzzi, in

order to their inspection, not by the general however, but by the policeman. The looped and windowed raggedness of this corps was rendered yet more striking by that love of cheap decoration which never deserts the Italian. Triple ranges of black velvet vandykes, bordered grey jackets sadly threadbare, yellow worsted braid guarded hose, which, like those of Poins, were once of some recognizable colour, now long since harmonised into a neutral tint. Of their linen an accurate account can be rendered, it was exactly one shirt and a half less than the amount possessed by Captain Falstaff's company. But strangest, most mysterious of all, were their hats. Hats they were fairly presumable to be, as each man bore on his head a piece of felt somewhat conical in form, a hat in the abstract, but so far removed from any ordinary head-gear that one might conjecture the wearers to be Lear's troop of horse, each man providently equipped with the felt necessary for the execution of the old king's delicate stratagem. At length when each individual of the recruits, passengers and crew had separately answered to his name and been checked off, the fat police officer left us free to get under way. We soon left behind the emblematic Vesuvius, growling ominously and so undermined as to its upper portion, that careful observers predict the downfall of the crown on the next outbreak; and after a passing glance at lovely Sorrento, the very loveliest of whose lanes has been sophisticated by the intrusion of two huge royal villas, we found ourselves at sunset rounding the precipices of Ana Capri. Morning showed us Urtica on the beam, and by half-past ten, greatly to the delight of the sea-sick general in the large cabin, and of his small army who had begun service by a night's drenching on deck, utterly unprotected, we hove to in the roadstead of Palermo. Though devoid of any great commercial adaptability, for it possesses neither a navigable river nor a good harbour, this city is so royally beautiful that none can wonder at its having been in all ages the golden apple of discord to many and various races. Here Greek battled with Carthaginian, Carthaginian yielded sullenly and step by step to the steadily-advancing Roman, till at length Hamilcar Barca, willing to wound and yet afraid to strike, clung for three whole years to the rocky fastness of Monte Pellegrino, unable to face the foe in open field, yet gazing like an earlier Boabdil on the *fair city* which he was doomed never to re-enter. No wonder when so great a prize was at stake that the Saracens offered a line of defence formidable enough to daunt even the daring Roger de Hauteville, nor until cheered by supernatural aid—for St. George in full armour bore his red cross banner into the enemy's lines—did Count Roger likewise charge the infidel's home, and, despite his chain mail, cleave to the teeth the Paynim Emir. Not even then had Roger gained the full meed of victory: his brother, Robert the Wily, considering probably that the fortune of the day was due no less to his auxiliary battalions than to sweet St. George's aid, generously presented to Roger all the rest of the island (most of which was not yet unconquered), but retained for his own guerdon the much-coveted Palermo. Not until thirteen years had gone by, years of hard fighting by sea and land, did the great Count at length hold his court in the Alcazar of Palermo, and might recall with just pride

the time when, twenty years before, he had cut his way with only a hundred men from Messina to Girgenti, or when he and his Countess, shut up by mutinous Greeks in the citadel of Traina, had borne the sharp winter with no covering for their bed save his knightly war cloak. The difficulties of entering Palermo have by no means ceased at this day, and while awaiting the slow process of getting leave to land the traveller may, if so minded, speculate as to whether this worthy prince, who ruled a motley race of Greeks, Saracens, and Normans respectively by the laws of Justinian, Mahommed, and Rollo, bade his officers look askance at any bearded stranger, and ask whether he was known to any person of respectability in the island. The happy forethought of a friend had enabled us to reply with well-studied carelessness that we have letters from the English Embassy to the Viceroy. This "large utterance" produced a satisfactory change of demeanour; our portmanteaus were released after a very slight examination, and ourselves made free to cross the harbour to our hotel; for the police and Customs' offices are with official ingenuity situated on the side of the port farthest removed from any centre whether of business or pleasure. When after a tedious passage over the glassy surface, which the boatman tried hard to persuade us was becoming wrinkled by wind—so as to avoid pulling—we landed, another Customs' officer asserted his right to a fresh examination of our boxes. This felony duly compounded, we were able to walk some twenty yards to the city gate. Physically this gate may be considered non-existent, there being no barrier, nor even an arch to connect its piers. I well remember a party once seeking its imaginary shelter during an April shower, and staying for some minutes firmly believing that we were not getting wet. The legal existence of the gate was however fully manifested to our present quartet, when—*uno avulso non deficit alter*—a third executive appeared, and asserted the city's privilege to investigate our baggage. This time the thing was too ludicrous, we burst into universal laughter, and the old fellow, probably puzzled by so unusual a protest against his claim, yielded the point. *Risu solvantur tabula.*

After due renovation of the inner and outer man at the Trinacria, a very good hotel, and—as subsequent experience taught us—the only good one in the whole island, we devoted ourselves seriously to the duty of sight-seeing. The plan of the city is simple and grand. The main street of Cassaro runs in a perfectly straight line from the sea-shore to the foot of the hills which, gradually rising into mountains, girdle the city with a picturesque chain of summits. The upper gate of the town is however more complete than its sea congener, having over the arch a pavilion of the Royal Palace, the Moorish Al Cazar, which gives its name to the street. About halfway up, the Cassaro is intersected by an equally long street, and the four façades of the point of meeting are symmetrically curved, and decorated with what Richie Moniplies terms the policy of bigging. The University Museum contains a gallery of painfully bad pictures, simpering saints and grim executioners to any amount. Lo Spasimo di Sicilia has now a different meaning to what it once bore. A good bronze from Herculaneum representing Hercules, the patron saint of that city, capturing the stag of

Diana, is the only object worthy notice in the upper rooms. Below, however, the case is different. A Pompeian mosaic of two old men is striking, from the life-like and appropriate expression given to the monstrous comic masks in which, as usual, the actors' faces are hidden. So vividly are the prevailing feelings of Menalias and Cliremes here delineated, that it is impossible to doubt that we look upon the first scene of the Heautontimorumenos. If, therefore, we can divest ourselves of the intrusively-ludicrous associations of Christmas pantomime, it becomes comprehensible that the mask may have been a useful adjunct to the ancient stage, where indeed the dimensions of the theatre often rendered some gigantic medium absolutely necessary. But it is obvious that the expression must have been confined to some overruling passion, some characteristic "humour" which was the keynote to the whole personation. Bobadil, Morose, or Epicure Mammon, might be tolerably represented; Macbeth or Shylock would defy the skill of the modeller. Some fragments of the *cella* of a Selinuntian temple, bright with scarlet and blue, might convince the antichromists of the Grecian practice in architectural decoration, did they care to be convinced, which I much doubt. But by far the most interesting relics bequeathed to us by Selinuntium are the sculptured metopes of her temples. Hercules carrying two thieves by their heels is a strangely archaic affair, Egyptian in some particulars, but so rudely proportioned that the demigod might almost do duty for a South Sea idol. Perseus is very similar in type, at best he can take rank merely with the Hindoo deities, while the goggle-eyed mask of Gorgon looks to have been carved in Mexico. But on the opposite side of the small courtyard are works of a later date, though still of early time in art history (the city was destroyed 409 B.C.), which display merit of a very high order. Pallas combating is a grand ruin, of which unfortunately little more than the general masses of drapery and attitude can be traced, the sea air having eaten away nearly the whole surface. The same remark to some extent applies to the Actæon torn by his dogs; his position is marvellously energetic, as with his right hand he beats down one dog, at the same time throttling another which he holds in his left, clear of the ground. In all these sculptures the material is a coarse limestone, but the faces, hands, and exquisitely-moulded feet of the female figures, being all which is visible beneath the decorous drapery, are of fine white marble. This method of producing an effect of greater delicacy would probably, did not chronology stand awkwardly in the way, have been ascribed rather to the decadence than to the infancy of art. Polychromy has also been employed, for the girdles of Perseus and Hercules bear traces of deep red paint.

Not far from the University stands a building to which a painful interest attaches itself, it was in 1849 the Parliament House of the Sicilian Republic. In that year the present writer had been a human unit in the noble squadron which under Admirals Baudin and Parker was sent from Naples to communicate the King's *ultimatum*, namely, that he refused all concession, and to express our good wishes that the Sicilians might get out of the difficulty into which they had been led by a foolish reliance on our word. Stately and ceremoniously was our manner of delivering this

far from honourable message; salutes from the admirals to each other, joint salutes to the Sicilian flag which we had in effect come to pull down, national airs from the ships' bands, all these "fierce vanities" could not blind our eyes to the undignified nature of our position. Distasteful as our presence must have been to them, the Sicilians showed us personally much high-bred courtesy, nor even among the poorer classes was anything of rudeness displayed. The sole exception that I can call to mind was when a wild mountaineer, who had come from the *Piazzo de Greci* to work at the fortifications, hustled one of our officers. The offender was immediately seized by the bystanders and severely reprimanded, while an ample apology was tendered to the fiery little Cymrian, even before he had time to knock down the Greek. The Sicilian Government determined to send the royal message to each municipality, desiring from each a separate answer. During the time necessarily occupied by this proceeding, our squadron remained at anchor, and at length the 'Bulldog' arrived from Naples, bringing the British and French Ambassadors, whose presence, it was supposed, might induce the Sicilians to submit apparently on the principle on which the governess or *mamma* is called when nurse has failed to get the rhubarb swallowed. More gunpowder and manning of yards followed, and at length came the moment when the Speaker had to announce to the Deputies that the message brought by the Ambassadors was identical with that previously communicated by the Admirals. The House unanimously voted that the message should not be read, and proceeded to listen to the replies which the various communities of the island had returned. These, though unanimous as to refusal, differed considerably in style. Some were brief, explicit, and dignified; others (and these, alas, the majority) were full of bombast circumstance, and even of puns, which, though most offensive to our taste, were not unwelcomed by the House. But as Cicero has told us that the Sicilians can never be so badly off but that they can make some appropriate joke on the subject, it is needless to subject their actions to our canons of criticism. Finally, on the question being put, the whole House rose simultaneously, and accepted the alternative of war, with outstretched hands and shouts of "*Guerra, guerra!*" The sight was grand, but the question "*Quid dignum feret tanto hic promissor hiatus?*" would intrude itself unpleasantly, and received a painful answer some months later.

A novel feature in the Cassaro cannot fail to attract the stranger's eye: along the upper storey of a house often runs a gallery whose curved projecting outline is unmistakably of the eighteenth century, closely latticed and gaily painted, a fantastic commingling of the lively and severe, intended doubtless to symbolise the very problematical fact that nuns fret not in their convent's narrow room—for these are convent lattices. Far up the street, just where these ornamental soul-traps are most frequent, stands the Cathedral, somewhat back from the main street. The building is one of the noblest, perhaps, taken altogether, the noblest specimen of Gothic architecture in Italy—the grand devout Northern idea rendered in all its main features, though somewhat modified by the medium through which it is conveyed. Gothic architecture in perfect purity never crossed the Alps. The carved tracery

round the eastern doorway which faces the street is something marvellous in elaborate intricacy; but we miss the solemn ranges of Saints and Prophets which in Northern cathedrals so fitly herald the approach to the temple of their master. Much of the exterior has suffered from the bad taste of modern repairers, but the belfry still remains in which Stephen of Perche expiated the rarely-forgiven crime of being too wise for his age. He was Chancellor to William the Bad, and a great reformer,—“*Advocatus et non latro: mirabundus populo*,” says the Romish hymn in honour of the Cornish saint, Ivo—wherefore the priestly party rose against him, and with “*Nolumus leges Siciliæ mutari*” on their banners, did veritably besiege the obnoxious Chancellor in this belfry till he was fain to capitulate and retreat to France. Passing under the lofty arches which connect this tower with the main building, we enter by the south door and find ourselves in a sadly sophisticated interior, over which a deluge of renaissance and whitewash has swept with desolating effect. High above the doorway, and, of course, facing the high altar, is a remarkable work of art. No Byzantine Madonna, no Holy Rood by Giotto, no Last Supper in fresco is here; but the post of honour and sanctity is filled by a half-length portrait of the gracious Sovereign of the two Sicilies in full uniform. Very full it undoubtedly is, and very forcibly do the tight buckskin inexpressibles and the wide expanse of chin and throat strike on the gazer’s eye. In the whole cathedral one chapel alone is really interesting, where, in four sarcophagi of porphyry, repose the ashes of the Norman sovereigns of the island. All are simple in form: that of King Roger (in which however he does not lie) is a plain oblong chest with a steep ridge roof. He had prepared this tomb for himself at Cefalu, but his successor, whether from respect to his remains or disregard of his wishes, buried him here in a white marble sepulchre; and Frederick the Second, the warrior, philosopher, and troubadour, speaker of six languages, founder of public schools, rests in the coffin destined for Roger, beloved by his subjects and duly hated by the Popes, who called him an atheist for allowing his Saracen subjects to live unmolested at Nocera de’ Pagani. His wife lies near him, who was, says her epitaph, “The last of the great race of Northmen,” for thus and not “Normans,” should we translate the good old bad Latin NORTH-MANNORUM.

In the well-proportioned and constructed crypt of the church we find a comfortable collegiate party of canons, deans and archbishops, with a small leaven of princely laity. A few of their tombs are decorated with Alexandrine mosaic, but the high fashionables of the cemetery have taken up their abodes like the hermit-crab in the disused marble sarcophagi of antique Romans whose togaed forms have been ruthlessly beheaded to make room for some shield rich with barbaric blazonry. The central place, however, which is worthily occupied by the builder of the crypt and of most of the south side of the church, offers to our view an un mutilated sepulchre, devoid of all armorial bearings. Walter Ofamilio, successor to our luckless friend, Stephen of the bell-tower, was likewise a reformer; but, more judicious than Stephen, he contrived to retain the good opinions of the Sicilian people as well of their Norman lords. One thing he lacked, not perhaps

essential to his own happiness, but the want of which caused dismay to the souls of seneschals and gentleman ushers. Walter Ofamilio, notwithstanding the good mouthfilling character of his surname, had no family shield; nor could the Garter or Rouge Dragon of those early days—for Walter was an Englishman—help their Sicilian brethren to dispel this annoying cloud. Etymology had not then made much progress, or a small acquaintance with our barbarous island tongue would have solved in no pleasing manner the mystery. Walter Ofamilio was simply the son of a miller; and as he lies there, Dean of Agrigentum, Archbishop of Palermo, and the Minister during whose life, we are told, there was more safety in the thickets of Sicily than in the cities of other kingdoms, the miller’s son may well afford to dispense with a herald’s voucher for his respectability.

After stopping for a few minutes to look at a Dominican church in the Piazza near the University, a marvel of laborious enormity in inlaid marble, we went on to the curious old church of the Martorana. A modernised choir, rich with carved work and gilded lattices—it is a nun’s church—has been joined to what remained of the ancient fabric of the High Admiral. An elaborate pavement of Alexandrine work, sundry pannels of porphyry and green basalt, bright as glass, together with two pictures of early mosaic are the chief features which time and modern decorators have spared. The most interesting of the two pictures represents the coronation of Roger the first king, son of the great Count. The figure of the king is historical for he is robed in the very dalmatic in which many centuries afterwards his bones were found wrapped, but instead of the officiating priest we see a figure of noble though somewhat stiff character floating in air, above whose head is inscribed the Greek monogram of the Saviour. Roger’s title is likewise given oddly enough, the language being Latin, the character Greek, thus ΡΟΓΕΠΙΟC ΡΗΞ. This, by the way, may serve as one instance—many others may be cited—to show that anciently the Greeks pronounced H like our A in *mane*, not like double E, although the modern Greeks agree with our schools in doing so. In the choir of the small church, which with the transepts forms the whole church, nave and aisles being destroyed, stood the Easter candlestick, which always occupies a conspicuous place in the Romish Church from Easter-Day till Ascension-Day, and bears a massive wax candle pierced with five holes, typical of the body of the crucified Saviour. Here, however, as in other churches in Sicily, it was a sort of rustic candelabrum, bearing seven lamps. Other object of interest was there none, save two comfortable armchairs, in which were seated two portly monks, one all black, the other all white, seriously inclining towards the gilded grates to receive the confession of unseen penitents.

Three of our party now leaving their comrade sketching in the Martorana, departed in search of the church from which in 1282 was rung the peal heralding the awful Sicilian vespers. Our search was unsuccessful, and no wonder, since, ignorant of the changes of soil, we were questing on ground which down to the fourteenth century was covered by the sea, whose waves then reached nearly to the cathedral. Meanwhile to the remaining man who was copying the mosaic of King Roger, there

offered itself a brief vision of romance, a Paris peep into Paradise, closed, alack, as soon as opened! For as he looked upon the old mosaic, dropped from the lattice overhead—there were two tiers of gilt cages and rolled along the porphyry pavement, a small scroll of paper. For none save him could the billet be intended, seeing he was alone in the church. Who shall say what visions rushed through his mind? but ere he could disencumber himself of portfolio and seize the prize, there emerged from a side door the impoetic form of a working carpenter, who quietly impounded the mysterious missive and vanished with his prize. What was the Sibylline leaf? was it a passion flower, which, like that of Catullus, had bloomed in the secret convent garden? was it the man's own paper of measurements? No farther seek its merits to disclose, but turn rather to enjoy the glorious sea view, which as you gaze from the windows of the Trinacria fills the mind with the rare sense of perfection. The hills behind Bagaria on the extreme right sink gradually to the sea in a series of picturesque curves; on the left rises in bold precipices above the city the Monte Pellegrino.

“Where darling of each heart and eye  
From all the youth of Sicily,  
Saint Rosalie retired to God.”

In front the many-coloured sunset waves of the Mediterranean are lapping gently against the parapet of the Marina, the most beautiful public promenade in Europe. The massive breakwater in front shows, however, that the scene is not always peaceful as now: when the N.W. wind—the fierce mistral—sweeps down from the Alps, and, ranging along the whole coast of Italy, dashes the waves against the Sicilian shore, the surf often inundates the whole broad road, and drenches the orange and pomegranate gardens which extend from it to the palaces on the land side. During our stay in 1849 the cutter of the French Admiral was dashed to pieces and two men drowned in one of these gales, and on a previous visit our ship, a powerful steamer, arrived but just in time to bring off a ship of the line, who, becalmed during a fierce Scirocco under the sheer limestone wall of Monte Pellegrino, was rolling her maindeck ports under water. These recollections prevent one from considering the scene too sybaritic. Statues, marble seats, and a handsome orchestra in the centre of the drive, all show that this place was meant for enjoyment; but a royal decree to enforce gaiety would be as impotent in Sicily as at the court of Seged. The Marina is nowadays utterly desolate. Its last stage of life was in 1849 when the Sicilians dug a huge trench at the farther end, ostensibly to repel the possible advance of the royal troops. The number of cubic feet reported in the evening papers as excavated by patriotic energy put to shame mere railway navigators; but when we visited the spot the lion was by no means so big as the picture. The men worked frantically for about ten minutes, then came fraternal demonstrations, female labourers, whose utility may be estimated from the fact that they were invariably preceded by ten or a dozen enthusiasts, shouting “*evviva* something or other” and waving their cigars, but by no means helping their tottering sisters. The only men who really wrought well were a party of Capuchins from the neighbouring convent of the Nome di Gesu, and when at the Ave Maria all left off work, the cowed,

corded and bearded fathers thought no shame to brandish high their shovel and join the Pyrrhic dance which, inspired by military music, men and women struck up. Well might the old French Admiral shake his benevolent head, and remark “I have seen men fight in many parts of the world, and if these men mean fighting I do not understand them.”

C. C. B.

#### AUGUSTUS PETERMANN.

WE regret to have to announce the sudden death of Dr. Petermann, which took place at Gotha on the 25th of September 1878. That eminent geographer was born at Bleicherode in Prussia on the 18th of April 1822, and studied geography under Berghaus at Potsdam. In 1845 he came to Edinburgh to assist in the preparation of the English edition of the Physical Atlas of Berghaus, published by Keith Johnston. He was in Scotland for two years, and from 1847 to 1854 he was settled in London. During that period he assisted in the publication of several valuable maps, among which were the very ably-designed hydrographical and population maps of the British Islands.

In 1855 Dr. Petermann returned to Germany and took the management of the geographical institute of Justus Perthes at Gotha, including the editorship of the *Mittheilungen*. From that time until the day of his death his life has been one of ceaseless activity in furthering the interest of geography, and for more than twenty years he has continued to issue a series of excellent maps and to publish valuable geographical information from all parts of the world. As Sir Roderick Murchison said, in 1868—“the *Mittheilungen* has aided the diffusion of a taste for scientific geography throughout all civilised countries.” In addition to this, Dr. Petermann was distinguished for the zeal he displayed in promoting the researches of travellers in distant lands, and for the hearty manner in which he always appealed to the public for aid to enable them to carry out their plans. With his own means, and at his own risk, he sent a small Norwegian yacht to the east coast of Greenland, and to him the despatch of Koldewey's two German Arctic Expeditions was mainly due. He also aided the African travellers Gerhard Rohlfs and Karl Mauch, as well as many others, with advice and powerful advocacy. He was an Honorary Corresponding Member of the Royal Geographical Society, and received the Founder's Gold Medal on May 25th 1868.

Dr. Ernest Behm, who has been his coadjutor for many years, will succeed Dr. Petermann as Editor of the *Mittheilungen*.

MESSRS. A. HARTLEBEN, of Vienna, announce the appearance on the 1st October of a monthly journal entitled *Deutsche Rundschau für Geographie und Statistik*, and devoted to geographical statistical and kindred subjects. The work is illustrated with plates and maps.

AN ANTHROPOLOGICAL EXHIBITION will be held in Moscow during the ensuing year, and a great number of objects will be sent from Samarkand, some illustrative of the history of the old Baktrian kingdom, antiquities dating from that epoch having been recently unearthed in the city.



## Reviews.

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### INDIA AND HER NEIGHBOURS.\*

THE author of this book advocates the Euphrates Valley Railway scheme, and appears to consider that, to do so successfully, he must plunge into what he calls history—"a series of dramatic incidents," and "word pictures." He is quite right in advocating that Railway scheme, but it is a great pity he did not keep on his own rails, and not have run off the line altogether in attempting historical feats, and thus lay himself open to adverse criticism.

Here is a bulky 8vo volume of over 400 pages, the contents of three-fourths of which contain nothing but padding (even the old map of India is familiar to us), and such as may be found in the dozens of trashy Gazetteers, and Students' Manuals of Indian History, so called, but not a scrap of anything new, except in the shape of new errors.

The Euphrates Valley Railway comes in for a very small share of the writer's attentions, but we have the "Khyber" and the "Bolan," as usual, in very prominent print, the mania with which many persons are still afflicted being that the Khaibar route from Kábul, and the Bolán route from Kandahár, are the only "two gates of India," as the author styles them, and the sole and only routes by which India can be entered and assailed from without, or by which traders can enter it; and that by these two routes alone can troops be sent into Afghánistán or farther into Central Asia, or caravans of merchants leave it, and if we only secure them we are quite safe. Woeful delusion, as we may find to our cost, if we do not take care!

Mr. Andrew's *forte* is certainly not history. In the very preface we have a specimen:—

"The Sikh and the Gourka [Sikh and Gúrkha, probably], the fiercest soldiers of Asia [with some exceptions he might have added] vie in ardour with the Musulman, who burns to avenge the head of his faith. Even the Hindostani, forgetting his caste restraints and prejudices, longs to strike a blow for those whose salt he and his fathers have eaten, etc."

From this we are to understand that there are no Musalmáns to be found among Hindústánís, seeing that the term applies to natives of India generally, and the writer would lead us to believe that the term "Hindostani" refers to Hindús only. It may be so with him, but not with those who know to the contrary.

He adds—"There never was put forward a greater fallacy or error more likely to be mischievous than that the Turkish question was of no importance in an Indian point of view." Here I can heartily agree with Mr. Andrew; and in no publication was the stupid one-sided fallacy upheld with greater obstinacy (as though Hindús were the only people worth caring for in India, and as though such Hindú miscreants as the Náná, Tántia Topí, and many others, had never existed) than in a certain journal devoted to Indian subjects, until within the last month or two, when Cyprus became the theme, and then it turned its coat.

Among some of the ethnological discoveries of the author may be mentioned (p. 22) that "a kindred

race to the Hindoos are the Parsees" (I foolishly thought they were a kindred race to the Persians), and that the Patans or Afghans (in another place we are told that Patans are only "half-caste" Afghans) only "inhabit the Punjab frontier, part of Rohil-kund, and much of Hyderabad." There are then none in their own country west of the "Panjáb frontier," we suppose, none in Bengal, none in Káthiawár, none in Southern India, and, indeed, none scattered every here and there, in greater or lesser numbers, over the peninsula of India?

We learn from Mr. Andrew, and for the first time, that "the Sunee" is the Turkish form of "Islam." Did the Turks introduce it, and was it unknown before their advent? The Persians, too, after the same fashion, are not of the "Shea" sect, they are only "like" them, and, among other things, "pay special homage to Hasein and Hossan." This, probably, is the "popular way" of writing Hasan and Husain—other Sh'ahs do not reverence them perhaps.

We are told also, that among the "Hindoo" titles, by which "a Mahomedan may be known from a Hindoo," are "Thákúre and Sirdár," which "answer to our Barons." So "Sirdár," is a Hindú title, is it? and a Muhammadan who is styled "Thákúre" may be known from a Hindú, may he? Can Mr. Andrew give us the names of any Muhammadan who bore the title of "Thákúre"?

Here is a specimen of the sort of history Mr. Andrew deals with in his "word pictures":—

"Sabuctugi, the father of Mahmoud, from a slave had risen to sovereignty, and at the time of his death Mahmoud was absent in Khorassan. His brother Ismael seized the empire, and attempted by bribery and corruption to secure his position on the usurped throne. Mahmoud first tried persuasion upon his treacherous brother, but soon had to reconquer his crown and capital at the point of the sword, and was clemently satisfied to confine his mischievous relative for life in the luxurious (?) fortress of Georghan."

Why, even Dow, with all his extravagant blunders, says that his father, Sabuk-Tigín, *nominated* Ismā'il as his successor, and that Mahmúd offered to leave him in possession of half the empire; and he was confined as a state prisoner in a fortress of Jawzján. Where might "the luxurious fortress of Georghan" have been situated? Ismā'il reigned two years at Ghazni.

Again (p. 39), "Ghuzni, built upon a rock 300 feet above the surrounding plains, soon became a city of groves, temples, and palaces, the beauty of which was unequalled in Asia."

The writer from whom Mr. Andrew takes this evidently did not know that the "rock" in question is no rock at all, but only the western extremity of a range of hills of slight elevation, commanded by others much more lofty. The site on which Ghazni stands contains no space for even one "grove," and Musalmáns do not build "temples." The citadel in Mahmúd's time stood nearly in the middle of the city, through which the river flowed; the two remarkable minárs, one erected by himself, the other by his valiant son and successor, stood at two corners of the great masjid, and the Rauzah Bágh or garden, in which Mahmúd was buried, and on the site of which his tomb still stands, adjoined the city itself. So it must have been a large rock indeed to have contained so large a city.

\* *India and Her Neighbours.* By W. P. Andrew (Allen and Co.)

At page 42 we are told that "Mahmoud left two sons . . . , the youngest, Mahommed, usurped the elder *Musuad's* throne. . . . Five years later, the blind Mahommed, restored to liberty and sovereign power, returned with interest the treatment he had received. He degraded and imprisoned *Musuad* and raised his own son to the throne. This prince, Ahmad I., at once slew his uncle, *Musuad*. . . . Modoad did not hesitate to avenge his father's murder. . . . His brother, Musdoad, now made war against him."

Here we have a perfect nest of errors. Mahmúd left, not two sons, but *seven*, and Muhammad was not the youngest, but the second son. "The blind Mahommed" was not restored to liberty five years later, for Mas'úd (there is no such name as *Musuad*) reigned a few days over eleven years, from 422 H. to 432 H. Neither did the "blind Mahommed" raise his own son to the throne, and there never was an "Ahmad I." among the sovereigns of Ghazni, nor will such a name be found in any list of them, not even in Dow's. Ahmad, son of Muhammad, did not "at once" slay his uncle, for Mas'úd was not murdered till the following year—433 H. There is no such name as *Modoad* to be found, save in the histories of Dow and Briggs, and their copyists. The name of Mas'úd's son, who avenged his father, and succeeded to the throne, was Maudúd, and his brother "Musdoad" did not make war upon his brother, because he had no brother called by such an impossible name. Maudúd had *eight* brothers, and one was called Majdúd. All these names have meanings.

I may also mention for Mr. Andrew's information that there are no such names (p. 43) as "Resehed," "Feroch," "Chusero," "Arsilla" and "Yaas King of Ghor," in Indian or Asiatic history; and (p. 47) "from 1321-1387 endless Afghán rulers" did not sit "on the throne of Hindústán," and, farther, that *not one* of those quoted by him was an Afghán: they were all Turks.

Such utter nonsense as this is only to be found in Dow and Briggs, and histories of that type. The *first* Afghán ruler who sat upon the throne of Dihlí was Bahlúl, the Ludí, and that event did not happen until the middle of the following century.

Again (p. 44) "Mahomed (*sic*) of Ghor," who, a line or two farther on, is called "Mahomed Ghor," was not an Afghán, he was a Tájik. Such assertions about "Afghan" and "Patan dynasties of Ghor," came first from Dow, was improved upon by Briggs, and followed by their copyists, but did not come from Firishtah, as was pretended.

We hear a deal now about Afghán dynasties of "Ghor," and Afgháns "settled in Ghor," "Afghans proper," and the like; and it is time such errors should be shown in their proper light and corrected.

Readers and writers of Indian history—even Mr. Talboys Wheeler—will find to their great surprise that, according to Mr. Andrew's discoveries, India was conquered by the "Mogul"; that "the Mogul age had fallen on India," as early as 1227, and then he quotes "Sullivan:" that Genghis Khan (when Mr. Andrew comes to "Deccan" history, and copies Meadows Taylor, he spells Khán—*Kahn*—according to the Taylolean system) *reigned* in India; and that *he was succeeded* by Feroze, and he in his turn by his sister the beautiful Sultana Rizia.

The Chingiz Khán never reigned for a single hour in India, and more than that, he never passed to the east side of the Indus, and was never in India in his life. There never was a "Sultana Rizia." The female sovereign who ruled at Dihlí, and respecting whom so much absurdity has been written by the writers above referred to, but not by Firishtah, was styled "Sultán," which is applied as signifying a sovereign without reference to sex, and her title was Raziyyat-ud-Dín: her name has not transpired.

A "Mogul"—as the author styles a Mughal—and a "Tartar" are all one to him; and, among other statements, called "word pictures," are (p. 323) the following:—

"The terrible Tartar Chingiz [it was Genghis before] carried his iron sway over greater part [only?] of Central Asia," and then we are told that "his famous *grandson* Tamerlane [Timur the Lame] ruled over a wide dominion from his splendid capital of Samarcand [it is "Samárkhand," in other places] in Bokhara."

So "Tamerlane," as he styles Tímúr-i-Lang, was Chingiz, *grandson*, was he? For such brilliant discoveries as the foregoing, and such truly "dramatic incidents," the author deserves, at the very least, the star of the C.S.I.

These are a few specimens only of the "*acts of heroism and chivalry that may vie with anything in the Chronicles of Monstrelet and Froissart*" according to one oracle, whose knowledge of Indian history is about on a par with Mr. Andrew's; and, according to another oracle of the same calibre, these are some of "*the salient points of Indian history*," which the author "*presents in a picturesque and graphic form*." This is how tweedle-dum answers tweedle-dee—the blind leading the blind—but the unfortunate *public* is not aware how far such darkness extends.

At page 48 (as yet I have not gone over one-eighth of the book, and how many scores of errors have been passed over in these few pages even!) we are told that when "Timour triumphed over Bajazet [this is "the popular way" of writing Báyazíd], and, glutted with conquest, returned to Samarcand to hold high festival in celebration of the marriages of his six grandsons," the "gardens of the Imperial palace ran with *kermiz*, hippocrene, brandy," &c.

The gardens must have run very *red* indeed then, because *kermiz* is *cochineal*! Perhaps the author meant *koumis* or fermented mare's milk.

In another place (p. 58) Mr. Andrew tells us that "Nadir Shah"—that "Persian of low origin" [who was not a Persian, however, but an Afshár Turkmán]—"after driving the Afghans out of Persia, followed them into Hindostan. The Emperor Mahomed made a feeble show of resistance, but quickly retired before the victorious arms of the conqueror. In the massacre he ordered at Delhi, the streets ran red with blood," &c.

So the Ghalzi Afghans, driven out of Persia, flew at once to Dihlí, across the whole breadth of Afghánistán and the Panjáb, and the "Emperor Mahomed," who made the "feeble show of resistance," was, of course, their Emperor. Well, I never knew before that the Ghalzi Afgháns driven out of Persia came to Dihlí to be massacred! This is certainly some of the "salient points of Indian history in a picturesque and graphic form."

Again (p. 163), Ahmad Sháh, Abdáli, won a victory

at "Páneput" by his own sturdy subjects, aided partly by the Afgháns of Hindústán—the Rohiláhs—and a few Hindústáni troops; and as to the "forces being about equal," while the Afgháns had a few pieces of artillery, light field-guns, the Marhattahs had no less than 200, including heavy guns, besides a superiority in the number of men.

In the same way "Babar" did not "lead his hardy Turks and Afgháns from Cábul to the field of Páneput," but led his hardy Mughals and Turks against the Afghán ruler of the Dihli kingdom.

By all means let us carry out the Euphrates Valley Railway scheme if it will strengthen our interests—very much weakened lately—or tend to bar the ever-increasing Muskov encroachments, for we must be prepared any day to find Marw and Balkh seized by the perfidious race, whose statesmen's promises are not worth a straw. They have already made a move southwards towards the banks of the Oxus, to "ameliorate" Balkh, as a counterstroke to the Cyprus move. We shall soon see what a "neutral zone" means in Russian, and we may prepare for "Bulgaricks" all along our frontiers: indeed the Russians have already begun to speak with "a sisterly voice" at Kábul; and they will bear "the torch of freedom" to Káshghar too, if they can do so without a war with the Chinese.\*

I am one among the number of foolish people who, perhaps, consider that it is better to form a strong barrier in front of our friends' house in order to keep out a thief lying in wait in that direction, and to prevent his occupying the strongest rooms in front preparatory to *looting* it, than to content ourselves by seizing upon an outhouse in the rear. The occupation of Batoum and Kárs by British troops *would* prove a barrier against the Russians, but now they have been "Shuffel-offed" to them, to be used as levers against the Turks and the Persians as well as ourselves. Cyprus, occupied by two regiments of infantry, a battery of artillery possibly, and a few Royal Engineers, is, however, not likely to prove a *very strong* barrier against their aggression. When they are next ready to play the game of amelioration, as they have been and are still doing in the Turkish provinces, they will have Batoum to receive their war stores and reinforcements, and Kárs as an almost impregnable base from whence to commence, and may overrun half of Asia Minor before we should be awake to the danger, much less ready to meet it. Of what use will Cyprus and its strong garrison be to prevent that?

We long ago allowed the Muskov—*la'nat ullah 'alaihim!*—to make the Caspian a Russian lake, and now we have furnished them with the means of beginning to work their way westward along the southern shores of the Black Sea, while we have taken up a dignified position in the rear!

Instead of carrying the Euphrates Valley Railway to the Persian Gulf, why not take the bull by the horns at once, and carry the line right across by Isfahán, to Hirát, and by Kandahár, which we can occupy, direct to Multán in the Panjáb, to join our Indian lines of railway? There are no insuperable

difficulties in the way: none greater than were overcome in carrying a line over the Ghauts in India and over the Alps in Europe, and the little extra cost would be money well laid out.

H. G. RAVERTY, Major,  
Bombay Army (Retired).

THE PHYSICAL SYSTEM OF THE UNIVERSE. By Sidney B. F. Skertchly, F.G.S. (Daldy, Isbister, & Co.)

THE BEGINNINGS. By the author of *New Pages of Natural History* and other works. (Trübner & Co.)

HERE are two books on the same subject, both starting from the same point, that heat and light were primary causes of the past and present conditions of this sphere; yet no two books could well treat the subject so differently as these, which Mr. Skertchly and Mr. H. P. Malet have now offered to the public. We take them up in the order of publication.

We learn by the Preface of the *Physical System* "that the earth is an integral part of the universe"—that its present condition is due to past actions—and these depend upon "the action of heat upon solid, liquid and gaseous matter." The Introduction tells us, "The surface of the earth receives heat from internal and external causes" (p. 6, sect. 11). "The heat from the former source is being continually dissipated into space. . . . The world is a cooling body. We have to read much before we find out how it got hot," and at p. 366 the author was "led by several lines of thought to the conception of a time when the earth was in a molten condition. . . . Therefore it is no far-fetched idea to suppose that the earth was once in a gaseous condition;" and that the whole solar system was once "in the condition of a nebula." He imagines this nebula "rotating and contracting"; in doing this "the rotating ring would almost certainly break up, and the different parts thus attain a rotation of their own." This is part of the nebular hypothesis of Laplace, but as he did not assign a cause for initial heat in the nebula, Mr. Croll is quoted, to show that "the energy in the form of heat may have been derived from motion in space." These ideas are accepted, and we are told at p. 375 "that in some form or other the nebular hypothesis is almost universally accepted as true." We may observe here that there are many believers in the slow cold aggregation theory of Gruithuisen, that many of our own living writers object to the nebular theory, and that it is so mathematically put together, that if we take away a part we destroy the whole. And, says Mr. Skertchly (p. 369), "As Laplace expounded it, the hypothesis fails to account for much that has since been discovered." This is very true, and it is one of those points calculated on by the sagacious Laplace when he said, that his planetary system would hold proof—"if foreign observations do not disturb it" (p. 365, translation by G. J. Pond, 1809.) It seems then that the whole "conception" of the internal heat of the earth is founded on an unproved theory; we can allow volcanoes and hot springs, we can admit that heat must exist in the deposits of the earth, but we deny that Mr. Skertchly has any authority for saying at p. 264 "*The interior of the earth is intensely hot.*"

At p. 285, the earth's external heat is accounted for. "The whole of the heat derived from external sources is practically the gift of the sun." It is not yet known how the sun's heat is maintained; and at p. 273 Mr. Croll is again quoted—"Are we really under any necessity of assuming that the sun's heat was wholly, or even mainly, derived from the condensation of his mass by gravity." Now, according to the theory of Laplace, the planets of our solar system were thrown off by the nebula before the condensation of the

\* These remarks were written and in type some time before Sher'Ali refused to receive our Mission. I think we should take into some consideration also how his feelings must have been worked upon by the Russians during the invasion and dismemberment of Turkey, our ancient ally.

remainder formed the sun; but, says that author (vol. ii. p. 355, *System of the World*) "This luminary not only acts by its attraction upon all these globes, and compels them to move around him, but imparts to them both light and heat." So far we have facts before us, but if the planets are ruled by the sun that body was formed before them. We do not know how he was formed, and Mr. Skertchly fails to explain this primary action of our universal system.

Turning to "The Beginnings," we find that every action or elemental matter is credited to the sun. Our ignorance of the origin of light and matter is allowed, but the Creator is made to say on the frontispiece—

"Go forth, my light! and, from the space around,  
Gather the wandering vapours to my care."

Light is thus adopted as the first agent of the Creator to act upon the matter in space for the purpose of bringing it under the law. After pointing out what he supposes to be wilful errors in certain reviews on *Incidents in the Biography of Dust*, a book which seems to have led on to the one under review, the author says (p. xvii)—"When we applied the discovery of Mr. Crookes—that light is force—to this matter, we found at once an undulating power, which must have acted on matter, in the condition supposed to have existed." Then by considering the present condition of the dry land and the water bed, by the natural conditions shown as existing now, and as having existed heretofore, by the geological survey of America, by the results of the spectroscope, and by the liquefaction of gases, "we seem to escape from the impulsive system of Laplace, to adopt the more natural slow aggregation of molecular matter of Gruithuisen, from the supposed nebulous mass floating in space as the only system under which the gases and the liquids could be liberated from their chaotic condition—the only system under which those gases do now assume, and must from their first acquaintance with sunlight have assumed, their present conditions of air and water." This is plain writing, and will require the attention of our physical science professors.

The first chapter discusses the age of the earth; it varies little from an article published in the *Geographical Magazine*, Feb. 1877. It is pointed out that, in our ignorance of the origin of matter and light, we have no data for our physical sciences to go upon—that in the absence of this knowledge light and matter are due to the incomprehensible Creator; and so, those who guess at the earth's age "are at present without chart, compass, or sounding line on the fathomless and boundless ocean of eternity."

Chapter II. discusses the nebular theory of Laplace, and introduces several arguments from living authors tending to destroy confidence in that system. Professor Tyndall is quoted to show that existing laws have never been broken, and, as the air, water, and dust are subservient to the sun now, so they must have been in their nebulous and chaotic condition. Mr. Proctor is quoted to show that "it is no longer supposed, as in Laplace's time was the case, that the outermost planets were formed first." It is pointed out that "if we disarrange any one part of the system, as laid down by Laplace, we throw the whole out of gear; having done this we destroy the theory of internal heat, and we are reduced to one point—"This earth, including its nucleus, its air, and its waters, was developed from a nebulous condition" (p. 46).

Chapter III. gives us some curious details from the theory of the German astronomer Gruithuisen: this also appeared in the *Geographical Magazine* for March and April 1878. At p. 74 we find—"The nucleus of this earth was consolidated because the gases and the moisture were gradually attracted and separated from the nebulous mass, while the heavier atoms, slowly but perpetually subsiding to their own centre of gravity, became the solid nucleus of this earth." At p. 77, till the contrary is proved, "we will believe in the God of

our forefathers; in the sun as His agent, in our solar system; and in the elements, as ordained by Him to be subservient to His laws from the Beginning to the End."

Chapter IV. details the laws of subserviency. It began when the nebulous mass was in a state of gravitation "aimless and endless." The first obedience was in the arrest of its motion, the conversion of it into rotation on its axis and revolution round the sun (p. 86.)—"Rotation on its axis must have been simultaneous with the arrest of aimless gravitation, as these actions are going on now they must have been the beginning of this globe." The vegetable and animal kingdoms are introduced as giving evidence of the action of extreme heat on internal matter. This heat is in all cases a direct or indirect action of the sun, and thus at p. 96—"From the moment of the first impulse we may suppose that evaporation took place, the light gases rose and the heavier subsided, the air and its winds were formed, the waters were condensed, and the solid molecules were consolidated," from a cold beginning. The heat of the interior earth, as depending on the theory of Laplace, is denied: the present sea level is reached by constant wear and tear, and by the constant consolidation and subsiding of the nucleus: mountains were formed by these actions, not by upheaval from imaginary forces. The law for the separation of the elements from chaos, for reducing them to their present condition, and for maintaining them, are clearly traced to the attraction, evaporation, and gravitation still holding good, and must continue so as long as the elements "owe obedience to the sun" (p. 117).

Chapter V. concludes the subject by a brief epilogue between the Creator, the Vapour and the Light. We have quoted the first two lines from the frontispiece: Vapour says, on its conversion to the planet Earth—

"Our present, and our future hang upon  
Attention to my duty, and my love!"

The Creator is allowed to say in conclusion—

"'Tis very good! Forsake ye not My law!"

As contemporary works on the great problem of the day these books should be read together, the last destroys the foundation of the first, and will possibly produce a new era in physical cosmogony. We must not forget that although Laplace formed the sun after he had formed the planets, he was obliged "to consider the sun as the centre of a force" (*System of the World*, Laplace, vol. ii., p. 11), and Mr. Skertchly says "solar heat determines the broad climatic zones" (p. 307). The *Beginnings* applies the heat and the force. If our mathematicians, geologists, and astronomers are right in saying, that the harmony of this world has never been broken, and that the present laws are those of the beginning, it seems as if Mr. Malet points to the truth of that long-sought action. We must leave the verdict to a larger jury, contenting ourselves with remarking that both books are full of interest; the latter treating of the mechanical beginning as briefly as possible; the former treating scientifically many of the phenomena of the world we live in. Much information may be gained from both.

AMONG the articles published in recent numbers of the *Globus* are several descriptive of Sir Douglas Forsyth's Mission to Kashgar. These are chiefly notable for the excellent illustrations with which they are accompanied. The photographs and sketches taken by Captain Chapman are reproduced in a manner which does great credit to the engraver. Especially successful are the landscapes in which the distances and effects are shown with an artistic touch rare in wood-engraving. The most successful are "Kirghiz encampment in the Tigarmath valley," and "View of the Pamir from Yangi-Hissar," the latter giving a picturesque idea of the great meridional chain the existence of which was so long doubted.

## Log Book.

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**Return of the Dutch Arctic Expedition.**—In our number for September (page 241) we gave an account of the proceedings of the 'William Barents' up to July 22nd, including her voyage along the north coast of Spitzbergen. Sailing from Vardö on the 23rd of July the explorers went northwards between Spitzbergen and Novaya Zemlya and were in the ice from the 1st to the 10th of August, on meridians 45° to 35° E. They then shaped a course to Novaya Zemlya, were in the Matoschkin Shar, coasted northwards as far as "Froost Kaap" to the east of Cape Nassau, and then, on a north-westerly course, reached their highest latitude in 78° 18' N. on the meridian of 55° E. The 'William Barents,' from this position, made her way to Hammerfest and arrived there on the 23rd of September, after a cruise of two months in the Barents Sea. Thence she made a quick run arriving at Kelzen on the night of the 12th of October, and proceeding thence by canal to Amsterdam, with Commodore Jansen on board.

The Dutch explorers have done good work, and the success of their cruise is a happy presage for future useful labours in the same direction. They met with a cordial reception from their countrymen, and on the 23rd of October were entertained at a public dinner at Amsterdam, with the Burgomaster in the chair.

We gather the following additional particulars from the *Eigenhaard*, a Haarlem periodical. Lieut. Speelman undertook the magnetic observations. The pressure of wind and all meteorological observations were taken every hour, night and day. There was continual fog in August between Spitzbergen and Novaya Zemlya. They met the ice in 77° 10' N. lat. : and 45° 40' W. and were beset for ten days. They were then driven by a storm to the N.W. The ice of the Barents Sea was of two kinds: to the east it was flat and smooth as at the mouths of the Dutch rivers in winter; but to the west it was old, and heaped up to a height of 30 feet, so that it would be impossible to take a sledge or boat across it: more like a chain of mountains than an ice-field. The 'William Barents' encountered many dangers, and once, owing to thick fog, she was nearly caught in a position that would have detained her through the winter. In the beginning of August they appeared to be on the boundary line where the warm and cold currents meet. Up to that time they found that the temperature of the sea decreased with its depth; but here they met with cold and warm currents flowing one over the other. To make this clear Lieut. Beynen gives some detailed results. On the 1st of August they passed the first iceberg in the Barents Sea; and after the 7th they met with heavier ice than Beynen had ever seen before. With the telescope extraordinarily heavy ice was seen, against which the most powerful steamer could do nothing. They reached Cape Nassau on August 9th and sailed for Tromsø on September 9th. Many interesting extracts are given in the *Eigenhaard* from Lieut. Beynen's Journal.

**The Swedish Arctic Expedition.**—On the 17th of October Mr. Oscar Dickson of Gottenburg

received the following telegram from Professor Norden-skiöld, which was despatched from Irkutsk on the 16th. "Arrived with steamer 'Vega' safely at the mouth of the Lena, after clearing Cape Chelyuskin, the sea being nearly free of ice. We proceed immediately for Behring Straits and Japan." The telegram was sent by the little steamer 'Lena' (see our number for August 1878, p. 197) which proceeded up that river to Yakutsk, whence it was posted to Irkutsk.

We heartily congratulate Professor Nordenskiöld and his gallant companions, on the achievement of what is already one of the most important Arctic voyages on record.

**Discovery of a new island on the Siberian Polar Sea.**—The account recently published in the *Times* of the above discovery was so very inaccurate, that our readers may wish to know the real facts. The well known walrus-hunter and Arctic navigator, E. Johannsen, discovered, on the 3rd September last, in longitude 81° E. of Greenwich (due north of the Yenisei river), and latitude 77° 55', a tolerably flat island about 2½ miles (German) long, to which he gave the name of "Ensomhaden" (Loneliness). Its highest point was 100 feet above sea level: the island itself was free from snow, poor in vegetation but much frequented by birds. To the west, north, and east the sea was free from ice, but to the south-east drift ice was to be seen. The presence of some types of animal life appeared to indicate that the Gulf Stream reached the western side of the island. On the north side the current sets strongly to the S.E. The ice indications were favourable everywhere, as long as one kept away from the Siberian coast. The new island is thus situated almost due east of Francis-Joseph land, and it is probable that, speaking broadly, it forms portion of the same archipelago.

**Dust Storms in the Atlantic.**—It has been a well-known fact among navigators of the Atlantic, meteorologists, and other scientific men, that a certain part of that ocean in the vicinity of the Cape de Verde islands has been characterised by occasional storms of fine red dust which have covered the rigging, decks, &c. of passing vessels. The origin of this phenomenon was discussed by Ehrenberg, Arago, Kamtz, Darwin, Maury, and others, but without any definite conclusion being arrived at. Dr. Gustav Hellmann, an able young meteorologist of Berlin, has favoured us with a copy of an interesting paper read by him before the Berlin Academy of Sciences on the 9th May, in which he discusses the phenomenon very exhaustively. Dr. Hellmann's arguments are based chiefly on the recent publication of the Meteorological Office of London entitled *Charts of Meteorological Data for Ten-degree Squares in the Atlantic*. These furnish him with details of 65 dust storms, which were observed by 1196 English vessels in the years 1854-1871, in the region contained between the meridians of 10° to 40° W. longitude, and the parallels of 20° N. to 10° S. latitude. The result of Dr. Hellmann's researches is to show that these storms prevail, or are mostly to be found between the parallels of 9° and 16° N. latitude. His conclusion respecting their origin is opposed to that of Ehrenberg and Maury, but coincides with that of all navigators and of some men of science such as Darwin and others, and is that the dust proceeds from the Sahara desert. Dr. Hellmann

appears to us to argue his theory very plausibly and fairly to answer the objections of Ehrenberg and others. He annexes two interesting reports by Mr. Sorby, President of the London Microscopic Society, and M. Tissandier on the microscopical examination of the atoms composing dust-storms.

**Trans-Caspiana.**—Steam navigation on the Caspian is as yet but little developed, and is chiefly confined to vessels plying between the ports of Astrakhan, Baku, and the southern ports. The trade in naphtha has received a new impetus, and Krasnovodsk and Briansk are partaking in the revival, the latter port being situated at the mouth of the Atrek, which is not far from Chikisliar, known for its produce of Chikir wine, which is exported to Russia. The Khivan products are usually conveyed to Krasnovodsk, but this year, owing to the disturbances among the Turkomans, the caravan journeyed straight to Alexandrovsk. Unfortunately the schooner which came to this port to convey the goods to Astrakhan was so small that half of them had to be left behind, and the entire cargo, which was destined for Nijni-Novgorod, did not reach Astrakhan till the beginning of August. The Alexandrovsk route is pronounced as preferable to that of Krasnovodsk, though the steamers visit the latter port twice a week and the former only once a fortnight. The disorders among the Turkomans continue, though General Lomakin has journeyed along the northern frontier of Khorassan, following the Atrek, and intended to occupy several points in the direction of Merv, with the view of coercing the predatory Turkomans, whose raids have rendered the Persian frontier so insecure.

**Russian Explorations in Southern Bokhara, Hissar, &c.**—On the 30th August M. Maief returned to Tashkent after a second excursion of 20 days duration in the mountainous country south of Bokhara. At Karchi he parted from the mission despatched to the Amir of Bokhara, and journeyed into the mountains by way of Guyar, during which trip he reconnoitred the road leading from Teng-i-Khoram to the well-populated and extensive kishlak of Koristan, by way of Akbach and along the valley of the Kerchak-daria, which river, as well as the Koristan-daria, was previously unknown. M. Maief also explored another route of importance leading from Koristan across the mountains by the Teng-i-davan pass to Shirabad. From the latter place M. Maief made for the Surkhan which he crossed near the kishlak of Kakaity and ascending its valley arrived at Regar and Sar-i-jui. To avoid returning by the way he came. M. Maief returned to Shahr-i-Sebz by the very difficult route explored by M. Oshanin during the same month, traversing the kishlaks of Sengri-dag, Batch, Tash-kurgan, and Yakobak. At Shahr, M. Maief took leave of the Amir of Bokhara and thanked him for the facilities afforded to him by the local authorities. This piece of exploration will fill up some important blanks in Mr. Ravenstein's map of Hissar compiled from the results of the last Russian expedition and published with our number for December 1876.

**Triangulation of Ceylon.**—In 1845 General Fraser made a military map of Ceylon based on triangulation, but his measurements have been found very unreliable as compared with the more recent triangu-

lation. In 1857 Captain (now Major-General) Gosset, then Surveyor-General of Ceylon, measured very accurately in the Ngombo district a base of 28890·0601 feet, or about 5½ miles in length, and the present Ceylon triangulation was started from it. Mr. James O'Donnell observed with a 13-inch theodolite from 24 stations between 1858 and 1860, and Mr. James Mantell observed from 21 points between 1870 and 1873 with the same instrument, and also from Adam Peak and Kiripanagallo in 1876. Mr. Winizer also observed with a 12-inch theodolite from Colombo clock tower, Welihada jail and Pidúrutalagala in 1860. A base of verification of 29,860·04 feet length was measured at Batticaloa by Mr. J. J. Grimlinton in 1859, with a 100-foot chain, and the computed length of this base as calculated from the former base, through all the triangles to Batticaloa, differed from the observed base by only 0·64 link, or a little over five inches. Efforts are being made by Colonel A. B. Fyers, R.E., the Surveyor-General of Ceylon, to extend the triangulation up to Manaar and Jaffna, with the object of connecting it with the Indian triangulation, a series of which has been successfully thrown across the straits on to the island of Neduvan, where two stations were fixed by Major Branfill in 1875 as a *point d'appui* for the Ceylon triangulation.

**Dr. Wilhem Junker's journeys in the S.W. portion of the Nile basin** during the months of January to October 1877 have filled up various blanks in a region partially explored by Peney, Petherick and others between the routes of Schweinfurth and the Nile, about five degrees north of the Equator. Dr. Junker appears to have covered much the same ground as Marno in 1875, but he ascertained definitely that the Jei was not (as Marno thought) the upper course of the Yalo river or Bahr-el-Rohl, but belonged to another system altogether. A second journey brought Dr. Junker further west to the Abakah and Mundo countries. On the way thither he passed some streams which he took to be the head waters of the Yalo, and others which appeared to join the Issu. His last journey extended some considerable distance to the north-west up to Senba-Agad-Wow, a point touched by Schweinfurth in his travels (see *Heart of Africa*, vol. i. p. 191). It is to be regretted that Dr. Junker was unable to get southward and visit the Kibaly river, which is believed to rise in the mountains west of Lake Albert, and to form the upper course of the Welle.

**M. Raffray in New Guinea.**—M. Raffray has furnished to the Paris Geographical Society an account (published in their *Bulletin* for May last) of his recent researches in New Guinea. He and M. Maurice Maindron were both deputed on this mission by the French Ministers of Public Instruction, and the two left Toulon on the 20th of July, 1876, arriving at Ternate on the 4th December of the same year. From the latter place a small fleet of Malay schooners set sail, towards the close of the S.W. monsoon each year, for New Guinea and more especially for Geelvink Bay. They import blue and parti-coloured stuffs, iron, knives and glass, which they exchange with the Papuans for shells, trepang, mother-o'-pearl, massoi (a medicinal bark in use in all Malay countries) and birds of paradise plumages.



Before starting for New Guinea, M. Raffray and his companion made an excursion to Dodinga, in the island of Gilolo, then in a state of insurrection. Besides making some collections in this spot, they inspected some of the natives called Alfuros. The information supplied by M. Raffray respecting the natives led Dr. Hamy to conclude that besides the pure Malays, there are in Gilolo two distinct races, one a mixture of Malay and Papuan types (but inclining rather to the latter), and the other apparently descended from the Polynesians called *Indonesiens* by Dr. Hamy.

On the 17th January 1877 they finally set sail for New Guinea, and coasting along the west of Gilolo, entered into the Pitt Straits, between Batanta and Salwatty islands, landing at the N.W. extremity of the latter. The Rajah Abu-Kassim, proprietor of Mysol (by whose orders M. Raffray states a portion of the crew of the 'Franz' were murdered not long since), received the travellers kindly, but warned them against penetrating inland. After a brief stay at Salwatty, M. Raffray proceeded to Dorey, a locality already known to European readers from the reports of various travellers. He gives a succinct account of the habitations, manners, and religious beliefs of the Papuans, and of the Mafor who live along the sea shore and subsist by fishing. M. Raffray observes that exploration in the interior is a very difficult matter owing to the want of navigable streams, the density of the forests, and absence of communications. The inhabitants of the villages scarcely ever wander far from their homes, and the country is most unproductive, even rice having to be imported. After making an excursion to Aiambori and Andai, M. Raffray set sail in three native canoes with a crew of thirty Papuans for Amberbaki. Amberbaki is a district situated about 80 miles westward, notable for some rare species of birds of paradise. M. Raffray was visited by some members of a neighbouring cannibal tribe called Karons, whom he photographed. After his return to Dorey, he made another excursion eastward to Mafor island, where the Wandamen islanders were carrying on continual depredations and making raids on the Mafor natives. Leaving this island he visited the Misori islands, three in number, which lie still further east. This formed the limit of M. Raffray's travels, and after a brief stay here he returned to Dorey, whence he returned home in the middle of July, 1877.

#### ATLAS OF THE RIVER AMAZONS.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In the map room of the Royal Geographical Society there is an Atlas of the River Amazons, the work of officers of the Brazilian Frontier Commission, which can hardly have been known to the writer in the *New York Herald*, whose article on "A new Survey of the Amazon" is reprinted in your September number. That work is, I fear, known to comparatively few, and has never obtained the notice it really deserved; perhaps because published without any memoir to state the labour and care and skill it really represents. A mere note for instance, in the corner of one map gives the elevation above the sea of Manáos and its longitude; and who guesses from this that the first was deduced from thousands of barometrical readings, and the second from (among the rest) more than a hundred lunar

culminations? At Pará, too, some, though not so many, good observations for absolute longitude were taken, and the chronometrical longitude from Rio de Janeiro was carefully determined at least twice. By 1868 Captain Costa Azevedo and the officers under him had nearly doubled the amount of detail in their map of the Amazons; but unfortunately there has been no second edition published. Still any one who will look at it as it now is will see that the main Amazons is not so un-mapped as the *New York Herald* article asserts. Channels and sandbanks and rocks (the last not common) are marked—I do not say all: nothing but a complete survey could do this. The soundings, too, are numerous.

I am unwilling to occupy more of your space, but recollecting the kindness I met with from Brazilian officers and surveyors on the Amazons—one of my many pleasant recollections of Brazil—I have felt it almost a duty to say thus much.

Of course a complete survey of the Amazons, or any great section of it, would be most valuable and interesting; but from an article in the *New York Times* (reprinted in the *Times* of September 18th) it seems that the Americans did not propose this, but merely a running survey, the work of a few weeks. Whether this will add much to our previous knowledge may be doubted.

The River Madeira needs for navigation not so much a running survey of the whole, as a very exact and minute examination of some particular places; and for this the season of lowest water, not that of flood, should have been chosen.

I am, &c.,

W. CHANDLESS.

5, PORTMAN STREET, W.

#### HALLE GEOGRAPHICAL SOCIETY.

October 9th, 1878.—Dr. KIRCHHOFF, President, in the chair. The learned President referred in feeling terms to the loss which the geographical world had sustained through the death of Professor A. Petermann. On the motion of the President, Professor F. von Hochstetter of Vienna and M. H. Duveyrier of Paris, were elected honorary members as well as several other scientific gentlemen as corresponding and ordinary members. The paper was one by Dr LEHMANN on "Travels in Norway and Traces of the Glacial Period in that Country." The lecturer spoke of the roads and method of travelling in Norway and gave a description of the natural features of the country illustrated by numerous views and maps. He also spoke at length of the various evidences of a former glacial period, which he had observed and which had also formed the base of Professor Kyerulf's arguments. The PRESIDENT announced the presentation to the Society from the Minister of Education of an important wall map of the moon, about six feet square, exhibiting the laborious astronomical researches of Herr Jul. Schmidt of Athens.

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THE  
GEOGRAPHICAL MAGAZINE.

DECEMBER, 1878.

A FAREWELL TO OUR READERS.

THE *Geographical Magazine* has fulfilled its objects, and will come to an end with the present number, its place being occupied by the new series of the *Proceedings of the Royal Geographical Society*. The Magazine has both created and supplied a literary want. It has been supported by a large body of geographical readers, and has furnished them with information contributed by many of the most eminent geographers of the day, and with news from all parts of the world bearing on all branches of their science.

Its Editor now addresses his numerous readers for the last time in that capacity; and he thinks it will be well, in the first place, to recapitulate briefly the history of the undertaking which has been under his guidance for the last six years and a half.

In 1870 the plan was conceived of a very useful hand-book for ocean routes, and containing much other information for travellers, which was published by Messrs. Stanford, in 1870 and 1871, and edited by Mr. Dempsey, of the Buckingham Palace Hotel, and Mr. Hughes, F.R.G.S., under the title of *Our Ocean Highways*. This led to the publication of a monthly periodical, called *Our Ocean Highways: a Monthly Supplement to the Annual Volume*, the first number of which, price 1d., and containing four pages, appeared in April 1870. In November 1870, it was enlarged to 8 pages at the same price; and in June, 1871, to 16 pages at 3d. The periodical continued in this form until June 1872, during which time Mr. Hughes wrote a good geographical article for each number. Mr. Dempsey deserves credit as the originator and pioneer of very useful work.

From July 1872, the present Editor assumed the conduct of the undertaking; and from that date to March 1873, the title was *Ocean Highways: The Geographical Record*, consisting of 36 pages in 3 columns, folio (10 being advertisements), price 6d., with a map to illustrate each number. In April 1873, the shape was altered to imperial 8vo (44 pages with double columns), and the title *Ocean Highways: The Geographical Review*. Mr. Dempsey ceased to be the proprietor in March 1874, and from that time the proprietorship was vested in Messrs. TRÜBNER, the publishers, Messrs. PETTIT, the printers, and Mr. Ravenstein. The title was *The Geographical Magazine* from April 1874 (44 pages with double columns in imperial octavo), with maps to illustrate each number. In this form the Magazine has been published

monthly from April 1874, to December 1878. Mr. Ravenstein parted with his share in July 1877.

The present Editor undertook the task at the suggestion of Sir Bartle Frere, and his position in the India Office made it necessary that he should do so with the approval of Mr. Herman Merivale, the Under Secretary of State for India. This permission was cordially granted; and the Editor soon afterwards was so fortunate as to secure the permanent aid of Mr. Ravenstein to review maps and charts; of Mr. C. E. D. Black for literary work; and of Mr. W. Ronson as a most valuable and efficient assistant.

The Editor had long thought that the *Proceedings of the Royal Geographical Society* were capable of great improvement, and that they ought to be, and might be made the leading authority in the world on all subjects relating to geography. As the time was not then ripe, he resolved, in editing the *Geographical Magazine*, to aim at realizing his idea of what he conceived that the Proceedings of the Society ought to be. With this object in view, he divided the matter in each number into the following sections:—

(1) Articles: consisting of geographical reports on new or unexplored countries; accounts of geographical enterprises; notices respecting the geography of regions which are attracting public attention; histories of surveys and of such departments as that of the Hydrographer to the Admiralty; papers on comparative geography, and obituaries.

(2) Reviews of geographical books.

(3) Cartography. Reviews of new maps and charts.

(4) Log Book. Geographical news arranged in concise paragraphs.

(5) Correspondence, in which geographical points of interest are discussed.

(6) Proceedings of the Royal Geographical Society, and of all foreign Geographical Societies.

The experience of six years, and a large correspondence with subscribers and contributors who have furnished the Editor with advice and opinions, have convinced him that the above form is the best that can be adopted for a geographical record in this country. Illustration is absolutely necessary, and one map, frequently two, has been given in each number.

The Magazine has met with a cordial and hearty reception from geographers in all parts of the world. It has had a steady constituency of upwards of a thousand subscribers; and has received valuable contributions from geographers and men of letters of the



highest eminence, so that the volumes will be of permanent value. Some of the articles have been published in a separate form. "The Threshold of the Unknown Region" has passed through four editions. Captain Palmer's interesting account of the Ordnance Survey was published separately by Mr. Stanford, and "Incidents in the Biography of Dust," by Mr. Malet, and the "Memoirs of Hans Hendrik," by Messrs. Trübner.

The great aim of the Magazine has been to furnish geographical information and news to its readers from all parts of the world. But the Editor has also striven to secure some special objects. One of these has been the resumption and continuance by this country of Arctic exploration. The first article in his first number (July 1872) was by the lamented Sherard Osborn, on the "Renewal of Arctic Discovery." An article in the present and last number is on the same subject. In the interval, the country has been aroused from a long lethargy; has despatched a well-equipped Arctic Expedition, which has returned with a full measure of valuable geographical and other results; has again become lethargic on the matter of polar research, and is now, we trust, about once more to be roused to action.

Another great object of the Editor has been to bring the Indian Surveys into the prominence they deserve, and to devote due attention to the geography of Central Asia. The work of the Indian Survey has, through the pages of the Magazine, been made widely known not only to geographers and others in this country, but to enquirers in all parts of the civilized world. The periodical consignments of maps from India, as they have arrived, have been regularly noticed and reviewed under the head of "Cartography." News connected with the surveys has been disseminated; useful maps have been prepared, some of which have proved of great value in India; and a large number of permanently valuable geographical articles on Indian and Central Asian subjects have been published. Many of these articles are by Colonel Yule, and others by Colonel Meadows Taylor, Dr. Brandis, Sir Arthur Phayre, Sir Frederic Goldsmid, Major St. John, Major Herbert Wood, Mr. Shaw, M. Vambéry, Baron Richtigofen, M. Khanikoff, Dr. Badger, Mr. Delmar Morgan, Major Raverty, Mr. Howorth, Mr. Michell, Major Trotter, Major Godwin Austen, Mr. Black, Captain A. D. Taylor, Lieutenant Stiffe and the Editor. Many will be useful hereafter in the India Office.

We may measure the success of the Magazine by the permanent value of the contents of the volumes; and by the support it has received. We conclude our labours with the feeling that we have worked for our constituents to the best of our ability, and that we have spared no pains and no trouble; while we are confident that no Editor was ever aided by a more zealous and efficient staff.

In the fulness of time the Council of the Royal Geographical Society felt the necessity for so enlarging and improving their Proceedings as that they should cover the whole ground occupied by the Magazine. The resources and position of the Society made it obvious that the great work would best be continued through its instrumentality, and that the Magazine would fitly and usefully find its successor in a monthly periodical containing the same matter, and published by the Geographical Society. A satisfactory under-

standing was arrived at, and on the 25th of November 1878, a Resolution was passed by the Council of the Royal Geographical Society that a sum should be paid from the funds of the Society to the proprietors of *The Geographical Magazine* as an acknowledgment of the services rendered by their periodical during the last 6½ years to the cause of geography, and in consideration of the surrender of their stock, and the transfer of their goodwill to the Society's proposed publication of *Monthly Proceedings*.

The Magazine has, we believe, completed its work and fulfilled its mission. Its labours have not been in vain; its objects will not die with it; but will be actively and ably pursued by its successor.

The title of the new publication will be *Proceedings of the Royal Geographical Society and Monthly Geographical Record*. It will be edited by the Assistant Secretary, and will be published regularly on the 1st of each month. The shape will be royal octavo. The Proceedings will commence with addresses delivered or papers read at the meetings of the Society, together with the discussions; then will follow articles on geographical subjects; geographical news, as "Record," similar to our "Log Book;" reviews of books and maps; correspondence; and notices of the proceedings of Foreign Geographical Societies. In short the contents will be identical with those of our Magazine. Each number will be illustrated by one or more maps. The price for subscribers, who are not Fellows, will be 1s. 6d., the same as for our Magazine.

We trust that the subscribers to the Magazine will continue their support to the *Monthly Proceedings* of the Royal Geographical Society; for they will find the same information, while the resources for obtaining and illustrating it will be infinitely greater. The Magazine has prepared the ground, has worked long and zealously to supply a want, and the task will now be still more fully and completely attended to by its successor.

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#### THE BOLAN PASS.

In our last number we passed in review the wild tribes of our north-west frontier, and the passes from the Kaibar to the Gomul, especially describing the Kurram pass which leads directly from the valley of the Indus to Ghazni. These passes are interesting from an historical point of view, because the most memorable invasions of India have been undertaken by them, and particularly by the Kaibar pass.

The Emperor Baber mentions four passes leading from Kabul into India. The first was by way of Lamghanât, which is north of the Kabul river. The second was by Bangsh. The Bangash tribe occupied the Kurram valley, and does so to this day. The third was by Naghr, and the fourth by Fermul. Fermul is a valley between the Kurram and Gomul passes. The three last all converge to the Kurram valley, and may be described as routes leading from Kurram to Kabul and Ghazni. Baber, from his mountain capital of Kabul, was meditating the conquest of India during many years, from 1505 to 1525, when he finally crossed the Indus at Nilâb (15 miles below Attock), and did not return. He usually adopted the route of the Kaibar pass, but on one

occasion he made a very interesting march which involved geographical discovery to him, and which led over ground still little better known to us. It is to the south of the area covered by the map in our last number, and the adventurous march introduces us to another pass from Afghanistan into India.

It is scarcely necessary to introduce the young ex-King of Ferghana to our readers. Driven from his native country by the conquering Uzbegs under Shaibani Khan, he crossed the Hindu Kush with a handful of faithful followers, establishing his rule at Kabul in 1504, and afterwards over the greater part of Afghanistan. There he meditated the conquest of India, and after several tentative expeditions, at last founded the dynasty of the "Great Moguls" in 1525. The march to which we allude, and which will be interesting to geographers, was made by Baber in the year 1505. He set out from Kabul in January, never having yet seen the "Germsil," or country of warm temperatures, and was struck with wonder at the change. The grass, the trees, the birds, the animals, the people—all were different. He marched through the Kaibar pass and encamped at Jamrud, close to the entrance of the gorge, in the valley of Peshawur. He then rode onwards to visit Peshawur, which was called Bekram in those days, and to examine the country. He was advised not to cross the Indus, but to turn his steps towards Kohat, and, as he had himself never even heard the name of the place, he adopted the suggestion, crossed the Kohat pass, and plundered the valley as far as the banks of the Indus. It was next determined to ravage the Banu country, and to return into Afghanistan by way of Naghr and Fermul—that is by the Kurram pass. He was engaged in desultory fights with the Afghan tribes, killing all his prisoners and making minarets of their heads; and in this way he advanced into the Banu district, which he describes as being fertilised by the River Bangash, the modern Kurram. After ravaging Banu, Baber was about to return by the Kurram pass, when it was represented to him that in the district to the south, called Desht (Damán), the inhabitants were wealthy and the roads good; so he altered his route and determined to plunder the Desht, and then return by some more southerly pass.

As he advanced, the inhabitants belonging to a tribe which he calls Isa-khail, fled to the mountains on his right, and made some night attacks, but Baber was a vigilant commander and could never be taken by surprise. In Damán he plundered a rich caravan of Povindahs or Lohanis, the warlike merchants of whom we gave an account in our last number, and killed their chief, who was one of the most noted and eminent of the Afghan merchants. The Povindah caravan had white cloths, aromatic drugs, and sugar both candied and powdered; so that it was on its way from India.

Baber's next march brought him to the banks of the Gomul, and there was a discussion whether he should return by the Gomul (or Gholeri) pass. There had been a heavy rainfall, and the river was much swollen, so that the guides reported unfavourably. It was then suggested that the mountain called Takhti Sulaiman was near, and that if they could turn its southern extremity they would come to a road that was level, although it might make a difference of a march or two. This plan was adopted and the river

Gomul was crossed, but none of the party having ever been by the proposed route, it was chosen, as Baber tells us, "on mere idle surmise." Marching along the skirts of the mountains to the southward, the monotony of the journey was broken by a skirmish with Afghan borderers, including an exhilarating cavalry charge. After four marches to the south they halted at Belah on the Indus, a small district dependent on Multan. The inhabitants fled across the river by swimming or in boats, and Baber made yet two more marches to the southward. He left the banks at a point opposite to the tomb of Pir Khana, south of Dera Ismail Khan. He then marched westward to the mountains, and halted on the summit of a hill pass, apparently the pass of Sanghar, which was afterwards used by Prince Dara in 1653. But the pass leads direct to Kandahar, so that Baber must have turned to the right in order to reach his destination, which was Ghazni. His route was through a mountainous country, which he calls *Duki*, but the name does not appear on modern maps. The horses were completely worn out, from 200 to 300 were knocked up each day; and in five marches their route brought them to the banks of the lake of Abistádeh. Baber describes this sheet of water as so large that nothing could be seen of the land on the opposite side, and as receiving the drainage from the valley of Katteh-waz, the dale of Zúrmet, and the river of Ghazni. As he approached the shores of the lake, Baber saw, between the water and the heavens, something of a red appearance like the ruddy crepuscule, which again by and by vanished, and so continued shifting until he came near it. When close up he discovered that this appearance was occasioned by immense flocks of wild geese, not ten thousand or twenty thousand, but absolutely beyond computation and innumerable. In their flight, as they moved their wings, their red feathers sometimes appeared, and sometimes were hid. The description sounds more like flamingoes. He adds that they were not wild geese alone, but that innumerable flocks of every species of wild fowl settled on the waters of the lakes, and the eggs of countless multitudes of fowl were deposited on every corner of its banks. A few Afghans were employed in collecting the eggs. Baber describes the Abistádeh lake as shallow, judging from the levelness of the plain, and the very gradual increase of depth when the horses waded into it. He marched thence to Ghazni.

This march of Baber, in 1505, seems worthy of attention, not only because he describes a pass, south of the Gomul, which has not been traversed by any Englishman; but also because his narrative suggests the comparative ease with which India may be reached by numerous routes which are unsurveyed and almost unknown. The pass used by Baber appears eventually to have led him into the Gomul pass, and was probably the Sanghar pass.

But the chief and most important route to the south of the Gomul, is by the Bolan pass, leading from the plains of the Indus to Kandahar. A map of the Bolan is given in the present number, and we now propose to describe the pass in detail, having, in our last number furnished some account of the tribes which inhabit the region to the north and west of it.

The Bolan pass is not that which has generally

been used by the conquerors of India. Baber, as we have seen, usually marched down the Kaibar, as did Nadir Shah. Ahmed Shah, however, the founder of the Afghan Durani Monarchy, fixed his seat of Government at Kandahar. His first invasion of India, in 1748, was by the Kaibar, but he seems to have returned by the Bolan, and on other occasions he traversed the Bolan pass, which was more conveniently situated as regards Kandahar. It was at the sanatorium of Murgha, in the hills of Toba overhanging the Bolan, that Ahmed Shah died in 1773. The pass was traversed by Masson and Conolly, and by the English army which invaded Afghanistan in 1839.

The Bolan pass is the grand route from Shikarpur and Dadur in northern Sind to Kandahar. It is a pass over a lofty range by a continuous succession of ravines and gorges, first winding among the subordinate ridges stretching eastward from the Hala mountains, and then going over the main chain. The mountains bounding the Indus valley on the west are truly a prolongation of the Himalaya. The Sulaiman range takes a southerly direction from the Sufid Koh, and the Toba mountains run parallel and within the Sulaimans, ending in the double summits of Tukatu in about  $30^{\circ} 18'$ . These peaks attain a height of 12,000 feet, and from them the Hala range may be considered to commence. The Hala mountains then run north and south for 400 miles, and terminate at Cape Monze in the Arabian Sea. Speaking broadly, the Toba and Sulaiman ranges are inhabited by Afghan, and the Hala mountains by Baluch tribes. These Baluch mountaineers, the Kasranis, Bozdars, Khutranis, Kosahs, Lagharis, Gurchanis, Maris, and Bugtis number 130,000 fighting men. The Kasranis extend from the Korak pass for about 50 miles, and muster 1200 thieves. The Bozdars extend along the British frontier for about 20 miles, in a range intersected by the Surgurh and eight other passes. The Khutranis are of Afghan race and live behind the Bozdar hills, surrounded by Biloches. The Kosahs consist of 1200 fighting men, partly in the plains, at enmity with the Bozdars above, and Lagharis below them, but on good terms with the Khutranis. The Lagharis are a quiet, well-disposed tribe, and the Gurchanis a debased, thievish clan of 2000. The strong tribe of Maris, numbering 4000, used to commit raids in the lower extremity of the Derajat, and the Bugtis, subjects of the Khan of Kelat, often serve in the Sind horse and Punjab cavalry.

Thus the Hala mountains, through which the Bolan leads, are inhabited by a Baluch race which is distinct from the Afghans further north. The length of the Bolan pass is 54 miles with a north and south direction, the elevation above the sea at its base being about 700, and at its head 5900 feet. The head of the pass at Karlaki is about 3 miles to the east of, and slightly dominating the Dasht-i-bi-daulat, and it debouches on the plains of Kachi 5 miles to the west of Dadur. The Bolan torrent runs through it from the source at Sar-i-Bolan, which is 10 miles from the head of the pass. The pass is formed by a succession of valleys of various widths (the broadest being the valley of Kirta), bounded by mountain ranges with a general N.N.W. trend.

The Bolan pass is contracted at two principal points. At the entrance from the plains, near Dadur,

the road winds through a valley about half a mile wide, with enclosing hills, 500 or 600 feet high, of coarse conglomerate. The torrent flows through a broad, shallow, pebbly bed, winding across and across the gorge. After about 3 miles there is a small valley covered with greensward called Drabi, where the advanced party of Engineers of the invading English army encamped in 1839. On April 12th 1839 the Bombay column of the invading force entered the pass and, going beyond Drabi, halted, for the first night, at Kohan-Dilan (*Khoondye* of Dr. Kennedy).

This part of the Bolan pass is classic ground because here, in most ancient times, was gathered the sacred plant (*Sarcostemma viminale*), a leafless asclepiad, with white flowers in terminal umbels, yielding the *soma* juice which is mentioned in nearly every hymn of the Rig Veda. The *soma* or moon plant was collected on moonlight nights, together with the *arani* wood (*Premna spinosa*) for kindling the sacred fire. The *soma* was plucked up by the roots and, after being stripped of its branches, the bare stems were laid on carts drawn by two rams or he goats, and by them brought to the houses of the worshippers. The stalks were then bruised with stones, and the juice expressed between two pieces of wood. The juice, diluted with water, was then passed through a strainer into a receiving vessel, where it was mixed with ghee and the flour of *wari* (*Panicum miliaceum*), and then allowed to ferment. Finally it was offered to the gods in a scoop or ladle, the vessel and scoop being made of the *Mimosa catechu*. The ceremony of offering the *soma* juice and chanting the Vedic hymns took place in the houses of the worshippers. In those primitive days there were no temples or public places of worship. The localities where these plants, yielding the *soma*, the *arani* wood, and the wood for bowls and ladles, are found, point unerringly to the route by which the earliest Aryan settlers came to India, as well as to the extreme antiquity of the Vedic hymns. They must have been composed when the worshippers of Agni and of Indra were still in the neighbourhood of the western mountains and of the Bolan pass.

Leaving the region of the *soma* plant the road proceeds over loose stones and shingle to Kirta, the Bolan stream being crossed no less than seventeen times in a march of 10 miles. In this part the pass narrows to a width of from 60 to 70 yards between perpendicular rocks, and then opens out to about 400 yards, still bounded by the same barren hills, about 300 feet high. At the end of the ninth mile, in this march, they recede and leave an extensive plain in which is situated the village of Kirta. Thence the road leads by an open, stony plain for 6 miles to a pass over a small ridge called Jalogir, and thence to Bibi-nani. The road from Bibi-nani to the next halting-place called Abi-i-gûm is still stony, and increases slightly in steepness. Here begins the country of the Bolan Maris.

At Abi-i-gûm (*lost water*) the River Bolan percolates through the pebbles to a lower level, and disappears, coming out again at Bibi-nani, several miles lower down. Abi-i-gûm is 2500 feet above the sea.

From Abi-i-gûm the ascent increases, the valley narrows a good deal, and the stony road is overhung with precipices. At the sixth mile there is a place called Sar-i-Kajur, where are some date trees on

THE BOLAN, THE MULA

and clover are raised, and the enclosing hills furnish pasture for herds and flocks. Orchards, too, are numerous and produce apples and pears, apricots and figs in great perfection. Quetta (Kwatah) is the chief town in the district of Shal, and some account of it, and of its political importance, will be found in our number for November 1877 (p. 288).

As regards Quetta, it will be sufficient briefly to repeat here that Ahmed Shah, the founder of the

In 1653, when Prince Dara marched to Kabul, used the Sanghar pass, which comes out between Ghazni and Dera Ismail Khan, and is also direct, and perhaps easier than the Bolan. The Sawar and Sanghar routes join each other at the mountains.

The existing frontier along the foot of the mountains, we have been told, is a scientific frontier. The meaning of this phrase may possibly be that, s

manship being a science, it is not a statesmanlike frontier. This no doubt is true. A frontier which necessitates the employment of a police force represented by an army of 12,000 men, and has led to upwards of 25 devastating border wars in 20 years is essentially unscientific. The policy of maintaining such a frontier by a large and expensive force, and by a system of frequent expeditions to burn, kill and destroy, is unstatesmanlike.

In adopting a policy intended to rectify the above state of things there are two alternatives. One, which was suggested by Major Evans Bell a few years ago, is to retire to the Indus, and to restore Peshawur and the Trans-Indus districts, which were taken from them by the Sikhs, to the Afghans, on condition that existing rights are respected. The tribes would then cease to be border tribes, and they would be under the control of the same Government both on the plateaux above them and on the plains below. The other alternative is for the British Government to assume a like position, by advancing the frontier into the basin of the Helmund, holding Kandahar, Kal'at-i-Ghilzi, and Ghazni, and preserving peace in the passes by occupying both ends, and by a firm and just rule. The class of officers that converted the Bhils and Mhairs from savage robber tribes into thriving and peaceable communities would bring the same high qualities to bear upon the Waziris and Afridis, and with the same results. The English are now known along a frontier of several hundred miles as punishers of raids, and enforcers of reprisals. When the mountains cease to be border-lands, and are within our territory, the English will be known as civilizers and benefactors, as they are now known in the country of the Bhils and of the Mhairs.

The rectification of the existing frontier on one of these two principles would, we believe, be a scientific—that is a statesmanlike—process; but the existing policy of incessant frontier wars is anarchical, and therefore unscientific.

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### CONTINUANCE OF ARCTIC RESEARCH.

#### III.

##### THE ROUTE TO BE ADOPTED.

IN the number of this Magazine for September 1877 (p. 223) we enumerated the various routes by which Polar research must be continued, and showed that the reasons for persevering in the great work are not only as strong, but much stronger now than they were in 1875, when it was resumed. In the article in our number for October 1878 (p. 249) we endeavoured to present to our readers a view of the important results which are secured by the labours of Arctic expeditions. With this object we selected one division of the Polar region, namely the known portion of Greenland, and displayed the rich and fruitful results of Arctic exploration in detail, and the wide field of scientific study, in almost every branch of investigation that they open out.

The unknown parts of the Polar area are as rich in those valuable materials which serve to increase the amount of human knowledge as are the known portions of Greenland and of the other Polar lands which have already been discovered. It is consequently

quite as important to explore the unknown area, as it was to investigate the geology, physics, and natural history of Greenland and the Parry Islands, of Spitzbergen and Novaya Zemlya, and of the still more inaccessible coasts discovered by the late English Expedition.

The point which it is now incumbent upon geographers to consider with the greatest care, and to decide upon, is the route by which the largest extent of new coast line can be reached and discovered, and by which the most valuable results may thus be secured. There is one perfectly well-ascertained fact in ice navigation, namely, that great progress northwards can only be made along a windward shore. Thus vessels have been able to pass up along the western shore of Novaya Zemlya, along the western shore of Spitzbergen and along the western shore of Greenland. By these routes all that is possible has already been done. These coasts have been explored, and all the rich and valuable results of their examination have been added to the sum of human knowledge. The next step in advance must be to explore some other windward shore extending in a northerly direction for an unknown distance; but until the discoveries of the Austrian Expedition in 1872-74 were made known in 1875 it was not ascertained whether any such coast existed. Now we have good reason for believing that the as yet unexplored western coast of Franz Josef Land presents the same advantages as are offered by the western coasts of Greenland, Novaya Zemlya, and Spitzbergen.

This, then, is obviously the route for the next expedition. But there is one great difference between the Franz Josef route and those which have already proved to be fruitful of useful results along western Arctic shores. In all other cases where the western shores of Arctic lands have been explored, it has been possible and indeed easy to reach them without encountering the difficult and hazardous work of navigating amongst drifting fields or floes of ice. Cape Farewell, where the western side of Greenland commences, is in the latitude of the Shetland Islands, and the southern points of Spitzbergen and of Greenland can also be reached every season without difficulty.

This is not the case with the southern extreme of Franz Josef Land, and the fact on the one hand points out the special difficulty that must be encountered and overcome by the next expedition, and on the other the advantages of the route. For the first time it will be necessary for an expedition, before it reaches its exploring ground, to force its way over an area of the ocean which may be occupied by drifting pack; but, as a compensation, it will, when this obstacle has been surmounted, have attained a position from whence to commence work, which will be more advantageous than that secured by any former expedition seeking to penetrate northwards. For the southern commencement of that windward shore along which it will force its way by ship or sledge, is far to the north of the northern extreme of Novaya Zemlya; to the north of the northern extreme of Spitzbergen; and north of the entrance to Smith Sound.

It behoves us, therefore, to examine with great care the probable nature of the obstacle which must be

overcome before so glorious a position for the achievement of great geographical discoveries can be reached. The Barents Sea is that portion of the Polar ocean which has the coast of Lapland for its southern boundary, Novaya Zemlya on the east, Spitzbergen and the bank down to Bear Island on the west, and Franz Josef Land to the north. It is open to the north Atlantic ocean between Spitzbergen and Norway, and to the unknown Polar ocean between Novaya Zemlya and Franz Josef Land. So far as our present knowledge enables us to judge, a warm current passes from the Atlantic along the coast of Lapland and Novaya Zemlya, keeping the sea comparatively clear of ice; while a Polar current brings down a harvest of ice between Novaya Zemlya and Franz Josef Land, which impinges on the east coast of Spitzbergen. It is across this ice-laden current that an expedition must make its way in order to reach the desired goal, namely the south-west point of Franz Josef Land.

Let us now consider the nature of the ice barrier, and come to some definite conclusion as to when and how it may best be broken through.

The earliest voyagers in the Barents Sea usually crossed it early in the season, and far to the south, near the Lapland coast.

Willem Barents, in the three voyages which he made to Novaya Zemlya in 1594, 1595, and 1596, crossed the sea which now bears his name in July, and met with ice between the 73rd and 74th parallels. In 1608 Henry Hudson, with a small vessel and a crew of 14 men, entered the Barents Sea. He came to the edge of the ice on the 9th of June in 75° 30' N. and coasted along it until he reached the coast of Novaya Zemlya on the 26th in about 73° N. Captain Wood, in the frigate 'Speedwell,' sailed along the edge of the ice in the same month, during the year 1676, and found it on about the same parallels, from 75° 59' N. to 74° 40' N. Many subsequent voyages record the same experience; and we may, therefore, take it as established that in June and July the ice of the Barents Sea stretches across between the parallels of 73° and 76° N.

Along the west shore of Novaya Zemlya, being a windward shore, progress may always be made at the proper season. Barents, in his first voyage in 1594, reached its north-eastern point at Cape Nassau, and in 1596 he rounded the extreme northern end. In 1612 Captain Jan Cornelisz May attained a latitude of 77° 45' early in August. In 1664 the renowned Captain Willem de Vlamingh, following in the track of Barents, also rounded the extreme north end of Novaya Zemlya, and this feat is now almost annually performed by Norwegian walrus hunters. Witsen tells us that Captain Cornelis Roule went far to the north, in the longitude of Novaya Zemlya, and discovered land, which, if the information of Witsen was correct, must have been Franz Josef Land. But Theunis Ys, one of the most experienced navigators of the seas near Novaya Zemlya, says that to the north there are large fields of ice which would stop the progress of any vessel. In later times, Weyprecht and Payer in 1871, and Beynen in 1878, reached the ice in 78° 4' N., at a short distance north and west of Cape Nassau; and in 1872 as soon as the 'Tegethoff' left the shelter of the windward shore, she was beset and was drifted during many months, first in the current flowing northwards and westwards; and then

by the polar current which took her eastwards in a higher latitude, until Franz Josef Land was discovered. But this is a method of discovery such as no explorer would wish to repeat. The 'Tegethoff' was helplessly drifted during twelve months and never more was free.

The voyages enumerated in the foregoing paragraph show that the sea along the western coast of Novaya Zemlya is always navigable, as it is along all windward shores. But they also show that immediately the sheltering coast is left, there is great risk of being beset in the ice, as occurred to the 'Tegethoff'; and the almost certainty of being stopped by heavy pack, even in August and September, as has happened to every vessel that has steered far to the northwards from Cape Nassau. The ice is coming, on the polar current, from the north-eastward, and the great mass is not checked in its progress until it reaches the land of Franz Josef, part of which is to the westward. Then, apparently, late in the season, its volume is reduced, possibly by obstacles presented by land, and the remaining heavy ice is jammed against the eastern coasts of the Spitzbergen islands.

Experience appears to tell us that, in order to advance northwards in the Barents Sea, the attempt must be made near the centre, at some distance to the westward of Cape Nassau and nearer to the meridian of Wyche Island, the most eastern of the Spitzbergen group.

Only two attempts have ever been made in this direction, and on both occasions the vessels were very small schooners without steam power, namely the 'Willem Barents' and the 'Isbjorn.' One of these attempts was made in August, the other in September, so that they furnish information respecting the position and nature of the ice in those two months.

The Dutch explorers, in the 'Willem Barents,' ran northwards along the meridian of 45° E. and fell in with the ice in 77° 28' N. and longitude 43° 50' E. on July 31st 1878. They then proceeded along the edge of the pack in a westerly direction until the 10th of August. It was observed that to the westward the ice was extremely heavy and so hummocky that it would have been impossible to travel over it, while to the eastward the floes consisted of very thin ice which was much rotted by the action of rain and sea. The westward ice seemed to be that which had come down with the Polar current, and was pressing against the east-side of Spitzbergen; and it appeared to Lieut. Beynen that progress northward might be made by pushing north in a steamer between the heavy west ice and the lighter floes to the eastward, in about this meridian of 44° E.

The Dutch explorers inform us respecting the state and position of the ice on this meridian in August. We learn the conditions in September from Payer and Weyprecht, who went northwards on about the same meridian in that month, during the year 1871. The Austrian explorers reached a latitude of 78° N. in 42° E. on the 30th of August, without seeing a fragment of ice, and here there was a heavy long swell from the north. Many whales and several eider ducks were seen. On the 31st the ice was encountered, but loose and widely dispersed, and following along its edge they reached 78° 30' N. To the westward the ice was dense with a strong blink, but to the north and east it was loose and open. Their report thus agrees



perfectly with that of Lieut. Beynen. Their highest latitude was attained at midnight on the 1st of September, when they were in  $78^{\circ} 48'$  N. on about the 42nd meridian. Even here the ice around them presented no serious impediment to progress. Their own progress, in a small schooner, was checked by a stiff contrary wind and not by the ice—the very conditions most favourable for advance in a powerful steamer. But even the 'Isbjorn' could easily have been taken north of the 79th parallel, while the most southern part of Franz Josef Land is south of the 80th parallel—the distance to land was under 60 miles.

To sum up the knowledge of the Barents Sea which has been collected by all the recorded voyages, we gather that during June and July the line of ice stretches along from about the 76th to the 74th parallels; that in August it is much further north, admitting of the advance of a vessel to  $77\frac{1}{2}^{\circ}$  N. on the 42nd meridian; while in September, in the same direction, there is nothing to prevent a steamer from advancing northwards across the 79th parallel. Such at least are the experiences of 1871 and 1878, and the former of those years was, we are assured, very far from being an exceptionally open one.

The great aim of an expedition should be to reach the south-east point of Franz Josef Land, in order to press onwards along its western or windward shore, which, arguing from the analogy of all other Arctic windward shores, may be expected to be navigable. The route has been clearly pointed out by those gallant pioneers in the 'Isbjorn' and the 'Willem Barents.' Somewhere about the 42nd meridian, in the first days of September, are the place and time for overcoming the only great difficulty which stands between an expedition and the desired goal on a new and as yet undiscovered windward coast. One advantage in the Barents Sea route is that there are coast lines both to the right and left in the event of disaster. A vessel, during July and August, would have time to establish the necessary depôts at Cape Nassau on one side, at Edge or Wyche Islands on the other, to retreat upon, before making the final advance in September. The practicability of taking these precautions will make it unnecessary to insist upon the expedition consisting of two vessels; although the co-operation of a second ship would always be welcome.

The route to be adopted for the next Arctic Expedition is, then, that by way of the Barents Sea to the western side of Franz Josef Land. The 'Discovery,' a powerful steamer specially prepared for work in the ice, is available for the service, and she should be despatched from England in June 1879. Discoveries of the greatest interest and importance may confidently be anticipated from a successful attempt to navigate her across the Barents Sea to the unknown northern goal. Progress along the western side of Franz Josef Land will lead the expedition far into the undiscovered region. The coast extends northwards for an unknown distance, and Lieut. Payer saw land beyond  $83^{\circ}$  N. Here then will be a new region offering fresh facts for the geologist, a special *fauna* and *flora* for the naturalist, most valuable investigations in physical science, and the solution of geographical and hydrographical problems of the highest importance.

This country is bound, out of regard for consistency if not from those higher and nobler motives

which will influence her, to continue the work that was so well commenced in 1875. "It can be done, and England ought to do it!"

CLEMENTS R. MARKHAM.

## ACCOUNT OF THE DUTCH ARCTIC EXPEDITION.

BY ONE OF THE SEAMEN.

THE 'Willem Barents,' commanded by Lieut. A. de Bruyne, sailed on her Arctic cruise on the 5th of May, 1878, and reached Bergen on the 12th. Full accounts of this interesting voyage will be published, and, as soon as the observations have been worked out, geographers will have the scientific results, including an important series of deep-sea soundings with serial temperatures. Meanwhile we present to our readers the first impressions of one of the volunteers of the 'Willem Barents,' a seaman of Zeeland, named Boljé, who is in the pilot service. He wrote his letter during the first part of the cruise, and sent it home from Vardö for publication in the newspaper of his native town of Goes (*Goesche Courant*, August 10th 1878). Every soul on board was animated with a feeling of patriotic zeal, and all took an intelligent and instructed interest in the objects of the voyage. Several of the men kept journals, and Boljé was especially diligent in that respect.

The names of the fourteen persons who were on board the 'Willem Barents' are as follows:—

*Captain*—A. DE BRUYNE (1st Lieut. R.N.N.)  
*Lieutenant*—L. R. KOOLEMANS BEYENEN (2nd Lieut. R.N.N.)  
*Lieutenant*—H. M. SPEELMAN (2nd Lieut. R.N.N.)  
*Surgeon*—DR. HYMANS VAN ANROOY.  
*Zoologist*—DR. SLUYTER.  
*Photographer*—W. G. A. GRANT, ESQ.  
*Boatswain*—WITTEVEEN (R.N.N.)  
*Carpenter*—VOGELAAR (R.N.N.)  
*Cook*—DE BRUIN (R.N.N.)  
*Seamen*—DE WITT (R.N.N.)  
 " KAMERMANS (Pilot service).  
 " BOLJÉ (Pilot service).  
 " ROOS } Young fishermen from Marken in the  
 " DE WAART } Zuyder Zee.

Boljé, as a Zeelander, took a special interest in that part of the voyage which included a visit to the old haunts of the Zeeland whalers, near Vogel-sang, in the extreme N.W. of Spitzbergen. His letter is as follows:—

"By a lucky accident we were at Bergen on the 17th of May, 1878, which is a great day of rejoicing amongst the Norwegians; it is the anniversary of the grant of their constitution in 1814. On this day one of our fishermen from Marken went on shore to see the town dressed in his national costume, which occasioned great excitement among the children, while the grown-up people looked at him with astonishment, and the women and girls shook with laughter. As in the evening he returned on board, he was escorted to the ship by a troop of young men, who had been parading the streets with flags and banners. Some of the people took him for a Turk on account of his wide trousers.

"As an acknowledgment of their gratitude to the Netherland Consul for all the assistance he had afforded, our officers presented him with a silver wine cup, with the following inscription, '*Aan Jacob Cramer, Souvenir Etat-Major Willem Barents, 17 Mei,*

1878.' The next day our compasses were tried and the chronometer regulated, and we continued our voyage, knowing well that this was the last spot where we should see civilized people. On the 9th of June, in spite of contrary wind, we passed the Polar circle, and at 12 our flag was hoisted and our national tricolor floated proudly over the waves, where for more than a hundred years it had been a stranger. It was a proud moment when our Commander proposed the health of the crew, which was answered by us with a wish for the success of the enterprise. But that day we met the winter king in a thick mantle of snow. On the 4th of June we saw, for the first time, the midnight sun, which we have never since seen set. It is indeed strange no longer being able to distinguish day from night. At last, after long struggles against foul winds, we reached Jan Mayen Island, over which Beerenberg rises proudly into the air (5,800 feet high) and almost entirely covered with snow: the island resembled a mass of silver. From this time, ever following the edge of the ice, we had every day fresh pictures from nature—sometimes a whale, sometimes seals stretched lazily out on the floe and the loose floating ice, in every sort of shape. Magnificent was the scenery around us, beyond the power of any pen to describe. After leaving Jan Mayen we were often fighting with drift ice.

"On the 18th of June, Spitzbergen was in sight. The time occupied in the voyage between Jan Mayen and Spitzbergen had been taken advantage of for taking deep-sea soundings, and making researches into the flora and fauna of these seas. Spitzbergen has justly earned its name, for one sees nothing but sharp-pointed rocks showing amongst the colossal glaciers, while the sun, throwing a red glow, brings the whiteness of the snow into startling contrast with the deep shadows. After examining the ice to the eastward we anchored off the island Zeeuwsche Uitkijk, and explored the islands around, finding on the island Vogelsang about 100 graves, where, in all probability, Zealanders rest, having died here in the days when the whale fishery flourished. The Amsterdam Council forbade the Zealanders to have a boiling place at Smeerenberg, and so they settled at Zeeuwsche Uitkijk, Vogelsang, &c., and established themselves there. We then reconnoitred the edge of the ice to the north, and on the 27th of July we reached the first place of our destination, the island of Amsterdam, the cradle of the Dutch. At the place where we anchored the land was very low and very marshy; we soon found the remains of the furnaces where the boiling places had been, for the most part they were surrounded by heaps of whales' bones. A little further away was the graveyard: some of the stones were still standing, but most had fallen, and many of the coffins were exposed, but they were still in a very good state, and some of the inscriptions were legible. We put the graves in as good order as possible, and in the middle erected the stone sent out by Holland with the following inscription:—



IN MEMORIAM.  
SPITZBERGEN OR NIEULAND,  
Discovered

In 79° 30' N. Lat.

BY THE DUTCH.

Here Wintered and Died, 1634-1635,

JACOB SEEGERSZ AND SIX OTHERS.

Here Wintered and Died, 1634-1635,

ANDRIES JANSZ, OF MIDDELBURG, AND SIX OTHERS.

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"We placed this stone fronting the sea, with a cross of immortelles, on which, in white letters, were the words 'Willem Barents,' on a red field with a blue border; we left also a soldered cylinder, containing two letters, one in Dutch and one in English, begging the finders to report to the Admiralty at the Hague that this stone was placed by us on Amsterdam Island, and that we left on the 1st of July. We also left a bottle of Geneva and some biscuits for the finders, and when all was in order we assembled round the stone and the Commander spoke as follows:—

"In the name of the Dutch people we have fixed this stone: it was their wish to do honour to our forefathers, who in these seas have done so much for the honour and greatness of our country: we have chosen this burial-place because so many of those noble men lie here who have done such great deeds far from their homes. Their bones are scattered and their graves unknown, but Holland does honour to their memory, and their deeds are highly prized by us, and therefore here is the fitting place for this stone."

"During this speech the photographer, Mr. Grant, took a photograph of us as we stood round. Our readers will be surprised to hear that this photograph was taken in the middle of the night.

"All day the weather had been misty, but at midnight it cleared off. On visiting a small island near, no bigger than the 'Groote markte' at Goes, we succeeded in getting 300 ducks' eggs, and if we wanted roast meat we had only to shoot for half an hour to return laden with birds. As we were becoming surrounded by a mass of heavy ice it was necessary to take to flight, and after fighting our way through ice the anchor was let go in Robben-baai, and we took in a fresh supply of water from a little brook flowing at the foot of a hill, and then again sailed for Beeren Island. Our zoologist had made a splendid collection, and said this was an excellent country for science, and Lieut. Speelman was also satisfied with his magnetic observations.

"Now that we had arrived at 80° 18' N. lat. the ice hindered any further progress. We had now had it colder than 5° min. (Celsius), however it was still summer. As to deep-sea soundings we had taken five with great success.

"On the 15th of July we reached Beeren Island, and having anchored went on shore to see if the 'Vöringen' (Norwegian steamer) had left anything for us. The first thing we saw was an empty barrel, and no one could believe, nor could I describe, the innumerable birds that flew around us, the rocks could not be seen for the numberless birds that covered them, and it was indeed a bad shot that only brought down five or six. But the greater number fell dead on their nests, and we could not get them. Looking at the rocks we were transported to the middle ages, so great was their resemblance to castles and fortresses, and we all agreed there was nothing in nature to be compared to the Polar world.

"In our wanderings we came to a hut built with planks, that appeared to have belonged to the Norwegians that wintered here in 1864, and not far distant were three graves. Suddenly we heard a cry, 'Hurrah, it is found!' Surely you can guess the cause of this. The cairn with the 'Post of the 'Willem Barents' was found, and this was greeted with a three times repeated hurrah! We brought one box of letters to the shore

and then lit a fire, and prepared our mid-day meal of potatoes, carrots, and bacon, and here Mr. Grant again photographed us. We left a record in a tin cylinder, with a thank-offering of tobacco and a basket of Gouda pipes. The same day the box was opened and the letters distributed, I receiving one from my parents. The President of the head Committee, through our Commander, wished us a happy and successful cruise. You can easily imagine how delighted we were to receive these letters, and how we felt ourselves cheered on by them to proceed on our journey."

Boljé's letter was written at Bear Island, whence the 'Willem Barents' proceeded to Vardö, and then commenced her reconnoitring cruise in the Barents Sea on the 22nd of July. Up to the 27th the explorers encountered very bad weather, and on the 1st of August they reached the edge of the ice, in 77° 54' N. and 44° 20' E., and cruised along it for ten days. A month later, in 1871, Weyprecht and Payer were able to proceed fifty miles further north on the same meridian, and even then there was nothing to prevent a further advance. Driven to the south by a furious gale after the 10th of August, the Dutch explorers shaped a course to Novaya Zemlya, and were at anchor for a few days in the Matochkin Shar from August 20th to the 25th. The 'Willem Barents' then proceeded towards Cape Nassau, whence they advanced N.W. until, on September 7th, they met ice in 78° 17' and 55° 14' E. This was the most northern point attained. On the 23rd of September the 'Willem Barents' anchored at Hammerfest; and the very successful and, in a geographical point of view, important voyage of the Dutch explorers came to an end on the 12th of October, when the little schooner returned to Amsterdam.

#### VOYAGES BETWEEN NORTHERN EUROPE AND SIBERIA IN 1878.

THE accounts that have reached us of the condition of the ice this summer in the European and Siberian Polar seas show that it has been exceptionally favourable for navigation. Not only has Professor Norden-skiöld been enabled to accomplish a voyage hitherto unique in the annals of Arctic exploration, but several successful voyages have been made between European ports and the mouths of the Siberian rivers. One of the most successful of these cruises was that of the 'Neptune,' Captain Rasmussen, a Danish vessel of 420 tons, which left Hamburg on the 14th July for the mouth of the Ob river.

The 'Neptune' is a slow sailer, and makes only 9 knots per hour, but she is strongly built and otherwise adapted for Arctic voyages. She was freighted by Messrs. Bartning, of Hamburg, and Funk, of Barnaul, with a miscellaneous cargo of petroleum, oils, colours, and various other goods: she had coals for forty-two days, and was provisioned for a year, her crew consisting of eleven Danes and a Russian. Her only chart was that published by the Russian Hydrographic Department in 1872. She reached the Straits of Kara on the 2nd of August, and found them free of ice; but, as there was still ice in the sea beyond, she held a more southerly course than usual in such cases, and made straight for the western shore of the

Samoyede peninsula, which she coasted northwards for a distance of about 10 knots, as far as White island. This island she sailed round, being afraid to venture in the narrow channel between it and the mainland. Once in the Gulf of Ob many difficulties were encountered, and the lead had to be constantly kept going, the soundings and other data regarding the river mouth being incorrect and very insufficiently laid down on the chart. The banks are in reality closer together than hitherto supposed.

However, on the 13th August, the 'Neptune' reached Linsita in safety. This place is a fishing settlement, situated at the mouth of the Nadym in the Gulf of Ob, in 72° 14' E. longitude and 66° 13' N. latitude, and here the 'Neptune' was to ship the wheat cargo sent down to meet her. Herr Funk and an agent of Herr Bartning (Herr Kühn) came down here by steamer, and the 'Neptune' proceeded to exchange her cargo for 360 tons of wheat, which had been brought down by barge. General Kaznakof, the Governor of West Siberia, who happened to be at Obdorsk at the time, took occasion to repair to Linsita to offer his congratulations to the captain, and manifested a lively interest in the new commercial route.

On the 24th of August the 'Neptune' commenced her return journey. The weather was still cloudy, and drift ice was also occasionally met with, but Captain Rasmussen successfully emerged from the gulf and made for the Matochkin Shar. These straits are very narrow, insomuch so that only two vessels can pass through at once, but the channel is deep and the passage easy. After experiencing some difficulty and delay in entering the straits, Captain Rasmussen successfully passed through, and, after coaling at Hammerfest, reached Hamburg on the 25th of September, the latter portion of her return journey being very rough weather. This is the first instance of a vessel making the double journey to and from Siberia in a single season.

The 'Warkworth' steamship, of Sunderland, Captain Joseph Wiggins, left England for the Ob in the early summer, and on the 4th September left the Nadym with about 500 tons of wheat and linseed for London. During her return journey she grounded twice, and had to throw overboard about a couple of hundred tons of grain to right herself. She sighted the Yugor straits on the 14th September, and reached the Thames on the 1st of October.

Turning to the voyages undertaken to the Yenisei, one of these appears to have been less successful. Towards the end of June, Baron Knoop, of Bremen, chartered the steamers 'Louise' and 'Moscow' and three lighter-vessels, and freighted them with a miscellaneous cargo to be exchanged for Siberian wheat for the European market. The 'Louise,' however, with a Norwegian pilot on board, got stranded in the vicinity of a small place called Brönö, on the Norwegian coast, and had to put into Drontheim for repairs. In order to prevent the enterprise from falling through, the Norwegian steamer 'Zaritza,' 313 tons, Captain Brunn, was engaged to convey the undamaged portion of the cargo to the Yenisei mouth, which she reached, in company with the 'Moscow,' at the beginning of September. The 'Zaritza' then, unfortunately, ran aground, but the cargo having been transferred to the 'Moscow,' which proceeded up to

Yeniseisk, she managed to get afloat again and returned to Hammerfest in company with the 'Fraser.'

This last-named vessel was despatched by Herr Sibiriakoff, in order to bring back Siberian wheat from Dudinko, in company with the 'Express,' 306 tons, a Swedish steamer under the command of Captain Gundersen, which acted as coaling and provision tender for the Swedish expedition, and which also took with her sixty tons of salt for Siberia. On the 9th of August, when opposite the Yenisei mouth, both these vessels separated from the Swedish expedition, after having transferred the coals and provisions to the Swedish expedition, and then proceeded up stream and took in a full cargo of wheat, rye and tallow. The return journey, according to the Bremen *Geographische Blätter*, was taken through the Matochkin Shar, and in fine weather and with little obstruction from the ice; but a Swedish paper, the *Nordlands Posten*, tells a different tale, and says that the 'Express' encountered a terrible storm at the outset, and was hemmed in by the ice for seventy-five hours, but sustained no material damage.

In connection with these voyages the experiences of the 'Zaria' ('Dawn') vessel, Captain Schwanenberg, possess a good deal of interest. This enterprise had its origin in a previous journey of a very unfortunate character. M. Michael Sidorof, a member of the Russian Geographical Society, had for years endeavoured to open up a commercial route between Siberia and Northern Europe, and thus to find a maritime outlet for the vast products of the former country. His first venture was made in 1876, when he chartered the 'Aurora Borealis,' a small vessel, built in Yeniseisk, which descended the Yenisei as far as the Malobrekhovsk islands, where the crew were compelled to winter. Their hope was to continue the voyage in the spring, but unfortunately when the ice began to break up, their vessel was a good deal nipped and cast ashore about 2 versts inland. During the winter, Numelin, the mate, and four others endured the greatest suffering. Their stock of provisions was very meagre, and they had nothing but a wooden hut hastily put together to shelter them from the rigorous cold. During the whole of the time, however, Numelin took three observations of the temperature per diem, and these will prove of scientific interest, although the freezing of the mercury often precluded any exact measurement of the cold. On the 23rd September the little party retired to their hut for the winter, and a fortnight later one could walk across the Yenisei over the ice. The thermometer did not rise to freezing point till the 26th April, and the sun was seen again on the 7th January, after a night of two months' duration.

The conditions under which this intense cold was endured were such that it is a matter of surprise that the whole party did not perish outright. On the 29th April the mate Meiwald and three men arrived at the hut and found Numelin seriously ill and three of his companions dead, the fourth, the assistant-surgeon Chesnokof, having left in December for Cape Tolstoi, and having been probably devoured by wolves on the way. As soon as Meiwald and his three companions arrived they began to disengage the vessel from the weight of superincumbent snow. The 'Aurora Borealis' had suffered a good deal, and there was a foot and a half of water in her hold.

On the first of May they extricated her, but a few days after a snow-storm came on and buried her again. The ice on the river began to set in motion about the first days of June, and on the 6th the waters rose so rapidly and strongly that the little vessel was carried more than a verst and a half inland. The following day the whole party, with two dogs, were obliged to take refuge on the roof of their wretched dwelling hut, and here they remained for eight days, surrounded by the waters which rose to a height of fifteen feet above their ordinary level. The roof was only a foot above the surface of the water; the party had nothing but a little firewood and some provisions as stores, while they were in imminent danger of being swamped by a further rise of the waters, a contingency which induced them to secure a boat in case of being compelled to abandon their precarious perch.

As far as the eye could reach the surrounding country was all under water, and the hut where the seamen had taken refuge was in imminent danger of collapse; they were continually engaged in fending off the floating fragments of ice with poles; and for a week, during which time the 'Aurora Borealis' broke up, the entire party was in a state of great anxiety. The birds were completely at a loss where to alight; one perched on Meiwald's head and others on the dogs. On the 11th June the waters began to abate, and two days after Meiwald and his companions were enabled to descend into their hut, which had been entirely cleared out by the inundation. The following day a light smoke was seen on the horizon, and at eleven o'clock in the day the steamer 'Alexander,' with Captain Schwanenberg and a sailor on board, arrived.

Although Captain Schwanenberg found his men in such a state of destitution, he would not abandon his projected expedition, and after a great deal of trouble he succeeded in obtaining another vessel, also constructed at Yeniseisk, but smaller than the 'Aurora Borealis.' This new craft, the 'Dawn,' was 50 feet long by 14 feet wide; she was flat-bottomed, and drew only 2½ feet of water; she was most insufficiently provided with instruments, and actually had no chronometer on board, while the sounding line was only two fathoms long. The captain took with him two pilots, a sailor, and a cook. The Russian flag was hoisted, and on the 9th of August the 'Dawn' emerged into the Sea of Kara. On the 12th, the captain sighted White Island, which no one is known to have ever visited, and landing there planted the Russian standard and buried a bottle with an account of his visit written in Russian and English. On the island were seen numerous traces of reindeer and bears. The following day the 'Dawn' set sail for the Matochkin Shar, but the voyage was one of great difficulty owing to the prevalence of drift ice, the thickness of the fog, and occasional icebergs. Finding that the entrance to the Matochkin Shar was completely blocked, Schwanenberg made for the Straits of Kara, which he entered on the 18th August. Here a violent storm arose, and the force of the current would have driven the vessel on to the rock-fringed coast of Noyaya Zemlya, had it not been for the courage and coolness of Schwanenberg and young Numelin, who saved the vessel when destruction appeared inevitable.

On the 30th August the 'Dawn' cast anchor in

Vardö, and on the 19th October 1877 was towed into Cronstadt.

The chief obstacle to the opening up and more general utilisation of the maritime route between Siberia and Northern Europe, is undoubtedly the want of reliable surveys. The Bremen *Geographische Blätter* commends this pressing need to the attention of the Russian Government, but it appears to us unlikely that that Government will stir in the matter, although it is clearly to their interest to do so. In our opinion there is not a more promising field for a summer "Arctic Expedition" than these northern seas, and were our present ministry to sanction the despatch of a special surveying vessel to the Sea of Kara and the mouths of the Yenisei and Ob rivers, there can be no doubt that the results, both practical and scientific, would be inexpensively secured and of high value. A tolerably complete survey of the two river estuaries would not probably occupy more than a couple of seasons, and, besides the soundings of the various channels, much useful data would be acquired regarding the state of the ice, the currents, &c. The excessively high insurance rates, which now form a discouraging bar to trade, would naturally fall in proportion as the hydrography of the seas became better known and voyages more frequent, and the now pent up wealth of Siberia would find a natural outlet towards our shores, to the mutual advantage, both commercial and political, of England and Russia.

C. E. D. B.

#### THE DARIEN INTER-OCEANIC CANAL.

IN our number for April 1878 (p. 82) we gave some account of the surveys executed by Lieut. Lucien N. B. Wyse on the Isthmus of Darien, with a map. That officer has since presented a report to the International Commission, on his second visit to the Isthmus, with reference to an inter-oceanic canal. The following *resumé* of this report is taken from the *Panama Star*.

The commission arrived at Panama from San Nazaire on the 29th of November, 1877, and was almost immediately joined by Mr. Sosa, who had been named for the second time, the delegate of the Colombian Government, and Mr. L. Verbrugghe who arrived from Brazil by way of the Straits of Magellan. Mr. Lacharme was unable to join the expedition for several weeks, a delay which was improved by Lieut. Wyse in making a new survey of the Isthmus of San Blas, leaving here on the 6th of December and ascending the Bayano and its tributaries to the right of Mamoni. Neither Commanders Selfridge nor Lull had made exact studies of that route, except on the Atlantic side. There still existed doubts, notwithstanding the labours of Messrs. McDougald and Sweet, due to the generous action of Mr. Kelly, as to the length of the tunnel necessary for this line, which is undoubtedly the shortest between the two oceans. The Bayano in its upper portion cannot be utilised for a canal on account of its crooked course and the hardness of the rock in the neighbourhood, an objection which may be made also to Aguas Claras. From tide water in the River Teralbe, an affluent of the Bayano, at the point nearest the Atlantic, the

distance is less than 30 kilometres to the north coast. Mr. Wyse gives credit to the route traced and published according to the explorations of McDougald. Among unimportant defects the most important is that relative to the Salto, which he found a mile above the confluence of the Chararé and not below. In general the rocks of the valley of the Upper Mamoni are harder than those of the Darien south, and less compact than those of the Isthmus of Panama properly so called. Mr. Reclus ascertained that the direction of the valley of the Teralbe is satisfactory so far as the making of the open excavations are concerned, but the tunnelling would not be less than by the route of the Chararé. The tunnel between Nercalegua and Mamoni would be at least 16 kilometres long. Notwithstanding the difficulty and cost of this immense work—its only difficulty in fact—Mr. Wyse is of opinion that on account of the shortness of the entire route, and its many advantages in other respects, any International Commission formed to decide on the course of the canal, should seriously consider its advantages. The length of the tunnel on the Tiati-Acanti route will be somewhat less than *viâ* San Blas. The Commission returned to Panama from this labour, and on the 29th of December departed for the Southern Darien, and on January 8th entered the River Tiati. A track was here opened in a right line to the stake No. 1091 *bis*, planted by the expedition of the preceding year.

Mr. Wyse left Mr. Reclus in charge of this work, and returned to Aspinwall with Mr. Verbrugghe to await Admiral Maudet, chief of the French squadron in the West Indies, who had formerly promised, with one or more vessels, to assist in the hydrographical survey of the anchorage at Acanti and determine its merits. The Admiral, however, could not come personally, but afterwards sent the steamer 'Du Petit Thouars.' Until the arrival of this vessel Mr. Wyse occupied himself and associate in the examination of the valleys of the Rio Grande, Pedro Miguel, and of the Caimitillo, traversed by the Panama railroad, and several localities in the neighbourhood of the route proposed by Garella in 1843. On the 4th of February he embarked in the 'Du Petit Thouars' for Acanti, examining the coast carefully on the way. With very slight differences the old Spanish charts were found to be correct. Acanti has a good anchorage, a break-water can easily be made from the rocky point at its northern entrance, which would make a well-sheltered harbour of 30 hectares, or about 85 acres. Between the Bay of Caledonia and the Atrato, Acanti is the only place where it is possible to make a sheltered port. On his return from the survey of Acanti, Wyse met his party at Panama, who had concluded their labours on the Darien, and immediately directed attention to the survey of the various routes proposed by Garella, Hughes, Totten, Lull and Menocal, on the Isthmus of Panama. Mr. Garella had proposed a canal which should terminate to the west of Panama, and which should have thirty-five locks and one tunnel of 8 kilometres, while Messrs. Lull and Menocal had proposed—with but little enthusiasm, however—a canal which should be fed by the Chagres, and would have twenty-five locks. At the conclusion of these various studies, Messrs. Wyse and Verbrugghe visited Nicaragua and passed over the route projected there. On the 1st of July he embarked for California, *en route* for

Paris, stopped on the way at Washington, where he had the honour of interviews with Admiral Ammen, Commodores Patterson and Franklin, Professor Nouise, Commanders Lull and Selfridge and Mr. Menocal, all of whom had taken part in canal surveys at various points. Mr. Wyse sums up the various routes proposed and advises that an Inter-oceanic Commission should be called by M. de Lesseps to decide which is preferable. He argues that the project is now sufficiently ripe for action on the part of Governments desiring to take part in the great work. The routes mentioned are six in number, as follows:

In Colombia—(1) That of Choco, with locks and a tunnel, *viâ* Atrato-Napipi, surveyed by Selfridge.

(2) The Southern Darien, Atrato-Cacarica-Iuira, locks and a tunnel, surveyed by the International Commission.

(3) The Southern Darien, Acanti-Tiati-Tapisa Chucunaque, on a level, with one tunnel, surveyed by the International Commission.

(4) The Western Darien, San Blas-Bayano, on a level and with a tunnel, surveyed by McDougald, Selfridge and the Commission.

(5) Panama: Colon-Chagres-Panama, with locks by Lull. Colon-Chagres-Rio Grande-Panama, on a level, with a tunnel, by the International Commission.

(6) In Nicaragua, San Juan del Norte—Brito, with locks, surveyed by Childs and Lull.

Lieutenant Wyse acknowledges his indebtedness to Presidents Correo and Aizpuru for the unequivocal expressions of sympathy and good will which they manifested towards the expedition, and also to Commander Maquay of Her Majesty's ship 'Fantome' for kindness and courtesies offered by him.

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## Reviews.

### THE TRANSVAAL OF TO-DAY.\*

IN our number for February 1873 (p. 34) we gave an account of the Delagoa Bay sovereignty question, which was so unwisely submitted to arbitration. This paper was illustrated by a map. Our number for February 1877 (facing page 27) contains a more accurate map of the South African Republics, with statistics of areas and populations. In reviewing the handbook by Mr. Silver, and the pamphlet on South Africa by Mr. Campbell Johnston, in our number for November 1877 (p. 299), we furnished particulars respecting the physical geography and history of the Transvaal Republic, and stated the pretexts on which this State was annexed by Sir T. Shepstone on the 12th of April 1877, in spite of the solemn recognition of its independence by the British Government on the 17th of January 1852.

The pretexts for the annexation of the Transvaal Republic were identical with the pretexts for the partition of Poland. It was alleged that the Transvaal Republic was dangerous to its powerful neighbour, owing to her internal weakness and discords; that

her Government could not preserve order, and that it was unable to cope with Kafir encroachments. It was added that the Boers were cowards and slave-owners, and that the majority of the people desired annexation.

Mr. Aylward, in the very interesting work now before us, brings these assertions to the test of fact. He proves that the Transvaal Republic was not in the condition that was alleged as a pretext for annexation, and that her Government was not only able to cope with the Kafir revolt, but had actually suppressed it. He refutes the calumnies respecting the Boers, showing that their retirement from the frontier in the summer, which was imputed to them for cowardice, was a necessity in order to save their horses; and that they are not slave-owners. He also exposes the inaccuracy of the statement that a large proportion of the inhabitants of the Transvaal desired annexation. The great majority of the Boers did not desire it.

The annexation of Transvaal has exasperated the Boers, injured the natives, and thrown the whole country into a state of anarchy.

The assembled Volksraad of Transvaal, and the executive Government of the Republic, solemnly protested against the annexation on April 11th, 1877, at the same time acknowledging that the Republic was unable to maintain the right and independence of the people with the sword, against the superior power of Great Britain. The Government, however, resolved to send a commission of Delegates to Europe to lay the desires and wishes of the people before Her Majesty's Government. The commission consisted of Dr. Jorissen, the Attorney-General, and S. J. P. Kruger, the Vice-President of the Republic. The efforts of the Delegates were unavailing, and then a petition was signed by upwards of 6600 qualified electors of the Republic, entreating the English Government to restore to them their liberty and their country. This protest was answered by an arbitrary proclamation dated March 11th, 1878, threatening to bring "to justice the seditious agitators who have endeavoured to mislead the people." The document is such an one as might be found among the archives of Russian Poland; but it is not in keeping with the traditions and the usages of a free country.

Nevertheless, the people of Transvaal once more appealed to the justice of England, deputing Mr. Kruger and Mr. Joubert to submit, on their behalf, their solemn protest signed by thousands of the citizens. They represented that the instructions to Sir T. Shepstone enjoined him not to proceed to the extreme measure of annexation unless the inhabitants or the legislature desired to become British subjects. They then submitted a resolution of the Volksraad of the Republic, dated February 22nd, 1877, calling upon the Executive to maintain the independence of the country; a resolution of the Executive Council, dated April 11th, protesting against the annexation; the protest of the President of the Republic; and a memorial in support of the protest signed by 6591 out of the 8000 electors, and dated January 7th, 1878. They further submitted that the petitions in favour of annexation represented a very small proportion of the inhabitants of the country, were got up after the annexation, and were signed by traders and gold diggers (about 1350 in number), and not by the

\* *The Transvaal of To-day: War, Witchcraft, Sport, and Spoils in South Africa.* By Alfred Aylward, Commandant Transvaal Republic; Captain (late) Lydenberg Volunteer Corps. (Blackwood, 1878), 8vo, pp. 428 and map.



6650 farmers upon whom is laid the task of supporting the State by the produce of their farms, and upon whom devolves the duty of defending the country or fighting for its rights. The other allegations of Sir T. Shepstone are ably met and refuted, and the memorial concludes with an earnest prayer to the British Government to restore to the country the independence which was guaranteed by the Convention of 1852.

These documents establish the lawless injustice of the annexation, and we think that every reader of Mr. Aylward's book will be convinced of its impolicy. If ever people deserved their independence, these people are the Boers of South Africa. They have sought it in the wilderness, they have endured hunger and sufferings of all kinds for it, they have fought gallantly for it, they have proved that they deserve it by the practice of those virtues which in all ages have been recognised as titles to freedom, and they finally won it by a Convention which the British Government ratified and ought not to break.

Mr. Aylward introduces his readers to the inner life of the Boers, and recounts their famous wanderings, the bravery of the men, and the heroic conduct of the women, describing their domestic habits, their occupations, and their hospitality. He also gives an account of the Kaffirs and of the chief Secocoeni, of the operations of the Lydenberg Volunteer Corps, and of the resources, the superstitions, and the sports of this part of South Africa. Finally, he tells the story of the annexation. The worst part of this story is that even the pledges voluntarily made in the annexation proclamation have been broken. A promise was then given that the Constitution of the Republic should be continued, that its laws should be maintained, and its pledges fulfilled. Sir T. Shepstone found the Volksraad in session. Without any authority he dissolved that body, and has since governed the country without the pretence or form of constitutional support. It is now eighteen months since the Volksraad last sat; and to this lawless rule is to be attributed the discontent, impoverishment, and ruin of the country.

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### PHYSICAL GEOLOGY AND GEOGRAPHY OF GREAT BRITAIN.\*

THE demand for the publication of a fifth and greatly-enlarged edition of Professor Ramsay's *Physical Geology and Geography of Great Britain* is a practical recommendation of this valuable work. The most important feature in the additions is an account of the British formations, showing their topographical range, lithological characters, and the general nature of their fossil remains. As stated by the author, this part of the work constitutes a condensed manual of British stratigraphical geology from the Laurentian to the latest Pliocene strata, and coming from such an authority as Professor Ramsay, aided by Mr. Etheridge in the palæontological sections, we may

\* *The Physical Geology and Geography of Great Britain.* By A. C. Ramsay, LL.D., F.R.S., Director-General of the Geological Surveys of the United Kingdom. (Stanford, 1878.)

rest assured that as a text-book of British geology it is unsurpassed.

To geographers remembering Murchison's saying that "Being a geologist I am an ancient geographer," the most interesting feature in the book is where the writer endeavours to give us an idea of the physical geography of Great Britain at the close of each successive geological epoch. No one can write with higher authority on this subject than Professor Ramsay, and no one can rise from the reading of those portions of his work without realising to a greater or less extent the theory of Hutton, "that, in the known geological history of the world, the course of events has never been disturbed by universal paroxysmal catastrophes, but that the course of change has been similar to that of the existing economy of nature."

Instructive as are Professor Ramsay's descriptions of the physical geography of Great Britain at the close of the successive epochs of the Palæozoic, Mesozoic, and Cainozoic periods, we must admit that our chief interest centres in the chapters devoted to the glacial epoch. In them the writer appears in his element, his intimate acquaintance with the glacial evidences in the highlands of Scotland, Cumberland, and Wales enables him to grasp each topographical detail, and weave them into one harmonious whole. "The general result has been that the whole of the Regions of Britain mentioned have literally been *moulded by ice*—that is to say, the country in many parts was so much ground by glacier action, on a continental scale, that, though in later times it has been more or less scarred by weather, enough remains of the effects to tell to the observant eye the greatness of the power of moving ice. Suddenly strip Greenland of its ice-sheet and it will present a picture something like the greater part of Britain immediately after the close of this glacial period."

In a chapter full of interesting details, Professor Ramsay vigorously urges his theory, that moving ice has been the origin of certain lakes—for instance, the lakes and fiords of the Western Highlands of Scotland, the Lake of Geneva, the lakes of Lucerne, Zug, the Wallen See, Zurich, and Constance, and to those who are conversant with the glacial phenomena of the Arctic, Antarctic, and Alpine regions of the globe it would appear that the author has not over-estimated the denuding powers of ice. The concluding chapters, on soils, the relation of the different races of men to the geology of the country, and the industrial products of the different geological formations of Great Britain, contain a vast amount of geological information, condensed and brought down to the latest date.

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**Statistics of Chief Cities and Towns of Europe.**—A statistical paper of considerable interest has been compiled by M. F. R. Von le Monnier for the *Mittheilungen of the Vienna Geographical Society*. It consists of a series of tables giving the number of cities and towns with upwards of 20,000 inhabitants in the various countries of Europe, and supplementary tables showing the total and the relative number of these in the different countries, as well as less detailed tables showing the total number of towns with 2000 inhabitants and upwards.

# Log Book.

## The Seal and Whale Fishing for 1878.—

This has been a most unlucky year for the whaling fleet, and the yield is smaller than in any previous season for the last ten years. The vessels engaged were as follows :

- |                                  |                                      |
|----------------------------------|--------------------------------------|
| 1. 'Arctic' (Capt. Adams).       | 9. 'Victor' (Capt. Adams).           |
| 2. 'Aurora' (Capt. Bannerman).   | 10. 'Ravenscraig' (Capt. West).      |
| 3. 'Esquimaux' (Capt. Yule).     | 11. 'Erik' (Capt. Walker).           |
| 4. 'Camperdown' (Capt. Gravill). | 12. 'Active' (Capt. Fairweather).    |
| 5. 'Polynia' (Capt. Kilgour).    | 13. 'Harald Haarfager' (Capt. Brün). |
| 6. 'Intrepid' (Capt. Nicoll).    | 14. 'Jan Mayen' (Capt. Deuchars).    |
| 7. 'Narwhal' (Capt. M'Lennan).   | 15. 'Mazanthein'.                    |
| 8. 'Nova Zembla' (Capt. Grey).   |                                      |

In 1877 the experiments were made by Messrs. Alex. Stephen & Son of sending the 'Arctic' and 'Aurora' to the Newfoundland seal fishing, and owing to the success of that enterprise the Dundee Seal and Whale Fishing Company resolved to send the 'Esquimaux' and the 'Narwhal' to the fishing last season. The catches at Newfoundland and Greenland are as follows :—

NEWFOUNDLAND.			GREENLAND.		
	Seals.	Tons.		Seals.	Tons.
'Arctic'	34,100	450	'Camperdown'	150	2
'Aurora'	12,000	200	'Polynia'	65	1
'Esquimaux'	3700	50	'Intrepid'	3600	48
'Narwhal'	700	10	'Jan Mayen'	7800	80
			'Nova Zembla'	5000	68
	50,500	710	'Ravenscraig'	3846	50
			'Erik'	4600	55
			'Active'	4100	56
			'Harläd Haar-fager'	4500	45
				33,661	405

The total catch at both fishings is thus 84,161 seals, calculated to yield 1,115 tons of oil. The catch in 1877 at both fishings was 80,130 seals, yielding 1129 tons of oil. This year the catch of seals has been greater by 4031 seals, but the produce of oil is 14 tons less. Taking the value of seal oil at 50*l.* per ton, including the skins, the total value of the catch this year is 55,750*l.*, or 700*l.* less than last year.

The following shows the result of the whale fishing at Davis Straits, the whole of the vessels at the seal fishing, excepting the 'Nova Zembla' and 'Harald Haarfager,' taking part in it, and in addition the 'Victor' and 'Mazanthein':—

	Whales.	Tons Oil.	Tons Bone.	
'Arctic'	1	17	1	'Esquimaux,' clean.
'Jan Mayen'	2	40	2	'Camperdown,' lost.
'Polynia'	1	17	1	'Intrepid,' clean.
'Narwhal'	1	20	1	'Victor,' clean.
'Aurora'	1	18	1	'Ravenscraig,' clean.
				'Erik,' clean.
				'Active,' clean.
	6	112	6	'Mazanthein,' clean.

The whale oil and bone of this year's yield is valued at 10,080*l.* being 77,390*l.* less than 1877. The total value of both the seal and whale fishing is 65,830*l.* as against 144,920*l.* for 1877.

For the sake of comparison, we give the results of the seal and whale fishing for the last ten years :—

SEAL FISHING.							
	Ships.	Seals.	Tons.		Ships.	Seals.	Tons.
1869 ...	11	45,600	480	1874 ...	11	45,742	576
1870 ...	9	90,450	870	1875 ...	12	45,395	450
1871 ...	9	65,485	648	1876 ...	11	53,776	578
1872 ...	11	40,621	420	1877 ...	14	80,130	1129
1873 ...	11	25,594	265	1878 ...	13	84,161	1115

## WHALE FISHING.

	Ships.	Tons.	Tons Bone.		Ships.	Tons.	Tons Bone.
1869 ...	10	140	7½	1874 ...	9	1285	65
1870 ...	6	760	40½	1875 ...	12	752	40
1871 ...	8	1165	61½	1876 ...	13	891	44
1872 ...	10	1010	54	1877 ...	14	983	44½
1873 ...	10	1352	69	1878 ...	13	112	6

There was an extraordinary accumulation of ice in Melville Bay, and none of the whalers succeeded in reaching the "North Water." We regret to have to record the total loss of the 'Camperdown,' commanded by Captain Gravill, who had been many seasons in her, among the ice. Captain Gravill's father, who commanded the 'Diana' when Sir Leopold McClintock went up in the 'Fox' in 1858, lost his life in this perilous service.

The whaling fleet left Dundee about 2nd May, and the ships had fine passages out, falling in with the ice at Hare island (the north end of Disco). No open water was seen from there, but the ships forced a passage—some of them as far north as Willcox Point. South-west winds were continuous, blocking up Melville Bay with large quantities of very heavy ice, which the fleet was unable to penetrate, the ice being heavier than it had been for many years. Seeing no chance of getting through Melville Bay this season ; all the vessels returned south, in the hope of getting round the tail of the ice to the west side of the straits. By the 17th of July most of the fleet had succeeded in reaching the west side, and proceeded north as far as Lancaster Sound, but unfortunately too late for the fishing. The 'Arctic' went up Prince Regent inlet early in August, and there got one whale. The rest of the fleet dodged about in the vicinity of Cape Kater, and the 'Camperdown,' 'Narwhal,' 'Polynia,' and 'Aurora' got one whale each, while the 'Jan Mayen' got two whales. The 'Camperdown' was severely damaged amongst the ice, and had to be abandoned in Exeter Sound on the 10th of October, the crew being brought home by the other ships. Seeing no prospect of adding to the catch, the fleet bore up for home on the 13th October. The 'Erik,' however, went south to Cumberland Gulf, but meeting with no success there, she also bore up for home on the 19th October, and the fleet has now all arrived at Dundee.

**Turfan in 1878.**—According to the *Turkestan-skiya Viedemosti*, Turfan contains 10,000 inhabitants, chiefly Sarts and a few Dungans and Chinese, and can be reached from Kuldja, *via* Shikho, Manass, and Urumchi in eighteen days, reckoning 40 versts as a day's march. Formerly, *i.e.* during the Chinese rule of the Ili district, the direct route was through the Yolduz pass, being much shorter, namely thirteen days. Turfan itself has no flowing stream, and the water for irrigation purposes is derived from wells. The summer is exceedingly hot, particularly in June and July, when the inhabitants are obliged to prolong their *siesta* till late in the afternoon. The buildings in the town, as well as in the environs, are mostly of clay, near to which there are cavities, made to shelter the inhabitants in the time of great heat. Rain is very scarce, and snow almost unknown.

The population is chiefly engaged with horticulture, agriculture, and particularly with the production of cotton. The gardens produce peaches, pomegranates,

grapes, apples, pears and plums, whilst cotton sown in open field is collected three times a year. The cotton plant reaches a height of about four feet and a half. The first growth of the cotton is in quality inferior to that of Bokhara, the second is still worse, and the third is scarcely equal to that produced in the south of the Kuldja district. Up to the time of the Dungan rebellion, cotton was exported to the interior of China; under Yakub Beg it went to Aksu and Urumchi, although in a limited quantity, for the greatest part was worked up for home use. The prices then were, for one pud, 2 roubles and 70 kopecks of the first growth, 2 roubles 10 kopecks of the second, and 1 rouble 90 kopecks of the third growth, which have, however, after the Chinese conquest, greatly risen, amounting now to 6 roubles the first, 4 roubles 80 kopecks the second growth (one pud). This extraordinary rise is chiefly due to the recent export to the north-western frontiers of China, which was impossible during the rule of the late Amir Yakub Khan, and to the increasing wants of the Chinese army.

The imports to Turfan from Shikho and Manass consist chiefly of chintzes bought in Kuldja at 15 and 16 kopecks the arshine, and sold for 20 and 25 kopecks. As for the rest, the production of cotton in Turfan, Lyuk-chun, and the environs was never of a considerable extent, for the export of former times to the interior of China came not only from Turfan, but also from Kucha, Aksu and Uch-Turfan, where cotton is much cultivated and sold from 7 roubles 70 kopecks to 5 roubles 20 kopecks the pud. Trade here is now, as everywhere in Eastern Turkestan, at a standstill, owing to the continual depredations of the Chinese soldiers and to the unruly state of the country. The Lin-Sho-Darin, the Chinese Viceroy of Eastern Turkestan, is now engaged in appointing civil officials, amongst whom a good number of Sarts will be found, who are already letting their hair grow (*viz.* the tail), and are anxious to get the distinction of coloured buttons. Turfan is garrisoned by 1000 soldiers.—(A. V.)

**Mr. A. Keith Johnston's Expedition.**—This enthusiastic young geographer and traveller left England in November 1878 to explore the country between the east coast of Africa and the northern end of Lake Nyassa. The Committee of the African Exploration Fund could not have selected a man more admirably fitted for the work. The son of an illustrious geographer, young Keith Johnston has inherited his father's love for the science, and he unites the qualifications of a skilled draughtsman and geographical student, with experience as a traveller and explorer. During 1874-75 he was in Paraguay, and the valuable results of his work consist of an article in our number for July 1875 (p. 201), of an exhaustive paper read at the Bristol Meeting of the British Association and printed in our numbers for September, October and November 1875 (pp. 264, 308 and 342), and of a map of Paraguay, on which his own field work is combined with that of Azara, Page, Dugraty, Mouchez, and Wisner. As we announced in our September number, Mr. Keith Johnston will start from the end of the caravan road now being constructed by a party of English engineers from Dar-es-Salaam (25 miles south of Zanzibar),

and direct his course to the northern end of Lake Nyassa. It is rare that such high geographical qualifications have been united in an African traveller, and we may, therefore, anticipate most valuable results from his labours.

**Marno's Journey in Eastern Africa.**—Herr Marno contributes to the *Vienna Geographical Society Mittheilungen*, an account of his journey made in January, February and March last, from Zanzibar to Saadami, on the African coast, and thence inland to a place called Koa-Kiorra, situated 283 kilometres distant, on the route followed by Cameron and Stanley. The greater portion of his route, however, lay to the north of the route followed by the other two travellers. He describes the country as rising gradually to the westward, and many tracts as being well cultivated with maize, tobacco, and occasionally bananas, although the natives are naturally averse from doing anything but the minimum amount of agricultural labour requisite. Fields of sugar-cane, capsicum and other crops were found near the western limit of their journey. Herr Marno gives a complete itinerary and survey of his route, and series of height and meteorological observations, which have been described by Dr. Hann, the well known meteorologist, as very complete and valuable.

**The American Survey of the Amazon.**—This new survey was announced in our number for September 1878 (p. 230). The steam sloop 'Enterprise' returned to Brooklyn navy-yard last October, after an absence of five months. Her commander, Thomas O. Selfridge, who was in command of the Darien Survey Expedition in 1871-72, reports that a complete range of soundings was taken daily at five minutes' intervals. The survey extended from the mouth of the Amazon to the falls of the Madeira. For a distance of 500 miles the Madeira was found to be navigable for vessels drawing 20 feet. But, as Mr. Chandless pointed out at p. 300 of our last number, the above was a mere running survey—the work of a few weeks—and adds nothing to the information furnished in the admirable maps of the River Amazon executed after surveys by the Brazilian Frontier Commission.

**Death of General Mosquera.**—We regret to have to announce the death of General Tomas Cipriano de Mosquera, a veteran of Columbian Independence, and an ardent geographer. He was one of the founders of the Republic of Columbia, and was President from 1844 to 1848, from 1861 to 1864, and again in 1866. During his administration, the new Columbian Constitution of May 8th, 1863, was proclaimed, by which Presidents hold office for two years. He also separated the Church from the State, and destroyed the influence of the priests in political affairs. He died almost suddenly at his estate of Coconuco, in the State of Cauca, on October 7th, 1878, in his eightieth year. As a geographer, General Mosquera is known to us through his work, *Memoria sobre la geografia, fisica y politica, de la Nueva Granada*, published at New York, with a map, in 1852, and translated into English in 1853. When he came to England as Minister for the United States of Columbia in 1865, he was an attendant at the meetings of the Geographical Society. On April 24th, 1865, he dined with the Geographical Club, and his

health, proposed by the President, Sir Roderick Murchison, was very warmly and cordially received.

**Earthquake in San Salvador.**—There has been a severe earthquake in the Republic of San Salvador, in Central America. At 6 p.m. on the 2nd of October the village of Jucuapa, in the southern department of Usutlan, was nearly destroyed, many families being buried in the ruins. The towns of Guadalupe, Nueva Guadalupe, Chinameca, Usutlan, the Caseria del Arsenal, and Santiago de Maria have also suffered more or less, the latter being entirely ruined and some lives lost. The shock which produced the greatest damage was at first a kind of oscillatory movement which lasted over 40 seconds, and terminated in what felt like a general upheaval of the earth, so violent that solid walls and arches, and strongly-braced roofs, were broken and severed like pipe stems. The movement proceeded from the south-west to the north-east. It was supposed to proceed from the volcano of Tecapa, which is reported as being in conflagration. The district that has been devastated is one of the most-thickly settled portions of the Republic. The people devote themselves to the cultivation of indigo, sugar-cane, and tobacco. They are industrious and thrifty, and many of them were in very comfortable circumstances.

## Correspondence.

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### THE KULDJA QUESTION.

FROM THE RUSSO-CHINESE FRONTIER.

To the Editor of the "GEOGRAPHICAL MAGAZINE."

SIR,—In your last number I see a paper on the Kuldja question, in which the state of affairs between China and the Russian Government is correctly though briefly explained. The claim of the Chinese, with reference to the restitution of Kuldja (which the Government of St. Petersburg has pledged itself to surrender as soon as the pacification of Eastern Turkestan ensures quiet on the Russo-Chinese frontier) is also stated. It may, therefore, be interesting to your readers to have a somewhat more detailed account of that transaction, respecting which we are now enabled to publish the following details:—

It was on the 19th July that the Embassy sent by the Tzin-tzan-tzyen—*i.e.* the Chief Commander of the Chinese troops in Kashgar, consisting of the Commandant de Corps, *On-khua-ti*; of the Commander of the Elder Regiment, *Hei-khun-lyan*; and of the Intendant of the Tchili province, *Littri-syen*—arrived at Vernöe, bearing two letters in reference to the extradition of Bye-yan-kho, a fugitive rebel, and to the surrender of Kuldja. Both letters were addressed to General Kalpakoffsky (almost literally translated), and run as follows:—

(The first letter). "Kuldja has always been our frontier. Formerly, in the 10th year of the rule of Tuntch-shi, your respectable Governor made to us the communication that you take upon yourself the obligation of surrendering Kuldja, and in that sense you wrote to our Ministry for Foreign Affairs. For this open-heartedness the Imperial Government is thankful to you. Besides this, others will thankfully acknowledge the act of surrender. The Dzian-tzun-shun has been unable to come forward hitherto with this business, in consequence of the unruly state of the country; but now the time has come for doing so, as, under the happy auspices of our Emperor, our soldiers have been victo-

rious, many towns have been taken, and order and tranquility have been established on our frontier. Therefore the question has been raised in the letter of Tzo-tzun-tan; and you are invited to regulate with us the conditions of the surrender of Kuldja, so that on his arrival the act of re-occupation may proceed smoothly."

(The second letter). After the usual salutations: "You will know that Bai-yan-khu, a leading chief of the rebellion, has succeeded, during the last winter, in escaping into your territory, where he has settled in Tokmak; in consequence of which the Dungan Mahmud (Mamut) has been sent with a letter to you. In your answer, respectable Governor, you said that you are unaware whether the said man is a rebel or not; you pretended to see in him a man escaping from danger, and therefore you accorded to him a reception. Well, since the Tzo-tzun-tan gives you clearly to understand in his present letter that Bai-yan-khu is actually a rebel, you, respectable Governor, must feel the obligation to deliver up that man, in order to strengthen the friendship of the two Empires. This is the more incumbent as our mutual treaties clearly state that every Russian subject, who lives either voluntarily within the Chinese territory, or who is a fugitive, will be delivered up when claimed; and, further, there is a stipulation in the treaty of commerce between Kuldja and Tarbagatai, that the transgressors of both sides cannot be retained, but must be delivered to the respective authorities. It is obvious, therefore, that you, respectable Governor, ought to have remitted to us, a long time ago, the said Bai-yan-khu, for the sake of friendship and a good understanding between the two Empires. This is the reason for which we have been sent, and in the fulfilment of which we hope to receive a satisfactory answer."

Such is the wording of the Chinese letters. The answer given by General Kalpakoffsky during the receptions on the 21st and 29th July, was to the effect that although this matter has been brought to the notice of the Russian Ambassador in Peking, still he (*i.e.* the General) must remark that so long as the Russian claims are not complied with, the question of the surrender of the Ili valley to the Peking Government cannot be entertained; and as regards Bai-yan-khu, that man not being looked upon as a thief or a fugitive on Russian territory, cannot be delivered up in accordance with the Russian laws. It was upon this that the Chinese Embassy left Vernöe after a sojourn of thirteen days, which passed off pretty well, as the envoys were invited to various festivities and amusements.

In connection with the above, we have been favoured with a few particulars respecting the military and civil administration of Eastern Turkestan, at the head of which is the Viceroy Lin-sho-Darin, who commands an army, amounting to 8000 or 10,000 men, encamped chiefly between Kashgar and Yenghi-Shahr, the soldiers living mainly upon the inhabitants. Each house has to pay monthly from 1 to 10 roubles, and must furnish besides all kind of victuals and a certain number of hands for public constructions, such as fortresses, walls, houses for the officers, and a large pagoda. Acts of cruelty and of gross injustice are of daily occurrence, whilst complaints are unheard and redress impossible. In the meantime all commercial movements are strictly forbidden, for the Lin-sho-Darin has issued an order forbidding the export of articles from Eastern Turkestan to Russian Central Asia under the heaviest penalties, and that foreign (*i.e.* Russian) subjects must leave the country within fifteen days, or become Chinese subjects. Judging from the details before us, the frontier question between China and Russia is getting more embroiled from day to day, and a *casus belli* will easily be found as soon as it suits the politicians on the bank of the Neva.

I am, &c.,

A. VAMBERY.

## Proceedings of Geographical Societies.

### FRENCH GEOGRAPHICAL SOCIETY.

October 16th, 1878.—M. DE QUATREFAGES in the chair. The President referred to the death of M. Le Baron Nau de Champlonis, M. Anthelme Thozet, at Rockhampton, in Queensland, and Dr. Petermann. A letter was read from the Vice-President of the German African Society, announcing the departure of two expeditions to Central Africa during the ensuing month. These two expeditions propose to explore the basin of the Congo, one starting from Loanda and journeying in the direction of Mussumba and the other making for Adamaua and Wadai. Following these two lines of advance, the explorers will then converge towards the Congo. The southern expedition will be commanded by M. Max Buchner, a gentleman of geological and zoological acquirements, who will first proceed to Mussumba, and thence onward to Nyangwe, which he will make his base of operations. The northern expedition will be entrusted to M. Gerhard Rohlfs, who will be accompanied by Dr. Sseener. These gentlemen will start from Tripolis to Wadai, the Sultan of which appears to be well disposed to Europeans, according to Dr. Nachtigal. From Wadai the travellers will make for the Shari, and, if possible, from thence for the Congo. The exploration of the water-parting of the Shari, the Congo and the Ogowai being the most important geographical problem still awaiting solution, full liberty of action is reserved to M. Rohlfs to do as his judgment suggests.

Dr. CREVAUX announced by letter his return to Cayenne on the 29th July last.

The MINISTER FOR FOREIGN AFFAIRS informed the Society of the departure of the Abbé Debaize from Bagamoyo in the beginning of August, accompanied by a caravan of upwards of 400 men.

After M. MANNOIR had read an obituary notice of the late Dr. Petermann, a letter was read from M. E. ANSART, civil engineer, dated the 12th June, from a point on the eastern shore of Costa Rica. This gentleman is occupied in making a survey and clearing the site for a railroad which is to start from Port Lemon, on the Atlantic, and to go inland. The central plateau, where San José is situated, and where coffee is extensively grown, is separated from the Atlantic by a chain of volcanic mountains, the highest of which, called Fraza, is 10,660 feet high. The slopes of these mountains are very steep, and the rivers which course down its sides flow in very deep fissures with perpendicular sides, often 600 feet in height, making a railway across them a matter of extreme difficulty. This belt of country is covered with virgin forests, the trees of which attain a height of close on 200 feet and 20 feet in diameter. M. Ansart's working party consists of 400 men, under the direction and command of General Quesada. One hundred of these form an advance guard, under M. Ansart's immediate supervision; twenty-five cut a passage for the visual ray of the theodolite, a like number enlarge the path, and 50 more following fell all trees within a path of 13 feet width. The main body of the party, 300 men strong, enlarge the roadway to a breadth of rather more than 30 yards, and clear it thoroughly, so as to admit of the sun drying up the natural moisture of the ground. The stores are carried on mule-back.

The country is described by M. Ansart as remarkably healthy, not a single case of fever having occurred in his camp. Dysentery, however, is common (though not of a fatal character), and is chiefly attributable to dampness and to the poorness of the food. The party are generally lulled to sleep by a torrent of rain which falls as a rule some time after sunset and lasts about two hours.

This concluded M. Ansart's letter and after a lecture from M. Deloncle, of the Lyons Geographical Society, the meeting adjourned.

### IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

October 11th (23rd).—M. P. DE SEMENOF, Vice-President, in the chair. H.I.H. the Grand Duke Constantine was present, this being the first meeting after the recess.

M. SREZNEVSKY, the Secretary, referred to the loss of several corresponding and ordinary members, among whom were the late Dr. Petermann, M. Stubendorff and others. He also gave, in his monthly report, a complete account of Baron Aminof's examination of the water-parting between the Ob and the Yenisei rivers. Having arrived at Yeniseisk towards the close of April, he descended the Ket river on the 13th of May, and after reaching the confluence of the Ozerna, ascended the latter river, the Lomovat and the Jazeva, and on the 21st reached the marshes intervening between the Ob and Yenisei. After making a *portage* for a distance of 3½ versts, the expedition reached the Kass lake, and thence made their way down the Great and Little Kass rivers to the Yenisei. A line of levels was commenced from the confluence of the Ozerna to that of the Great Kass. The only real obstruction in the way of navigation appear to lie in the Jazeva and the upper part of the Little Kass, which are very narrow and sinuous. The Baron considers that it may be necessary to construct locks in order to render the rivers navigable during all seasons, but the general practicability of the scheme can hardly be decided till the levels have been completed. He expected to finish the work of the expedition about the beginning of October, when the rivers are frozen.

An account was given of M. Poliakov's ethnological researches in the valley of the Oka. This gentleman has found a large number of stone implements of various shapes, belonging to the neolithic period side by side with bones of animals of the present age. He also found some prehistoric structures made out of large trunks of oak, &c., and bearing some similarity to lacustrine habitations. The most interesting discovery was made near the village of Karacharof, and consisted of a profusion of mammoth, rhinoceros, and *Bos primigenus* bones, and some common flint implements of the palæolithic age, found in a stratum of subsequent date to the glacial period. After completing these researches, M. Poliakov undertook a tour through the greater part of Europe to make a study of the stone implements in different museums.

M. Smirnov had finished his magnetic observations at the mouth of the Petchora, thus completing the whole series of magnetic observations over the whole extent of Russia in Europe. M. Meddendorff's journey to Turkestan for the purpose of studying its agricultural conditions had been highly successful, and he had returned to St. Petersburg leaving M. Smirnov to study the fruit of the country. In the Arctic regions, M. Tratchin had started for Novaya Zemlya with the object of studying the natural history of the country, and M. Nordquist had joined Professor Nordenskiöld's expedition from Europe to Behring Straits.

The Society has commemorated the fiftieth anniversary of the Berlin Geographical Society by the foundation of two Medals, one in memory of Humboldt and the other of Karl Ritter. The first of these two will be awarded every five years for the highest geographical achievement, and this year has been given to Colonel Prejevalsky for his exploration to Lob-Nor.

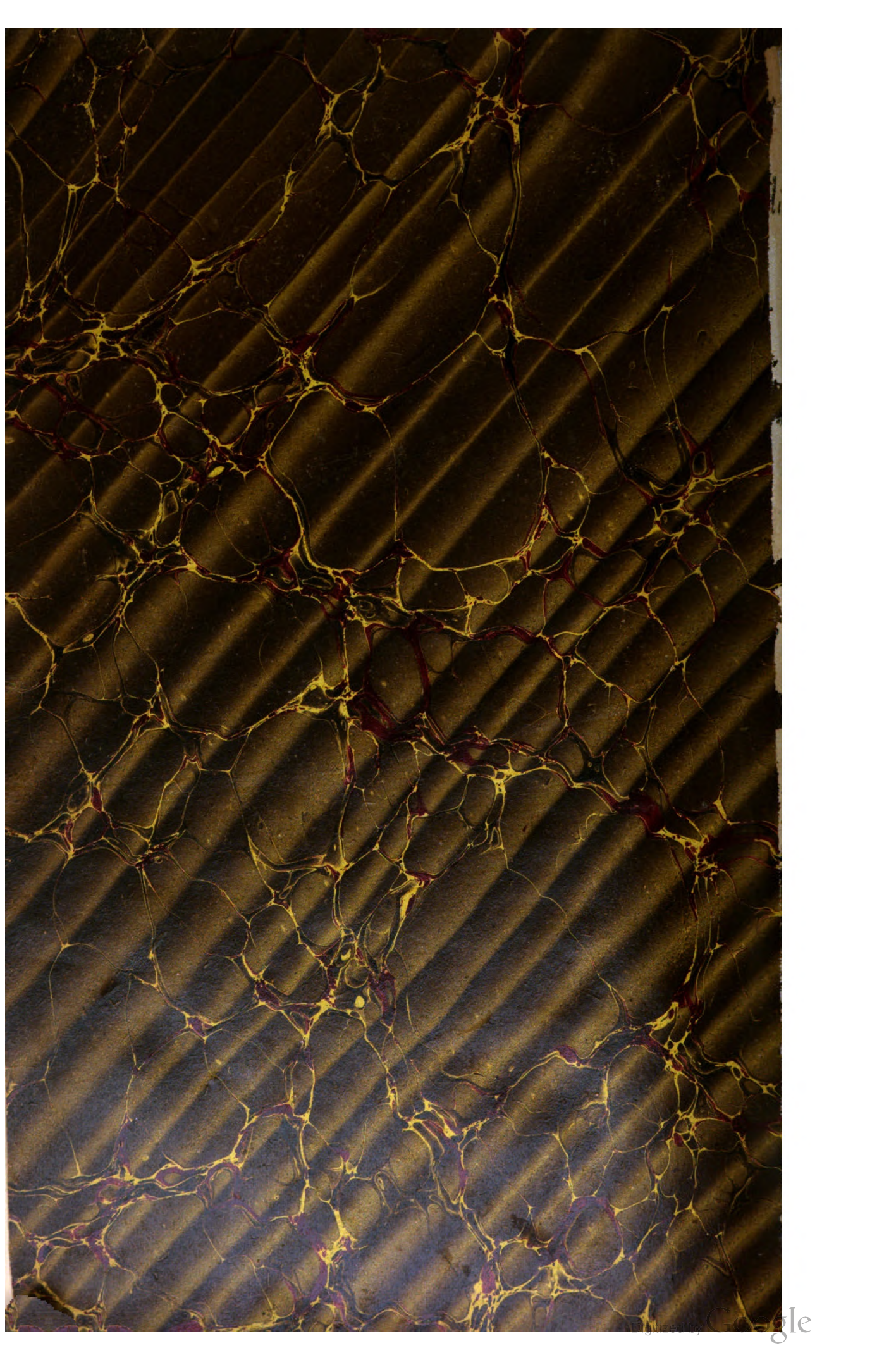
Colonel PREJEVALSKY then read an account of his last journey, and exhibited specimens of the arms and clothing of the inhabitants of the Tarim valley and vicinity of Lob-Nor. This paper was very much applauded.

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