

The historical study of the changes of form of Romney Marsh has been considerable, particularly on account of the question as to where Cæsar landed in Britain.\* Romney, one of the Cinque Ports of ancient south-eastern England, has completely lost its coastline.† And now New Romney cannot claim any of the seafaring glory of its ancestor.‡

Mr. A. J. Burrows§ has made out from historical data changes in Romney Marsh which suggest the above geographical interpretation. The drawings of former positions of the spits and shingle beaches, which accompany the paper by Mr. Burrows, were not constructed with this type of tidal foreland in mind; but with a slight change in the direction of the hypothetical curves to accord with the geological evidence, all these former shorelines fall into a successive series of sympathetic curves, outlining a broadly cusped foreland.

The relation between geography and history can be very well shown in Dungeness foreland, and a review of the historical data in connection with the structural indications of former stages of development, would make a most interesting study. The historical students of Romney Marsh have not sufficiently regarded the fossil shorelines indicated by the ridges, and have placed too much reliance upon outlines given on early maps, which generally show poor sketching and little appreciation of geographical form. The question of property lines, as determined by old surveys upon this area of shifting alluvium, has an important connection with the historical problem.

English sailors have recognized in other parts of the world forms similar to Dungeness foreland, and have applied the same name to two widely separated deposits, both having a similar geological structure. One is in Puget sound, and the other is south of Patagonia, in the Strait of Magellan.

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## RUSSIAN EXPEDITIONS IN TIBET.

### I.

#### M. V. PYEVTSOFF'S EXPEDITION, 1889-1890.¶

THE Russian Geographical Society has added two more volumes to its admirable collection of works upon Central Asia, namely, the first and the third volumes of the 'Works of the Tibet Expedition, 1889-1890, under M. V. Pyevtsoff.' The first of them contains the leader's general record of the expedition, and the second embodies the records of Roborovsky's and Kozloff's "excursions"—that is, reconnoitring journeys into the highlands of the northern border-ranges of the Tibet plateau. Both volumes are admirably published, and the former contains an excellent "Map of Eastern Turkistan and the Northern Border Highlands of the

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\* F. H. Appach, 'Caius Julius Cæsar's British Expedition from Boulogne to the Bay of Apuldore, and the Subsequent Formation Geologically of Romney Marsh' (London, 1868).

† See 'Cinque Ports,' by Montague Burrows (1892), for the historical recorded changes upon Dungeness.

‡ For an account of the great invasion of the sea in 1287, see Hasted, 'History of Kent,' vol. viii. p. 448; Robertson, 'Archæologica Cantiana,' vol. xiii. (1880), p. 237.

§ The Surveyors' Institution *Transactions*, vol. xvii. (1885), pp. 335-376.

¶ 'Works (*Trudy*) of the Tibet Expedition, 1889-1890, under M. V. Pyevtsoff' Part i. and part iii. Published by the Russian Geographical Society. St. Petersburg: 1896.

Tibet Plateau" (40 miles to the inch), as well as forty excellent photo-engravings, which, better than pages of text, give an idea of the snow-clad mountains, the high dreary plateaus, the oases, and the lakes of the region, and partly of the inhabitants. A portrait of General Pyevtsoff is also added. The other volume (part iii.) contains five maps (13 miles to the inch) of the regions visited by Roborovsky and Kozloff during their incursions into the highlands.

Much of what was veiled from our knowledge during that expedition has already been disveiled by both Roborovsky and Kozloff's last expedition, or by the explorations of British explorers, especially of Mr. Littiedale. The terrible Takla-makhan desert, in the middle of Chinese Turkistan, has been crossed by Pyevtsoff's own comrades during their subsequent expedition, and our knowledge of the borderlands of the Tibet plateau has already been extended. And, nevertheless, the two volumes before us are full of interest.

After the death of Prjevalsky, his comrades, M. V. Pyevtsoff, V. L. Roborovsky (botanist), and P. K. Kozloff (zoologist), who were joined by a geologist, K. I. Bogdanovich, started under the leadership of M. V. Pyevtsoff. They left the town Prjevalsk, crossed the Tian-Shan *viâ* the Bidel pass, and came to Yarkand. Then, following the lines of oases, they passed through Khotan, Niya, and Cheroben, at the northern foot of the border-range of the Tibet highlands, making incursions into these highlands and exploring the "Russian mountains," which make the western part of the Astyn-tagh, and the Akka-tagh, which has received since from the Russian Geographical Society the name of "Prjevalsky's range." \* Thus they reached Lob-nor, and then, turning northwards, went to Karashar, Urumchi, and Port Zaisan in Russian Turkistan. We thus find in General Pyevtsoff's record (vol. i.) a wealth of information about the physical condition and the inhabitants of these oases; and, both in the first and third volumes, most interesting data in the structure of the outer fringe of the Tibet highlands, from the meridian of Khotan to Lob-nor (10° to 90° E. long.).

The work of General Pyevtsoff opens with an excellent "Historical and Geographical Sketch of East Turkistan," followed by a chapter on the journey from Prjevalsk to Yarkand *viâ* the Bedel pass. The next chapters, devoted to the description of the Yarkand, Khotan, and other oases, are extremely interesting. One would hardly suspect, for instance, that they would be so densely peopled as they are. Thus, the small Yarkand oasis (264 square miles) has a population of 150,000 according to the last census—that is, 567 inhabitants per square mile. The land is, of course, admirably cultivated, and all agricultural produce is cheap; while the few Indian goods which are imported *viâ* Ladak on horseback—the journey lasting thirty-five days—have to support a cost of transport of from 8s. to 10s. for each 36 English pounds. The next oasis, Kargalyk, has also a very fertile soil, and, although it covers only 132 square miles, its population attains to 30,000 inhabitants.

From Kargalyk the expedition went southwards to spend the hot months of July and August in the mountains, the spot Tokhta-khon having been chosen for that purpose. The spurs of the Kuen-lun are named here Topa-tagh (Dusty mountains), and strike the traveller by the incredible steepness of their slopes, the sharp edges of their crests, and the numbers of deep and narrow valleys intersecting them. No pass across these mountains that would be accessible to horse, or even to man, is known, with the exception of the Topatagh-davan. The rivers, after each rain or when the snows are thawing, rush through these narrow valleys with a fearful

\* Astyn-tagh, not Altyn-tagh, as it stands on the map and in Pyevtsoff's text, as is pointed out by the editor in part iii. of the present work.

force. Only about a hundred Tajiks from Vakhān inhabit that part of the mountains. While staying here, the expedition received the welcome visit of M. Dauvergne, Major Cumberland, and Lieut. Bower, all coming from Ladak.

On September 13 the journey was resumed along the northern slope of the border-range. They visited the Khotan oasis (440 square miles, 130,000 inhabitants, to which the 30,000 inhabitants of the next two small oases, Zava-kurgan and Karakash, must be added), less fertile than Yarkand, but very well cultivated also, and distinguished by its various petty trades and cotton plantations, silkworm-culture being temporarily in a poor state on account of a silkworm disease. A lively trade in all sorts of wool is carried on with Russian Turkistan and partly with Ladak (*viā* the Kilian pass). The next oasis, Chila (7000 inhabitants), owes its wealth chiefly to its fine sheep and silkworm-culture; while Keria (97 square miles, 14,000 inhabitants) is less densely populated than Khotan, and is given, to a great extent, to the culture of cereals—wheat, rice, and barley. The Keria river carries a considerable amount of water, and consequently penetrates for 200 miles into the Takla-makhan desert. And finally, the Niya oasis has only 9 square miles and 1850 inhabitants. On November 29 this last oasis was reached, and the expedition wintered there.

The next chapter is devoted to an ethnographical sketch of Kashgaria, whose population is estimated at 2,000,000, including about 200,000 nomads, and nearly 6000 Dungans, who have immigrated from China during this century; there are, besides, some three hundred families of Tsiganes. The oases are separated by deserts covered with small gravel (*sai*), and of difficult access during the hottest part of the summer. The layers of loess, of which the soil of the oases consists, but which are far thinner than in China, constitute their wealth. The high culture of these latter can best be seen from the fact that land attains very high prices—from £10 the acre in the less populous oases like Keria, to nearly £30 the acre in the Yarkand oasis. Irrigation stands at a high degree of perfection, and is learned by every inhabitant from early childhood. A common play of the children is to make miniature canals leading to their miniature play-fields, and irrigating them with water drawn from the real *aryks*. A European can only wonder at the clever way in which the natives solve the most difficult problems of irrigation. Elected elders (*m'rab* or *aryk-aksakal*) regulate the turn amongst the landholders for irrigating each field, and settle the possible disputes. Indian corn, wheat, rice, barley, two kinds of sorgho (*jugara* and *taryk*), and peas are grown, as well as lucerne, the wheat crops being from twenty-eight to forty to one. Cotton, flax, hemp, kunjut, poppy, tobacco, saffron, and madder plantations are the other cultures, the best cotton being obtained in Khotan and Keria. Hemp is grown for hashish, which is exported to India. In fruit-growing the Kashgarians excel, but they grow no almond and pistachio-trees, which are, on the contrary, so common in Russian Turkistan.

General Pevtsoff's sketch of the inner life of the Kashgarians—condensed, but full of interesting details—is very good, but could not be further considered here. He knows the people well, in all the details of their inner life, and has a high opinion of their sweet, honest, and amiable character, spoiled only by such features of servility as are fully explained by the recent history of the region. "An impartial explorer must recognize," he writes, "that the moral standard of the Kashgarians is very high. Robberies, arson, and murders are extremely rare, and are considered as a general misfortune; and theft is rare—much rarer than in Europe, with the exception, perhaps, of Scandinavia." Though Sunnite Mussulmans, the Kashgarians are by no means fanatics.

Kashgaria, as is known, forms part, since 1864, of the Sin-tsiān province of

China, and is under a governor-general residing at Urumchi. It is divided into two provinces, Ak-su and Kashgar, under two *dao-tais* (governors), each province being divided into districts (Ak-su, Uch-Turfan, Kuchas, and Karashar; Kashgar, Yarkand, Kargalyk, Khotan, and Keria). Each district is divided into several bekdoms, the beks being elected by the Chinese from among the natives. Each village has its elder (*aksakal*), and there are besides milleniers, centurions, and decarions (*min*, *our*, and *yuz-bashis*). The richer natives seem to like Chinese rule, while the poorer classes prefer the rule of Yakub-beg, who was, they say, poisoned by the Chinese.

The winter in Niya (37° 5' N., 82° 40' E., altitude 4460 feet) was relatively mild. Cold winds from the north-east, accompanied by dust-fogs, began only in December, and then the cold reached 11° Fahr., and even 6° Fahr. at night. Snow fell only thrice (0.1 inch, 0.05, and 0.3), and this last, in February, lay on the ground for three days. Fearful storms, carrying with them a thick dust, and producing sometimes absolute darkness, began in February. The dust sometimes covered the ground three-tenths of an inch thick, and traces of animals were then seen on it just as they are seen upon fresh snow. Dust-storms were altogether so frequent, that the mountains (25 miles distant) could only be seen four times in five months. Spring began in the end of February, and already, in the middle of that month, the geologist, K. I. Bogdanovich, began his excursions towards the mountains, and Roborovsky soon followed him.

On May 6 the expedition left Niya, and continued to follow the foot of the border-range. Its northern slopes have for inhabitants the *täglyks* only (mountaineers), "who differ," General Pyevtsoff says, "from the inhabitants of the oases by their shepherd life, and perhaps by a still greater purity of manners." They spend the winter in their very poor and small villages, but when the summer comes, they go with their flocks of sheep to the higher valleys and camp there. They have, however, no tents, but have in the valleys many caves, which were excavated in the loess or conglomerate cliffs, with a fireplace and chimney, and stay there. They accompanied the members of the expedition in all their mountain rambles, and won their full sympathies. They are admirable in mountain rambles, but have a superstitious dread of the high desert which lies further south.

Occasionally, when the winter is very cold, they move to a higher level in the mountains, probably because the temperature is milder there than in the valleys exposed to the cold anti-cyclones (p. 218). Speaking of winds, it is worth noticing that every day in May and June a cool wind used to blow from the north, *i.e.* from the Takla-makhan desert, between 11 a.m. and 5 p.m., while at night the wind was from the south, from the mountains. The existence of a cool wind blowing from the desert was the more astonishing, as it was known that since the 15th of May great heat prevailed at Niya, and the heat must have been simply unbearable in the desert. What the temperature in the desert must be in summer may be judged by the fact that on its border the heat reached 80° Fahr. in March, and the sand was heated to 140° Fahr. In summer its temperature must be 180°, or more. An ascending current of hot air must consequently exist over this immense desert, and the hot and extremely dry air of the desert, on rising to a higher level, must lose a considerable amount of its heat, which energy is spent during the ascent of the air. Considerable masses of cooled air must therefore accumulate at the higher levels of the atmosphere over the desert, and they must flow in all directions towards the surrounding mountains. General Pyevtsoff remarked, indeed, that the cold wind, which attained a speed of from 10 to 35 feet per second at lower levels, and up to 50 feet higher up in the mountains, was *not* a horizontal wind; and by means of a specially devised apparatus, he found out that its angle with the

horizontal line was from  $5^{\circ}$  to  $10^{\circ}$ , the dip being from the desert towards the mountains. The same air-current was noticed later on in July and September as well.

The chief aim of the expedition was to penetrate as far as possible southwards into the plateau of Tibet, but almost unconquerable obstacles stood in the way. From Kashgar eastwards, to the meridian of Keria ( $81^{\circ} 30'$  E. long.), the mountains which enclose Kashgaria run, as is known, from north-west to south-east. From that meridian the border-range takes a direction from south-west to north-east, and is known under the name of "Russkiy Khrebet" in its western portion, and Astyn-tagh further east till the longitude of  $93^{\circ}$  E. Many rivers pierce this immense border-range, in which, or in whose spurs, snow-clad mountains, rising above 20,000 feet, tower here and there (the Ak-tagh,  $36^{\circ} 40'$  N.,  $84^{\circ} 50'$  E., reaches 20,880 feet). The high valleys of these rivers, before they have pierced the border-range, lie at heights of from 12,000 to 14,000 feet, and these valleys are still of a relatively easy access. The members of the expedition did, in fact, explore most of them. Thus the valley of the Tolan-khoja, in the south of Niya, was visited by Roborovsky; Lake Dashi-kul (13,880 feet), close to the Ak-tagh peak, was visited by Pyevtsoff; and a large tract of land on the plateau was explored in the south of Cherchen and Lob-nor, namely, the upper Cherchen-Daria and the Togry-sai, both separated by a range (Muzluk, Achik-kol, or Moskovskiy) from lakes Achik-kul (14,320 feet) and Unfreezing, or Lyag-kum-kul (13,300 feet).

But an immense chain of mountains, the Akka-tagh, or Prjevalsky's ridge, rises in the south of these parts of the plateau, and separates them from the true North Tibetan desert. One of the peaks of that mighty chain was found to attain the altitude of 23,700 feet (under  $87\frac{1}{2}^{\circ}$  E. long.). Immense portions of it are snow-clad, and the Kashgarians, as a rule, very rarely cross this chain. Pyevtsoff's expedition succeeded in crossing that range and pushing southwards for a short distance into the desert in two places only. Roborovsky did so in the south of Niya, under the 83rd degree of longitude, and there nearly lost his life. When he entered the desert, he found it utterly devoid of all vegetation. A distance of 22 miles was covered before the party met with a few bushes of willow. The surface of the desert was covered with rows of sharp quartzite *débris*, being the heads of quartzite strata running west and east; but even no mosses or lichens would grow on these stones, never watered by rain. Only snow falls all the year round in that dreary flat desert, having an altitude of over 17,000 feet. Roborovsky pushed for 40 miles southwards (to  $35^{\circ} 40'$  N.), but all his horses, save one, broke down, and the party nearly perished in a snowstorm.\*

Another attempt to push beyond Prjevalsky's range was made by Pyevtsoff in the south of Dashi-kul. What these mountains are is best seen from the admirable photographs illustrating the volume under review. To cross the border-range was already very difficult,† and a halt of five days had to be made at Dashi-kul, to let the horses recover, which was again by no means easy, on account of the scarcity of fodder. Only bones of birds, which must have perished in their migrations, and skulls of wild yaks (different from the wild species known in North-East Tibet) were found around the salt lake Dashi-kul (13,880 feet). A basis was measured for geodetical measurements on the shores of this lake, and several heights were determined: Ak-tagh, 20,880 feet; lower limit of snow-line on the south slope of the Astyn-

\* See vol. iii., where this "excursion" is described in full, and a map, 13 miles to the inch, is given.

† M. Pyevtsoff always says "the Kun-lun;" but, to specify, it must be borne in mind that it is of the Astyn-tagh that he speaks in this place.

tagh, 19,140 feet; end of a glacier on same slope, 18,080 feet. The rate of propagation of sound in this rarefied air (barometer, 17.95 inches) was also measured by the aid of the chronograph, and was found to be 1073 feet per second. As soon as the party, proceeding southwards, entered one of the transverse valleys of Prjevalsky's range, they found plenty of traces of antelopes, Tibetan hares, and kulangs, although the vegetation remained still extremely poor. The top of the pass had an altitude of 16,590 feet, and a beautiful view opened southwards. An immense high plain was seen, with rows of low ridges running upon it from west to east; further to the south-west a high ridge was seen, which went further and further and was lost below the horizon in the south-east. To the north masses of mountains appeared, their relative heights increasing, or, in other words, more and more deeply ravined as they were receding from the main range. The southern slope of the Prjevalsky range was very short, as it lies on the high plain, at a height of 16,100 feet. Water boiled there at 183° Fahr., and meat could not be boiled. Next day, July 9, a thick snow began to fall, but in one hour all traces of it disappeared, owing to sunshine and rapid evaporation in that dry air. No traces of river-beds or of any running water were seen; it must never rain in those deserts. The soil was gravel, with rows of hard slates appearing from beneath it. It was covered with fissures 5 inches wide—probably due to frosts—which were also filled up with gravel. In lower spots some moisture was found, nevertheless. The *Eurotia*, of a miniature variety, with thick roots, was the only plant seen—even lichens and mosses do not grow; but still a few *orongo* antelopes and one crested lark were met with, and traces of kulangs, hares, and Tibetan steppe-partridges were seen. The same dreary landscape was sighted from a mountain (16,150 feet above the sea-level) which Pyevtsoff and his small party climbed upon, and the same high ridge was seen running to the south-west. A terrible snowstorm, with thunder, compelled the half-frozen party to return.

From all his information, General Pyevtsoff concludes that all hope to explore this desert from the north, without spending a very considerable amount of money in organizing a row of dépôts, must be given up; the more so as there are no *yaks* in Kashgaria, and *yaks* are the only beasts of burden which could live in those deserts without requiring fodder being brought for them from the lowlands.

From Bashi-kul the expedition returned to Karasai (at the foot of the Russkiy range), and thence went to Cherchen, crossing the Achanyu sands (a very characteristic photograph of these sands at Kara-muran is given; while another photograph admirably illustrates how the poplar forests die out on the borders of the Taklamakhan desert, being buried in loess dust). The Cherchen oasis has now lost 2000 out of its 3500 inhabitants, who fled to escape the heavy work which was imposed upon them by the Chinese, as they compelled them to dig out a new irrigation canal, never ended and now abandoned.

The expedition once more approached Prjevalsky's range, near Lake Yashil-kul (87¼° E. lat.). This range runs without interruption over all the length from Dashikul to this spot, and rises above the snow-line. In the east of the meridian of Cherchen the snow-clad peaks grow more and more numerous, the highest of them being said to be the Tyumenlyk-tagh, about 180 miles to the east of Yashil-kul. There the range is said to bend toward the south-east (Marco Polo range?), entering a land which is unknown to the Kashgarians. In its northern spurs, especially further eastwards, good grazing grounds are said to be occasionally found. To the south of it stretches a land much higher than the valley between the Akka-tagh and the Astyn-tagh—that is, of a higher altitude than 14,000 feet. The hunters know that it is higher on account of the difficulties of breathing they experience,

and the length of the slopes. It never rains there, only some snow falling; and there are no high mountains—only hills upon its surface, with occasional depressions. All is covered with gravel, the only vegetation being the white willow (*Eurotia*) and a Tibetan *Carex*. There are no rivers nor lakes, but there are wet spots where a hole, being dug in the ground, soon fills up with water. Only a few wild yaks live in that desert, and this in summer only; but no other mammals, nor birds, nor reptiles have ever been seen by the hunters. Such is the “land beyond the clouds,” as it is described by the hunters, who enter it only when they pursue wounded yaks. If a wounded yak crosses the border-range, they load a donkey with a provision of barley, and follow the track of the wounded animal, sometimes making a two days’ journey beyond the border-range. When the yak has been killed, the best pieces of its meat are put on the donkey and brought to be sold to the gold-diggers, who stay on the northern slope of the Prjevalsky’s range. The best pass across this chain is at the head of the Gükerma river.

When Roborovsky returned from his excursion to Lakes Unfreezing and Achikul, during which he explored a wide region between the Astyn-tagh and Prjevalsky’s range (described in vol. iii.), and covered no less than 500 miles, the expedition begun its return journey.

They visited the Lob-nor (2650 feet) and the Tarim, whose proper name is Yarkend-daria (*tarim* means “a tilled field” in Kashgarian). The lake rapidly desiccates, and a very old man, 110 years old, whom Pyevtsoff spoke to (his son, fifty-two years old, was the only one who could understand the old man), said that he would not have recognized the land if he were absent all this time. Ninety years ago there was only a narrow strip of rushes in the south-west part of the lake, and the Yarkend-daria entered it  $2\frac{1}{2}$  miles to the west of its present mouth, where now stands the Abdal village. The lake was then much deeper, and several villages, now abandoned, stood on its shores. There was also much more fish, and otters, which used to live there, but have long since disappeared. As to the Yarkend-daria, tradition says that two hundred years ago it used to enter another smaller lake, Uchukul, which was connected by a channel with the Lob-nor. This old bed, named Shirga-chapkan, can be seen still by the trees which grew along it. The greater previous extension of the Lob-nor is also confirmed by the freshwater molluscs (*Limnæa uricularia*, var. *ventricosa*, *L. stagnalis*, *L. peregra*, and *Planorbis sibiricus*), which are found at a distance from its present banks. Another lake, 400 miles in circumference, Kara-boyön\* (*black isthmus*), lies, as is known, 27 miles to the south-west of Lob-nor. To the east of the lake, a salt desert stretches for a seven days’ march; and further on begin the Kum-tagh sands, where wild camels live.

The return journey, from Lob-nor to Karashar (88 square miles, 11,000 inhabitants, out of whom 10,000 Dungans), and thence to Urumchi, is also described with many interesting details, of which we only will mention the discovery of the Luk-chun depression, whose surface is below the level of the ocean. It was first discovered by the hypo-thermometer, which shew to Bogdanovich the quite unexpected temperature of boiling water, 212·63° Fahr. The barometer was immediately opened, and confirmed the indications of the former instrument. It stood at 30·55 inches, and the temperature of the air was so mild that the high stand of the barometer, continued on the next two days, could not be explained by the prevalence of a barometric maximum which, in Central Asia, is always accompanied by cold weather. The altitude of this depression was thus found to be 164 feet below the ocean—a fact which was also found in October, 1889, independently, by

\* Not Kara-buran, as it stands on Prjevalsky’s map.

Grum Grjmailo, and later on was fully confirmed by Roborovsky and Kozloff's expedition. This depression is now known to have a length of 95 miles and a width of 27 miles, including the town of Turfan and the villages of Luk-chun, Assa, Pichan, and Toksun.

From Toksun the expedition went to Urumchi (15,000 inhabitants, out of whom 13,000 Dungans and 2000 Chinese), and thence to the Russian post Zaisan, following a new route past Telli-nor (960 feet), and the Chelikty pass. The post was reached a few days before the New Year's Day of 1891.

The above sketch gives, of course, but a very imperfect abridgment of the interesting contents of the first volume, and still less of Roborovsky's and Kozloff's work related in the third volume. It would be most desirable, at the same time, that an abridged edition be published of these volumes, and, in fact, of all the series of volumes on Central Asia, lately issued by the Russian Geographical Society. It would be in the interests of geography in Russia itself, and of science too, that such abridged editions be published in Russian (similar to what was issued in Sweden, for the general reader, after the first Spitzbergen expeditions), and they would most certainly be translated into all European languages.

## II.

### THE CONCLUSION OF ROBOROVSKY'S EXPEDITION, 1893-1895.

THE last number of the *Izvestia* of the Russian Geographical Society contains the last instalment of the preliminary reports of Roborovsky's Tibet expedition. It is written by P. K. Kozloff, and reveals in the author a not common gift of descriptive power. By the end of July of 1895, the expedition left, as is known, the Nan-shan mountains and went northwards, across the Hami desert and the eastern spurs of the Eastern Tian-shan, to the Russian post of Zaisan. From Hami Kozloff made an "excursion" in the mountains, that is, covered some 400 miles with his surveys. He now gives both a general sketch of that part of the Tian-shan, as well as a more detailed record of his mountain journey.

The eastern part of the Tian-shan, to the east of the Hami-Barkul route, stretches from north-west to south-east for about 100 miles. Its middle part is snow-clad for nearly 35 miles, and there are no passes through this part of the chain. The natives know it under the name of Karlyk-tagh (snow-mountains). Both slopes are very steep, the snow-line lying on the northern slope, at Yashil-kul, at a height of 12,000 feet, while the peaks enclosing one of the glaciers visited rise to 15,000 feet. The steepness of the glacier is appalling; towards its end it falls almost vertically, and has ice-cascades. The glaciers of the northern slope, on issuing from the main chain, give origin to a mighty stream, named Ak-tuguruk. It pierces the Mechin-ola mountains, and flows north for 20 miles across the desert, to be lost in the Noma oasis. The streamlets of the southern slope unite in the Naryn, and feed the oasis of Hami. From the last snow-clad peak which lies farthest east, the Karlyk-tagh spreads in several radial chains, and in the meridian of Bai the Tian-shan nearly ends—only a dreary, narrow, and low chain marks it; but further east it rises again in the rocky Emir-tagh, to be lost finally in the stony desert which stretches further to the south-east.

Only the northern slope is covered with vegetation, which is there very rich, and offers a beautiful sight. The upper limit of the tree-zone attains 9000 feet; higher up lie the alpine meadows. The Siberian larch and the fir (*Abies Schrenkiana*) make the forests, with a variety of under shrubs, while the *ak-dark* poplar is characteristic of the valleys. On the southern slope the vegetation is destroyed by the dry heat, and both vegetation and man seek refuge in the

narrow gorges, which are all the more beautiful on account of the contrast with the surrounding burned desert. The fauna of the Eastern Tian-shan is the same as in its western portion, but is somewhat poorer; bears and fallow deer are unknown, and stags are rare.

Nearly five hundred families of Chantus, or Taghchis (mountaineers), from Hami, live in small villages in the mountains up to altitudes of 7500 feet, growing some barley and wheat, and partly living a nomad life with their cattle. They have splendid grazing-grounds, keep a considerable number of cattle, sheep, and horses, and live very cleanly. The Belu-daban pass, which Kozloff followed on his way across the Karlyk-tagh, is 10,600 feet high, and another pass in the western part of the same mountains was found to be 9600 feet.

Leaving Hami on September 24, the expedition went to the Lukchun depression, taking the desert route, which is the worse of the two leading to the depression, but was not yet explored; and Kozloff, with one man only and two camels, made an excursion into the desert. It is stony desert which runs sloping from the Tian-shan to the Chol-tagh. The winds have blown away all the movable soil, and the whole is covered with table-like heights, from which a number of ravines run both ways, the watershed having but an altitude of 1000 feet above the sea-level. Low hills rise west and east. The work of the wind is extremely interesting in shaping the rocks into fantastic forms, and the imagination of the natives sees in those rocks ruins of mystical towns. It was this route that was followed by the fugitives from Hami to Lukchun during the Dungan insurrection, and the sufferings of the fugitives in the desert were terrible. The tamarisk and rushes are the characteristic representatives of vegetation in this desert, and in the animal world the antelope *kara-sulta* (*Gazella subgutturosa*);\* of birds *Podoces Hendersoni* is a permanent inhabitant of the desert, and *Sylvia nana*, with a species of *Saxicola*, were temporary visitors. Many species of aquatic birds were seen on the shores of Shonor. At Lukchun the expedition found their true Cossack, Shestakoff, who had stayed there for two years, making those most valuable barometrical observations which will permit geodesists to determinate with great exactitude the level of this remarkable negative depression.

From Lukchun the expedition continued to move northwards through Urumchi and Manas to Zaisan, while Kozloff took an eastern route, *viâ* Guchen and across the Saur ridge of the Altai. The Tian-shan being already covered with snow, it was crossed in its lower part (Pass Gochan, 7500 feet), where it has a width of no more than 35 miles, and a most beautiful view of the snow-covered Jungarian plain was seen from its summit. Guchen (altitude 3200 feet, population two thousand five hundred) is very picturesque, being situated some 30 miles from the northern foot of the Tian-shan, where some Chinese and Chantus live, supplying the town with timber for export. In the company of smugglers, Kozloff crossed the last mountain tracts which separated him from the Russian frontier, thus visiting the valley of the Urungu and the Kobbe Sans which was visited by Prjevalsky during his second journey, and are the dwelling-places of the wild camel, the wild horse, the *kulang*, and perhaps, also, of some unknown tribe of men who are said to be met with in this desert, especially in the neighbourhood of the stone monument Khan Obo. These *Kyz-kiiyk* (wild men) are described by the natives as in size about the same as their own; a short wool, similar to the fur of a young camel, covers the whole body; black hair falling to the shoulders; dark eyes; body short, but legs rather long. They feed on roots growing in the desert; move about always in pairs; look severe and hard; emit sounds when angry, or as a calling signal; when

\* All zoological names are those given by P. K. Kozloff.

pursued, shout pretty loudly, and a whistling sound is noticeable in that cry; run very rapidly; walk rapidly too, putting the feet wide apart. The Kirghizes whom Kozloff questioned said that they had been in possession of living *Kyz-kiiyks*, chiefly females *enceinte*. They kept them for two or three days, offering them meat and cakes; but they refused food, simply crossing the hands on the breast and twinkling with the eyes. When looked at for some time, the *Kyz-kiiyk* became angry, turned his head, and made his hair bristle. When they were left free, they at once took to the desert, a comrade making his appearance in the neighbourhood where he concealed himself. The Kirghizes added that *Kyz-kiiyks* could be caught in winter, but never are seen in summer. "Personally," Kozloff writes, "I do not much trust to the rich imagination of the nomads, but I was interested in that communication, and give it that other travellers might verify if there is something in that information concerning the mythical problematic inhabitants of the Kobbé sands."

From the Urungu valley Kozloff went to lake Botogan-kul, which communicates with the Ulungur. Then he crossed the Salburty range, which belongs to the system of the Altai, and next the main range Saur, and entered the Russian village, Kenderlyk, from which a *troika* of post-horses brought him to Zaisan. The main body of the expedition, under Roborovsky, was already there.

Another 1200 miles were thus surveyed by Kozloff during these three excursions, which he made independently from the main body of the expedition.

P. K.

## THE MONTHLY RECORD.

### THE SOCIETY.

**Royal Medals and other Awards for 1897.**—The annual honours conferred by the Society on distinguished explorers and geographers have been this year awarded as follows:—the Founder's Medal to M. P. Semenoff, vice-president of the Russian Geographical Society, for his early exploration of the Tian Shan range, for his important contribution to geography in the form of addenda to Ritter's 'Asia,' and especially for his long-continued efforts in promoting Russian exploration in Central Asia. The Patron's or Victoria Medal to Dr. George M. Dawson, C.M.G., F.R.S., director of the Geological Survey of Canada, for the geographical exploration carried out by him in the North-West Territories, in Alaska, and in other parts of Canada, during his long connection with the Dominion Geological Survey; and for the encouragement he has given to geographical work on the part of the survey officers. The Murchison Grant has been awarded to Lieut. Seymour Vandeleur, D.S.O., for his careful surveys during journeys and active service in Somaliland, in Uganda, Unyoro, and on the upper Nile, and in the Niger region; the Back Grant to Lieut. Ryder, of the Danish Navy, for his explorations and discoveries in East Greenland in 1891 and subsequent years; the Gill Memorial to Mr. C. E. Douglas, for his persistent explorations during twenty-one years of the difficult region of forests and gorges on the western slopes of the New