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the majority of them so bad that even a mule could not travel on them. The road from The Cayo to Benqueviejo is, however, an exception as it is a well-cut road of about 24 feet wide, and in dry weather very good for mule traffic.

The position of Ycaiche has always been doubtful, but I think I have marked it on just about correctly as 30 miles to the northward of the head of the frontier. The doubt concerning this town is to be accounted for by the terror which the Ycaiche Indians inspire. Last Christmas, I applied for leave to visit this town, but permission was refused by the Colonial Government. The town is described to me as being of considerable size, but scattered; and there are supposed to be about 2000 fighting men there. These Indians dress in trousers and cotton shirts, and their staple food is the tortilla cake made of pounded maize baked over the fire into little round flat cakes. They have a rough idea of municipal self-government and elect alcaldes among themselves, who have powers to try and to punish offenders.

WILLIAM MILLER,

Assistant-Surveyor General B.H.

BELIZE, BRITISH HONDURAS, 21st March, 1887.

Russian Geographical Work in 1886.

From Russian Sources, by E. DELMAR MORGAN.

1. Work of the Imperial Russian Geographical Society.

FROM the *Otchet* (Report) of the Russian Geographical Society for 1886, we learn the losses by death of its members have been unusually severe during the past year. Among the geographers mentioned in the obituary record are those of Abich, who devoted about thirty of the best years of his life (1844 to 1877) to the study of the geology of the Caucasus, and whose name will live for ever in its annals; Abramof, whose article on the Karateghin was translated for our Journal (vol. xli.). He too initiated Fedchenko's expedition to the glacier named after this naturalist, and to Iskander Kul, as well as that to the Alai, Pamir, and boundaries of Kashgar, where such men as Middendorf, Mushkétov, and Sévertzof found a field for their talents. Among other well-known names lost to science is that of Poltoratski, who, together with Major-General Ilyin, founded the cartographical establishment now known under the name of his colleague. Poltoratski gave great assistance to the first Russian explorations in Central Asia, and himself led the Chatir Kul expedition in 1867, which first crossed the Naryn and brought Russian surveys to Kashgar ('Journal,' vol. xl.). Lastly, we must not omit mention of R. K. Maack, one of the first travellers on the Amur, in the Ussuri country, which he explored in 1857, and in the Viliui district, giving to the world the results of his investigations in three separate works relating to each of these journeys.

The Report goes on to speak of recent expeditions organised by the Society. First, that of Potanin, lately noticed in our 'Proceedings' (May 1887), in which three branches of geographical science had their representatives, viz. ethnography, in the person of M. Potanin himself; natural history, in that of M. Berezin; and

topography, in charge of M. Skassi. The *personnel* of this expedition, too, was remarkable, owing to the fact that Mme. Potanin shared its hardships and privations, accompanying her husband throughout his three years' wanderings in Southern Mongolia, Western China, and on the confines of Tibet. Another expedition explored the magnificent Khan Tengri group of mountains in the Thian Shan, whose summits soar up to a height of 22,000 and 24,000 feet. With regard to this group M. Mushkétov gives some interesting particulars. Khan Tengri is situated between 42° and 43° N. lat., and is remarkable as the point where the Thian Shan, extending eastward as a narrow, though lofty range, develops into a wider and more complicated system, affording a difference so striking as to have led some explorers to distinguish the western Thian Shan as a separate range under the name of the highlands of Turkistan.

The relation of Khan Tengri to the folded ridges of the Thian Shan, is of equal or even greater importance than that of Mustag-ata to the Pamir; its orography and stratigraphy therefore demand investigation in order to elucidate the origin and structure of the system of which it forms so conspicuous a centre. In like manner, the scientific interest attaching to the glaciers of Khan Tengri may be readily compared with that of Mount Elbruz in the Caucasus, the more so, as the Thian Shan system is generally deficient in glacial phenomena, while on the other hand, when these do occur they are on a most imposing scale. Thus the glaciers of Khan Tengri are probably quite as extensive, if they do not surpass, those of the Zarafshan and Muk-su. Lastly, the volcanicity of Central Asia may best be studied here, for though it has been amply proved in recent years, that the opinions of Humboldt and others regarding active volcanicity in Central Asia* have no foundation in fact, there yet remain abundant indications of the presence of typical volcanic rocks, and from the scanty data yet collected, it is probable that although Khan Tengri is chiefly built up of granites and schists, analogous to those of the Terske Alatau, Musart, &c., there are nevertheless among its component rocks recent volcanic formations. These and other considerations prompted the Russian Geographical Society to organise an expedition to investigate. Travellers have hitherto admired its stupendous size from a distance, but none have approached Khan Tengri closely, except P. P. Semeonof, who in 1857 penetrated to the glaciers of Sary-jas and first drew attention to their importance. In those days, thirty years ago, travelling in Central Asia was very different from what it is at the present time. Then a journey to those regions could not be accomplished without great discomfort and some risk, now the ordinary tourist may visit them and the naturalist pursue his investigations without fear of interruption.

It had been intended to send two expeditions in 1885, but owing to the absence of its leader, J. V. Ignatief, on other duties, a start was not effected till the following year. The point of departure was Karakol,† a Russian settlement at the east end of

* Since these lines were written a great earthquake has been reported from Verny, by which that town has been nearly destroyed, and a region about a thousand versts in extent has been affected.

† Karakol is the capital of the district of the same name, and an outpost of Russian civilisation in the Thian Shan. Its mud walls and gardens give it an Eastern appearance, but the present town is entirely modern, having been founded since the annexation of the country by Russia. The bazaar is worth seeing from the variety of types and nationalities frequenting it. Here turbaned Sarts and pig-tailed Dungans sit in little shops and open booths selling the produce of the country. About twenty miles from Karakol the ruins of an ancient town are visible on the south shore of Issyk-kul. Its walls are imbedded in sand, but various articles, such as copper vessels, Chinese

Lake Issyk-kul, where A. N. Krasnof, a botanist of some repute, joined it. His special object was to study the flora of the high snow and ice regions of the Thian Shan, and compare this with that of the Polar regions recently worked up by Veit Brecher Wittrock*: to determine the vertical distribution of plant-life on Khan Tengri, and compare this with corresponding zones in the better-known regions of the Trans-Ili and Kungé Alatau chains. Moreover, M. Krasnof's knowledge of the Aralo-Caspian flora would enable him to deduce some interesting comparisons between it and that of the sand and clay wastes bordering on Lake Balkhash and with the transitional forms met with on entering the mountains. From these aspects the sands of Tau-kum, the lower Ili plains, and Trans-Ili mountains possess an exceptional interest for the botanical geographer, their recent lacustrine and riverine sedimentary deposits never yet having been botanically investigated, while the oldest flora of the higher regions up to and including the snow-line affords unequalled opportunities for comparison.

With reference to this expedition J. V. Ignatief has communicated the following report:—"Starting from Karakol on the 16th(28th) July, 1886, we crossed the outlying spurs of the Thian Shan, the rivers Jerghes and Bosechuk to the Turgen-aksu which we ascended to the valley of the Sari-jas and up this to the glaciers discovered by P. P. Semeonof in 1857. We were then obliged by a heavy snowfall to retreat to the valley of the Kok-jar-karkara. The large glacier at the sources of the Sari-jas, called by P. P. Semeonof a *mer de glace*, we named after him, and another, at the sources of the Adir-tur, 'Mushkétof.' Our topographer Alexandrof made an instrumental survey of Semeonof glacier and measured its rate of movement. Mushkétof glacier was half instrumentally surveyed by Khludof. At the sources of a left tributary of the Sari-jas we discovered another glacier, the Inilchik. From the valley of the Sari-jas we descended to that of the Tekes by a new pass, Naryn-kol, on which there is an overlapping glacier, Tura-jorga. By the 16th(28th) August, we were at 'hunters' settlement,' whence we made an excursion to Borodobosup and from this point took a photograph of Khan Tengri. On the 22nd August (3rd September), I with the draughtsman Khludof, six Cossacks, three jigits and an interpreter went to Musart, while the topographer was engaged in measuring trigonometrically the height of Khan Tengri from the Baian-gol Valley, taking Hunters' Station as zero. The deduced height of the peak was found to be 24,000 feet above sea-level.

"The Musart Pass has an elevation of 12,000 feet above sea-level. We followed the defile to its southern termination at Yaman-Kurgan where the mountains end, and the road to Aksu enters the steppes. Traces of ancient glaciers were found at a height of 6800 feet above sea-level on the southern slope of the defile, which had therefore been completely filled with ancient glaciers, for the marks on the southern side, where atmospherical desintegration had taken little effect, were plainly visible, while on the northern side there was no trace of them at 6800 feet. The Thian Shan at the Musart consists of granite, sienite, gypsum, diorite, marbles and azoic schists, white marbles being predominant at the summit of the pass. The strati-

bricks, &c., are occasionally brought to light, and I saw a number of coins with nearly obliterated inscriptions, said to date from the thirteenth century. About five miles from Karakol there are some hot springs where the water comes up boiling. The road to Musart from Karakol is divided into seven stages, and passes through Russian settlements.

* Cf. 'Ueber die Schnee- und Eisflora besonders in den Arktischen Gegenden,' forming part of Nordenskiöld's 'Studien und Forschungen' (Leipzig, 1885), pp. 67-119. The author here quoted is the most recent authority on Arctic flora.

graphical conditions of the Musart are much involved, the layers have a strike north-east to south-west, and north-west to south-east; in the latter case, the azoic schists are uplifted by intruding diorites.

"On the 7th(19th) September, we returned to Karakol, whence we made a boat excursion on Issik-kul lake."

M. A. N. Krasnof has communicated the following particulars with reference to his branch of the work, and the results obtained by him during the Khan Tengri expedition. He passed the spring on the lower Ili, near the rivers Kurtu* and Kopa,† thence he went to the watershed of the Chu and Ili, to the Andrakai and Kak-tau‡ Mountains, the sands of Tau-kum,§ and to Kaman. In the spring he also skirted the shore of the Ala-kul gulf,|| and explored the At-lesken hills.¶ In the summer he made excursions in the valleys of the Tekes, Naryn, and Khirghos. July and the beginning of August he devoted to the exploration of the highest uplands of the Thian Shan at the foot of Mount Khan Tengri and the watershed of the rivers Syr-daria and Tarim, where he discovered new glaciers in the group of Sir-tash and Sari-jas. Having visited the southern slope of the range and crossed the Bedel Pass to the Chinese town of Utch-Turfan the traveller returned by the valley of Issik-kul to Verny and thence through Tashkend, Samarkand, Bokhara, and Merv to St. Petersburg.

M. Krasnof is of opinion that the valley of the Ili once had an entirely different vegetation to that possessed by it now, and this earlier plant life has completely perished owing to the desiccation of Central Asia and the consequent change in its climate. Formerly, says M. Krasnof, the whole flora of the Ili valley was similar to that still preserved at the foot of the snowy mountains, resembling that of Central Russia with its copses of deciduous trees, where the maple, the apple, and the elm are the prevailing kinds in the midst of wide tracts of black earth steppe lands. In many places the black earth still remains distributed much in the same way as in Russia and similar in character.

At present all the lower chains are deprived of the moisture they derived from melting ice-fields and have changed their flora in the most radical way, having now only Central Asian forms. Many of these, though remarkably changed in form, owing to climatic influences, are nevertheless, according to M. Krasnof, the direct descendants of the Russian black earth flora greatly altered, however, by harder conditions of life. To such forms there have been added many immigrants from the eastern plateau of Asia. These low ridges may be considered as centres of propagation of the forms of vegetable life best adapted to the arid soil of Central Asia.

Of special interest too is the fact that in many places, owing to the dryness of the climate, granites and other hard rocks become pulverised, and the powder or dust thus formed collects in large hillocks; these again become covered with the most extraordinary forms of plants barely maintaining an existence in the snow-belts, but here in the sands suddenly deriving new life, and developing into gigantic plants.

* The Kurtu is the last of the tributaries of the Ili, entering it on the left about 50 miles below Iliisky ferry (bridge?).

† The Kopa flows from west to east through a wide valley, dividing the so-called Alexandrofsky Mountains from an outlying range to the north, and falls into the Kurtu.

‡ The Andrakai and Kak-tau are probably native names of the range of low rounded hills mentioned in the last note. I saw them from the high road near Pishpek.

§ The Tau-kum sands form a belt about 30 miles wide, along the left bank of the Ili, from the river Kurtu to Lake Balkash.

|| The Ala-kul gulf is the southernmost portion of Lake Balkash.

¶ The At-lesken hills align the south-west shore of Lake Balkash, in lat. 45° N.

The shores of Balkash and Ala-kul are, according to M. Krasnof's description, a stony desert where plants, which under more favoured circumstances are tall enough for the scythe, attain only a diminutive size, whilst other parts again are sands, covered with Aralo-Caspian shrubs nearly bare of leaves. These sands in M. Krasnof's opinion, originated in the disintegration of old sandstones. Lake Balkash has greatly shrunk in size, compared to its former area.

The Ala-kul gulf has water of a bitter saline taste. It has shrunk so much that the Kirghiz ford that part connecting it with Balkash. The water in Balkash, however, is nearly sweet. M. Krasnof did not find one of the rivers shown on the map as falling into Balkash from the south-west, all these affluents having long since finally disappeared.

The shores of Balkash are the haunt of numerous wild animals. In the lower reaches of the Ili are tigers, wild asses, *kulans* * which the Kirghizes take alive, and crossing them with their own horses obtain the fastest gallopers.† In July, M. Krasnof crossed to the head-waters of the Sari-jas. The glaciers here, three in number, are very dirty, water-worn, covered with pebbles and rapidly disappearing. The earlier glaciers, as evidenced by glacial marks, were larger, and descended 40 miles lower into the valley than at present. There are even now small isolated glaciers, which are the remnants of former tributaries. Near the Klinya a new glacier was discovered, and named "Friede" in honour of the governor of Semiréchia.‡ The Sir-tash group has seven glaciers, the largest of which was named "Kolpakofsky" in honour of the governor of the steppe country (Western Siberia).

Although the highlands through which flow the rivers Sari-jas and Sir-tash are above the tree belt and even upwards of 10,000 feet, their flora nevertheless does not bear an alpine character. Alpine meadows with plants mostly common to the Caucasus, Altai, and Polar Siberia, are only preserved on the northern slopes in localities moistened by the snow; wherever the warmth of the sun is felt the soil becomes so parched that alpine vegetation cannot exist, and its place is taken by representatives of the wormwood-covered steppes of the Turanian lowlands. Glacier drift of the Syrt is so dry as not to be in a condition to give a start to clayey-sandy soils; but the rains, of rare occurrence, only wash out of it the finest dust which settles in a thick layer marvellously like loess, that fertile yellow earth which sustains the whole of China. Hence M. Krasnof thinks that in many parts of Asia this soil has been formed by light rains gradually washing from the dry crumbled débris of glacier rivers, an exceedingly fine dust produced by the attrition of ice on rocks and their disintegration by weather. M. Krasnof entered Chinese territory by the Bedel Pass, one of the best in this part of the Thian Shan. The river Bedel in its lower course flows between precipitous cliffs of conglomerate before entering a stony desert very scantily clothed with vegetation. Beyond this the oasis of Turfan is reached, where notwithstanding the elevation, grapes, melons, and nuts mature. There are even rice plantations, and the lotus is cultivated. The flora of the Issik-kul valleys and of the Tekes is transitional between that of the Syrts and the northern outliers.

* *Kulan* is the Turki word for the wild ass, the Tibetan *Kiang*.

† I was very much struck with the peculiar colour and markings of some of the Kirghiz horses. One in particular which carried me a long day's march over the mountains, had the dark stripe down the spine and across the withers, its colour being generally ashy grey. The endurance of these little horses is quite extraordinary, even when carrying a heavy man over a rough and hilly country.

‡ General Friede, chief of General Kaufmann's staff in the expedition organised to operate against China in the Kulja district in 1880. General Friede, I regret to see, is reported to have been injured by the recent earthquake at Verny.

The general conclusions of M. Krasnof may be summarised as follows :—Formerly the Thian Shan flora was intermediate between the Altai and alpine, and resembled more closely that of the central and northern Caucasus. The process of desiccation began on the south, and showed itself by the formation of detritus, retreat of the glaciers, and disappearance of lakes. It caused the formation of loess deposits, sands and pebble-strewn plains, while it diminished the areas of marshes and black earth deposits. All plants common to polar and alpine regions disappeared from the southern slopes and syrts, while coniferous and deciduous arborescent vegetation also vanished from *all* waterless slopes, those species requiring humidity having entirely died out. Wherever the snow has ceased to lie, the ancient flora has also perished, only a few species having adapted themselves to a continental climate, and assumed an Asiatic character. Barren tracts are supplied by emigrants from other arid parts of the continent, while only those kinds of the Thian Shan flora best adapted for removal are distributed over the plain. These migrants mingle with other Asiatic forms and select certain soils divisible into four steppe formations: the wormwood, sandy, saline, and stony. The high valleys in the mountains and the dried lake-beds, lacking moisture, have likewise the same typical soil, and the same vegetation as the plains, the altitude above sea-level having but little influence on the character of the flora.

The report refers then to A. V. Elisief's journey in Asia Minor undertaken for anthropological researches among the various tribes inhabiting Anatolia.

M. Elisief had intended reaching Kurdistan and Armenia by way of the Caucasus, but failing in this owing to an insurrection among the Kurds, he returned from Kars to Batum, and thence by steamer to Iskanderun (Alexandretta.) M. Elisief tried in vain to discover any trace of Russian colonies on the coasts of Asia Minor. He only succeeded in visiting the well-known colony on Lake Mainos,* and learned from some of its oldest inhabitants that offshoots were sent to the banks of the Tigris or Euphrates, but where exactly no one could say. The people of Mainos are gradually forgetting Russia, and to many of them it appears quite a foreign country. There is a church at Mainos and a resident Unitarian clergyman. The people of Mainos are generally uncouth and illiterate, many of them speak Turkish better than Russian, and the general impression made on M. Elisief was painful, the more so when he learned that some of these people had served in the late war against Russia, and had even earned military rewards.

Having landed at Alexandretta M. Elisief crossed on horseback the Amanus† and Kizil-dagh Mountains, descended the Amuk valley, rounded Lake Ak-tenghiz, and reached Antioch. Hence he followed a wild mountain path to Aleppo, visiting on the way a number of ruins and caves, and in one of these he discovered the bones of a prehistoric man. The cave in which he found them is opposite the ruins of Koslar-terai. From Aleppo, the traveller took the direct route to Beilan,‡ the celebrated pass, and thence proceeded to Aintab,§ having made an excursion to Biredjik || in order to visit the Arabs of the Euphrates.

* Lake Maniyas, three hours from Aidinjik on the Sea of Marmora, in lat. 40° N., long. 28° E. The Cossack settlement here dates from 1770 and was visited by Mr. W. J. Hamilton in 1838. Cf. 'Journal R.G.S.,' vol. viii. p. 139.

† The Amanus range borders the Gulf of Iskanderun on the east.

‡ The Beilan Pass or "Syrian Gates" leads through the Amanus range from Syria into Cilicia.

§ Aintab stands on lofty heights overlooking the valley of the Tadjur, a tributary of the Euphrates.

|| Otherwise called Bir or Bir al Birat, on the Euphrates. It was here, according to

At Malatia * M. Eliséief was overtaken by winter, and could no longer move easily, his natural history collections suffering in proportion. Having made an excursion to Kharput,† and thence across the mountains of Musher to Keban-maaden,‡ he left Malatia viâ Sivas, Tokat, Amasia to Samsun, and thence by sea to Constantinople. The results of his journey comprise 150 sets of anthropological observations; though these are far from complete they include measurements of Arabs in northern Syria, Kurds, Kizilbashs, Yezidis, and others. In the mountains of Arabistan he found a sarcophagus, a stone with a Latin inscription, several kitchen-middens, and two rubbings of stone bas-reliefs inscribed with the names of ancient inhabitants. Near Keban-maaden he met with menhirs, and at Kharput opened tombs—round pits in limestone containing enormous vessels with bones burnt and intact.

Prince Masalsky has made a botanical excursion in the Kars district for the Caucasus Section of the Russian Geographical Society, with the special object of comparing the transitional forms of the Pontine flora with those of Eastern Trans-Caucasia and Armenia, and to determine their horizontal distribution as well as the vertical distribution of arboresecent and bush vegetation. He also intended collecting observations on cultivated plants with the view of ascertaining the possibility of developing the culture of the orange, lemon, tea, coffee, and other useful plants. Prince Masalsky travelled viâ Alexandropol and Kars to Kaghizman, situate at the foot of the range bordering on Turkey and dividing the waters of the Araxes from those flowing into the Euphrates. Kaghizman was selected as a central point for Prince Masalsky's excursions in the valley of the Araxes and other mountainous districts. During these excursions, he visited the Kurdish encampments near Yagljudi Dichur and Beshkilis, known for their mineral waters and the ruins of Neren. He descended the Arpachai along its bank to its confluence with the Araxes and visited Kulpakh, one of the most ancient salt industries. From Kaghizman Prince Masalsky ascended the dividing ridge near peak Marmor, visited the rich pasture lands of Chaschaclar on the head-water of the Ak-chai, a right tributary of the Araxes. He then ascended the Araxes by Zorab-khan to Bish-keh, crossed the frontier-range near Kess-dagh, and proceeded viâ Kara-kurt to Sari-kamish on the Erzerum road at the foot of the Soganluk range. Hence he made excursions into the Soganluk Mountains, climbing one of its chief peaks, Surdy-khatch, and thence passed through Bardus in the basin of the Chordokh to Olti. Here he made researches in the Olti district and then went on to the Tortum lake in Turkey, finally returning to Olti and thence to St. Petersburg which he reached in September. The materials collected by Prince Masalsky are under examination.

V. A. Fausek received a small subsidy for zoo-geographical researches in the Kumo-Manytch lowlands,§ where he undertook a journey in conjunction with

the Greek legend, that Bacchus threw the first bridge across the Euphrates preparatory to his march to conquer India.

* The Melitene of the Romans, the winter town surrounded by irrigating canals which rendered it so unhealthy that the inhabitants abandoned it when the first summer heats came for Aspuzi, in a higher valley.

† Kharput is placed on an eminence and commands a view over an extensive and fertile plain. Its inhabitants apparently enjoy great prosperity and a temperate climate. Cf. 'Journal R. G. S.,' vol. vi. p. 207.

‡ Keban-maaden is situated in a ravine about 30 miles from Kharput, and derives its name "Mine of the gorge or pass," from a recently abandoned mine of argentiferous lead. Ibid., p. 206.

§ The Kumo-Manytch lowlands extend in a wide belt from the Sea of Azof to the Caspian. They are well marked throughout by a series of long pools of stagnant water

D. L. Ivanof, a geologist. Their routes lay through the Caspian depression occupied by the Turkoman and Kara-Nogai sands to the mouth of the Terek and the shores of the Caspian, a belt 40 miles in width along the Manytch Isthmus, comprising the area of the Stavropol Yegorlyks,* the Kalmuk steppe of the great Derbetof ulus, the horse-breeding region of the Don district, and the environs of Stavropol. The materials of M. Fausek are being worked up by him. With regard to those collected by M. Ivanof, apart from their scientific value, they have a special practical interest from their bearing on the water supply of steppe lands. Among his geological discoveries reference may be made to one of a series of Miocene deposits traced eastwards to the meridian of Georgievsk.

The expedition of M. Grum-Grjimailo to the countries bordering on the Pamir, of M. Konshine to the Trans-Caspian region, and of M. Kuznetsof to the Government of Archangel, received no pecuniary grants from the Society, but only their moral support. The results obtained by M. Grum-Grjimailo's first journey to the Pamir in 1884 and 1885 led him to the following conclusions:—The lepidoptera of the Pamir and adjoining regions are distinct from those of the Thian Shan as far as this is known, but having many points of similarity with the lepidopterous fauna of the Hindu-Kush, at all events as far as types common to both would seem to indicate. The inference from this is that at the period when the lepidoptera (and therefore other orders as well) of the Pamir was established, this region was in closer connection with the countries to the south of it than with those on the north; in other words, the Pamirs were at that period detached from the Thian Shan. This may be explained in either of the two following ways: (1) a non-synchronous upheaval of the two mountain masses, or (2) if their upheaval took place at the same time there was a certain interval of time during which they were parted from one another by a wide aqueous expanse; in other words, at that period the ranges which now unite the Pamir with the Thian Shan were non-existing, and Ferghana and Kashgar formed the bed of one sea—the Tarim-Ferghanah.

M. A. M. Konshine accompanied, as geologist, the expedition of Dr. J. Radde to the Transcaspien country and northern Khorasan. From Askabad M. Konshine passed through Merv to Charjui in Bokhara in order to examine the channel of the so-called Kelif Usboi and the alluvial deposits of the central Amu-daria. Returning from Charjui to Merv, M. Konshine joined M. Radde's caravan and took part in his journey up the valley of the Murghab to Meruchak; hence he proceeded along the Afghan frontier to Zulfagar (Zulfikar) whence he descended via Pul-i-khatun and Sarakhs to Kari-bend and so to Askabad. In the course of this journey M. Konshine examined the deposits of Glauber salts in the oasis of Merv, the common rock-salt *in situ* at Ak-rabat, hillocks of nitre at Imam-baba, &c.

From Askabad Dr. Radde and his companion Konshine went to Kochan, in Khorasan, thence following the head-waters of the Attrek to Keshef-rud, they descended to Meshed, recrossed the Kopet-dagh, and reached the Akhal oasis by Deregez valley.

M. Kusnetsof, whose excursion into the Government of Archangel in the spring of last year was principally for botanical purposes, undertook a series of barometrical observations for obtaining data as to the relief of the country in the valleys of the Dwina and Vaga between Vologda and Archangel.

and bitter salt lakes, indicating very clearly a former connection between these two seas. It may be worth mentioning that the idea was formerly entertained of reuniting them by means of a canal.

* The Stavropol Yegorlyks are two rivers, the greater and lesser Yegorlyks, flowing from south to north to join the Manytch.

In conclusion the report mentions that the military topographical department of the Staff Corps has decided on perpetuating the memory of Prejevalsky's remarkable activity in exploring Central Asia by connecting his name, now so famous, with one of the mountain ranges discovered by him during his fourth journey.

The awards for geographical achievements this year have been as follows:—The Constantine medal to Grigory Nikolaievitch Potanin for his twenty-five years' labours in the cause of geography in general, and for his last journey to China in particular. The lesser gold medals to Stephen Osipovitch Makarof for his article published in the *Isvestija* entitled 'Double currents in straits,' being the results of his investigations on the flow and reflux of the waters of the Black and Mediterranean seas; to Augustus Ivanovitch Skassi for his services in Potanin's expedition into Kan-suh; to Andrei Alexandrovitch Bolshof for his cartographical works; to Adolf Georgievitch Eigner for the elaboration of the meteorological materials of the Ust Lena polar station; and to Vassili Vassilievitch Zverinsky for his assistance in compiling the Geographico-Statistical Lexicon published by the Society.

Silver medals were awarded to Alexandra Victorievna Potanina the unwearied companion of her husband G. N. Potanin in all his journeys, for her active co-operation in forming a herbarium, keeping a meteorological record, and generally for the part she took in the expedition; to the companions of N. M. Prejevalsky on his fourth journey into Central Asia, viz. to Peter Kozlof and Panteley Teleshof for their invaluable assistance to the expedition; to Dmitri Nikolaievitch Bukharof for his work, 'A journey through Lapland in 1883,' published in vol. xiv. of the *Zapiski*;* to Franz Karlovitch Schperck for his 'Russia of the Far East,' published in vol. xvi. of the *Zapiski*;† to Nikolai Nikolaievitch Beliafsky for his article on his march across the Ust-Urt from Tsarévitch Gulf to Kungrad; to Gr. Efim. Grum-Grjmailo for his paper on his two journeys to the Cis-Pamir countries (*supra*, p. 430); to Stanislav Danilovitch Rylke for his labours as member of the Committee of the Society for deciding upon a first meridian; to Alexander Vasilievitch Eliséief for his report on his travels through Arabia Petrea and the Sahara; to M. Ivanof for his map to illustrate E. S. Feodorof's article entitled "Information on the Northern Ural," published in vol. xxii. of the *Isvestija*; to Lieut.-Col. Nadarof for his MS. work on the 'Northern Ussuri Country' and others. Bronze medals were also awarded.

Among the most important communications made to the sections of the Society were, the chief results of A. M. Konshine's long continued investigation in the Trans-Caspian region, leading him to the conclusion that the so-called Kelif Usboi or Charjui Ungus which intersects the Kara-kum steppe from north-west to south-east, is only an ancient shore-line of the Caspian, and that it is a gross mistake to assume that the various "ungusses" i.e. desiccated bights, gulfs, and lakes, are old channels of the Amu-daria. The Usboi, in M. Konshine's opinion, owes its origin to a system of coast lakes, extending in a chain parallel with the Ust-Urt and the former seaboard. At another sitting of these sections M. Jarintsof read a paper on the cliff formations along the coast of the Black Sea at Odessa. His conclusions, which were at variance with those of the late M. Barbot de Marigny, will be published in a forthcoming volume of the *Zapiski*. M. N. N. Beliafsky communicated the results of his investigations in the Ust-Urt and Amu-daria from Petro-Alexandrofsk to Charjui. He described the surveys that had been made from Tsarévitch Bay to Kungrad and Kunia Urgendj, and from Hazar-asp up the Amu-daria to Charjui, finally stating that in his opinion the best route for a universal Russo-Asiatic

* See 'Proceedings R.G.S.,' 1886, p. 533.

† Ibid., p. 62.

railroad would be from Saratof to Kungrad, then along the Amu-daria to Kelif, and thence to Kabul.

The Ethnographical Section held six meetings during the year at which ten papers were read on subjects relating to the ethnology of the Russian people, the southern Slavs, Lithuanians, natives of Siberia, Mongol Buddhists, and inhabitants of the Upper Zarafshan.

2. *Military Topographical Work by Officers of the Staff-Corps and Members of the Corps of Military Topographers during 1886.**

Reconnaissance of the Eastern Slope of the Northern Ural.—This work was accomplished under the auspices of the Ministry of Imperial Domains by the mining engineers MM. Feodorof and Lebedzinsky in conjunction with the topographers MM. Ivanof and Koncha. The region surveyed comprises the ridge of the Ural and both its slopes from the river Vyshura on the west to the Lozva on the east. In this region 100 miles from such large centres as Bogoslofsky zavod (iron-works) and the Turinsky mines, the first steps to obtain accurate topographical and geological data have now been taken. The expedition followed for the most part river valleys where there were abundant outcrops of mountain formations, but it was occasionally necessary to cross intermediate tracts by paths only beaten by the Vogul reindeer sledges and their herds, where supplies had to be accumulated beforehand. Four hundred miles of route survey were executed in 1886, over an area of 5400 square versts along the Northern Ural, from the village of Ust-Uls, along the rivers Vingera, Chuvalka, and along a path leading to the northern praying stone. The survey was made on a scale of three versts to the inch, by means of the plane-table, and was based on the positions determined by the late Professor Kovalsky of the Kazan University (Feodorof's survey is mentioned *ante*, p. 431). Heights were ascertained by the aneroid.

Expedition to the Bokharian dominions, organised by the Military Topographical Department of Turkistan.—Its chief object was the astronomical determination of the geographical co-ordinates of a whole series of points in Eastern Bokhara, in order to obtain sure data for the cartography of that part of Central Asia. This work was undertaken by M. Schwartz, assistant director of the astronomical and meteorological observatory; the method adopted was that of lunar occultations; the instruments used were five pocket chronometers, a Dollond telescope for astronomical work, a Pistor circle with an artificial horizon, an inclinor, azimuth compass, and Brauer's apparatus for pendulum observations. The travelling equipments were finally arranged at Samarkand, including forty shoes for each horse and a box for carrying the chronometers. At 6 A.M. daily observations were made for terrestrial attraction, dip, and declination; at nine the chronometers were compared and solar altitudes taken. Altitudes were again taken 15 minutes before noon, followed by readings of the barometer, aneroids, and thermometer. At two the chronometers were again compared. Every computation that could be made on the spot immediately after the observations. Bad weather accompanied M. Schwartz throughout, while the intense heat on the bare steppes burst the glass fittings of his instruments and the ivory rings of his field-glass. In addition to these misfortunes, myriads of mosquitoes on the bank of the Amu-daria, and the peculations of the Amliäkdars (tax collectors) terribly exhausted M. Schwartz's physical strength, weakened as he was by the attacks of the Shirabad fever, which obliged him to take quinine in doses of 40 grains.

* Extracted from the Report published in the 'Russki Invalid,' and kindly communicated by our Hon. Corresponding Member, M. Venukof.

From Shirabad he proceeded viâ Baisun, Yurchi, Karatagh, Kafirnahan, Faizabad, Baljuan, to Khovalin, 10 miles from the town of Aksu, a place replete with classical memories, and now chiefly remarkable for its fortress built of stones and timbers, answering closely to the description of those mentioned by Cæsar in his campaigns in Gaul. From Aksu M. Schwartz went towards Gharm. Between Tabi-dara and Chil-dara the route follows the lofty and precipitous right bank of the Khingou along narrow cornices, some of which were so nearly washed away as to necessitate détours by the crests of the mountains through thick brushwood and along the road over the sharp ridge of Shah-Kandagh, by which Captain Rodionof passed in 1885. From Gharm the expedition continued to follow Rodionof's itinerary to Zanku along the Pitán-Kul and over the southern Bok-bash Pass. Above Kirchin the river-beds were blocked with snow, the drifts at the end of August lying 15 feet deep.

Nearly opposite the mouth of the Laisu rivulet, which falls into the Pitán-Kul, there is a pretty waterfall, Sharmarak, 150 feet high in three descents. From the valley of the Gadai-sai, one of the head-streams of the Laisu, M. Schwartz went to Kara-kaza by a circuitous route. In ascending the Bok-bash (about 11,000 feet), the road crossed a snow-field for several miles, while on the opposite slope Kirghiz summer encampments were met with, a contrast attributable to the fact that the aqueous vapours entering Turkistan from the south-west deposit their moisture in those defiles which are open in that quarter. On the 17th (29th) August the expedition rested at the foot of Kara-kazyk Pass, at a height of 14,500 feet, before commencing the very steep descent, over débris and ice; for two versts it passed over a glacier, and then followed the rocky bed of a torrent leading to the military road to Vuadil, constructed in 1878. Hence the expedition returned viâ Marghilan and Khojend to Tashkent on the 30th August (11th September).

During their 116 days' journey they fixed 34 points astronomically, 50 magnetically, and observed for altitude at 335 places. M. Myshenkov, one of M. Schwartz's companions, collected information on the naphtha springs, gold-fields, and other mineral resources of this part of Bokhara, while M. Rudnef executed the topographical work. He reconnoitred the western part of the Shahri-sebz range between Takhta Karacha and Djam, passed through the Bokharian settlement of Tutla [Tulta?] and thence back to Kitab. The late spring, constant rains, and snow-fall interfered greatly with his work, and rendered the passage of the Takhta-Karacha unusually difficult. M. Rudnef met M. Myshenkov at Samarkand on the 20th April (2nd May) and the two started together to re-cross the Takhta-Karacha pass to Kitab and Shahrshaus (a place erroneously rendered on maps as "Shahr," its native name being "Shahrshaus"). Their advance was again delayed by the impassable state of the roads in the Kashka-daria valley. The Shahri-sebz range attains its highest altitude between Takhta-Karacha pass and Djam. From this centre the mountains diminish in height, and bear more the character of tablelands covered with luxuriant pasturage and arable land. The northern slopes are less adapted for tillage, owing to their rocky nature and their steeper gradients, than the southern, at the foot of which there extends a ridge of hills forming a continuation of a northern spur of the Hissar range. The streams flowing northwards are smaller than those which roll their waters to the Bokharian settlements. One of these, Makret, has an extent of about four versts (2½ miles), while another, Kalkama, is even more populous. Four caravan passes cross the range. The direct road viâ Derbent, Yakkabagh, Tash-kurgan, and the head-waters of the Katta-uru-daria and Kichi-uru-daria being found impassable the expedition followed that viâ Yar-tiube, Kalta-minar, and Kara-khaval, crossing the above-mentioned rivers in their lower courses. From Derbent they followed the foot of the Ak-tau mountains to Shirabad, visiting the sulphur and naphtha springs of Shakarlyk-astan.

On the 3rd(15th) June M. Myshenkof returned to Samarkand, while M. Rudnef continued his topographical survey. Owing to the approach of the Mahommedan fast no guide would consent to undertake a march of 50 miles through barren mountains exposed to the fierce heat of the sun, M. Rudnef had therefore to confine himself to a reconnaissance of the western slopes of the Terekli-tau range and the waterless Tash-rabat valley. He then reached the valley of Lahur which terminates in a salt lake, visited in 1884 by another topographer, M. Petrof. On the 17th(29th) June M. Rudnef reached Baljuan. He found in the valley of the Darai-dash-tak burning schists, and in the mountains north of Baljuan traces of lead. Having crossed the Ruyut Pass near some salt-works, M. Rudnef was obliged to return to Baljuan to connect his survey with that of M. Rodionof. At the settlement of Suk-seh, M. Rudnef visited the gold-washings, said to be the richest in Bokharian territory, and employing the inhabitants of four villages, each labourer earning 60 copecks a day. He also visited the gold-fields of Khovalin, about four miles above Hazret-sultan. Having halted at Chil-dara the expedition went westward along the right bank of the Obi-Khingou, which forces its way between precipitous cliffs 1400 feet high. The path winds along cornices, supported on wooden props overhanging the rushing torrent some hundreds of feet below. Here the most experienced mountaineer dismounts and holds by his horse's tail. On the 27th June (9th July) M. Rudnef arrived at Gharm, whence avoiding the valley of Dashti-bidan, an old glacier bed, he reached Kafirnahan. The road from Kafirnahan to Ura-tiubo passes along the valley over the Sardi-mion, over the Hissar, Zarafshan, and Turkistan ranges, and crosses the rivers *en route* by swinging bridges, for the use of which the Bokharians levy a toll. This is the only tolerable road for pack animals, and may be accomplished in five days from Kafirnahan to Ura-tiube, and in three days more to the Amu-daria, though the Bek of Hissar said that he could reach Ura-tiube in three days if he were obliged to run. By this route the Russian dominions are supplied with corn, asses, horses, horned cattle, and sheep. From Kafirnahan M. Rudnef turned westward by the spurs of the Hissar range; having arrived at Sarijui he took a north-westerly direction by the difficult Sangardak defile, and arrived at Karshi, his health and that of his Cossacks having suffered so severely from constant fevers that he has not yet recovered. During the last three years four-fifths of the population of the Kashka-daria valley between Karshi and Chirakchi have fallen victims to this fever. Completely prostrated by illness, M. Rudnef returned to Samarkand.

Another topographer, M. Glagolef, attached to the expedition of Captain Pokotillo, began surveying from Karatagh down the left bank of the Surkhan; he reconnoitred both banks of the Vaksh and part of the right bank of the Pandj to the defile of Chaila-kamar, where huge mountains prevent access to the Pandj. He found the pass of Valvayak to be 11,000 feet high. From Tiliakh viâ Zygar to Kala-i-khumb and beyond, the road is for the most part carried along cornices and balconies some hundreds of feet above the river which has a current of about 10 miles an hour and forms numerous waterfalls. M. Glagolef and his party travelled on foot while their instruments were carried by hand, and often erected in spots where a single false step would have cost a life. Owing to the commanding height of the right bank of the Pandj, it was possible to survey the left bank with sufficient accuracy and to trace out the boundary of the sinistral riparian possessions of the Bokharians. From Kala-i-khumb the expedition crossed the Darwaz and Peter the Great ranges to Gharm.

Survey in the Zarafshan.—In February 1886, Captain Partiisky, of the corps of military topographers, was ordered to the left bank of the Zarafshan, between Penjakent and the Bokharian frontier, in order to fix a base for the survey of this region,

the 1875 survey having been interrupted by the war which broke out in that year with the Khan of Kokand. Soon after the departure of Captain Pariisky from Tashkent, the fine, dry weather which had continued during the whole of the winter of 1885-6 suddenly changed to rain and frost which lasted all through March and April. The spring of 1886 was altogether an exceptional one in Turkistan; the rainfall was so heavy that the Syr-daria overflowed its banks, which had not occurred for fifty years; communications with Samarkand were consequently cut off, while at Khojend several buildings were washed away. The rains were accompanied by cold and vegetation was unusually backward. The survey operations had to be conducted beyond the Darghan canal in a steppe country almost wholly intersected by deep ravines. The bordering strip of fertile land is but thinly inhabited, but pack animals are abundant, so that the dry baulks for erecting signal stations, which could only be obtained at Samarkand, were transported by the completely spoiled roads on asses. The festival of "the holy water" and the new year also made the natives indisposed to hire themselves out as labourers for Captain Pariisky. In the twelve years that have elapsed since the interruption of the survey in the Zarafshan district many old signals have disappeared, and only traces of them could here and there be found. However, at length the object was attained, and the survey of 1886 was admirably joined with the renovated signal posts and the old survey. In all 1108 sq. verstys were surveyed on either side of Samarkand. It was proved that the cultivation of the country had undergone a marked change; the number of buildings and gardens had increased, particularly in that part of Samarkand occupied by the Russians, as well as in the Miyankal valley, changes in a measure due to the altered course of the Kara-daria. This interesting phenomenon had been in a measure caused by the usual physical influences which alter river courses in Central Asia, as well as by the erection of a new dam in 1882, two verstys above the old one (the fall of the Ak-daria is considerably greater than that of the Kara-daria, and the object of the dam was to divert water into this southern arm of the Zarafshan). The inhabited points in the Zarafshan district are quite different from those in Ferghana where the people live in settlements of some size with constant bazaars. The Zarafshan district, on the other hand, is covered with a network of detached huts and settlements, in which bazaars rarely occur, and these only on certain days. The nature of the country to the east of Samarkand differs from that on the west. While the former is abundantly watered by the Zarafshan, and is almost one continuous rice-field, the region to the west of Samarkand depends either on rainfall for its water supply, or on irrigating dykes led from the hills near the Bokharian frontier. Between these two tracts lies a belt of steppe land. In a hygienic sense one would have expected the rice-fields to be the most unhealthy part, but the opposite is really the case. The officers and men engaged in the survey enjoyed pretty good health in the eastern district, whereas in that on the west topographers and natives fell sick with fever, except the children of the latter, who kept their health well.

Reconnaissance of the Syr-daria region.—In 1886 this reconnaissance served as a continuation of similar work carried out in 1885 in the district of Khojend and the Zarafshan region in the western part of the Turkistan range, beginning at its northern outliers. Having taken in the former Ura-tiube region, the survey passed into the Kuraminsk district, intersecting the Syr-daria at two points above and below the Begovatsky rapids. Here, too, changes were found to have taken place during the last twenty years, owing to the increase of population and the greater extent of cultivated lands. The rivers Maidan-tal and Ugam, hitherto not entered on the map, owing to their inaccessibility, were found to belong to the basin of the Chirchik, and to have their sources in the snowy Karatau range. The passes, Maidan-

tal-ashu, Turpak-bel, and Kurum-jul, all above 10,000 feet, are continually covered with snow. The roads here are quite untouched; they are mere footpaths winding along steep, rocky cliffs, or in defiles obstructed by huge boulders of rock. Owing to the heavy snowfalls in the winters of 1885 and 1886, the water in the brooks and rivulets rose so high that bridges and fords were injured or swept away. The April and May rains washed away all traces of paths on the steep slopes, and added further to the difficulties of the reconnaissance.

Survey in the trans-Caspian region.—This was done in the districts of Tedjend and Merv, between the 15th (27th) May, and the 12th (24th) October, by five topographers, on the scale of 2 versts to the inch. In the Tedjend district 13,336 square versts were surveyed, containing mostly a sandy, waterless, and uninhabited tract. The survey was based on positions previously fixed astronomically, and accurately tested by measurement of base-lines. Five topographers also worked in the Merv district. Here, owing to the want of trigonometrical data they depended on a network of angles, taking as a base the nearest points of the instrumental survey of the Merv oasis, accomplished in 1884 on a scale of 1166 yards to the inch, and the astronomical positions of Utch-adji, Repetek, and Charjui fixed by Captain Gedeonof of the Staff Corps. An extent of 9827 square versts of steppe were surveyed, and 1693 square versts in the Amu-daria oasis, extending for a distance of about 53 miles down the left bank of the river, between Eldjik ferry and Sakar-bazar settlement. The ground is everywhere much cut up by watercourses, and covered with detached buildings, small gardens, fruit orchards, and single trees, causing much impediment to the work of survey. From Charjui up the Amu valley to the ruins of Kuraimkala near the river bank opposite Burdalyk, and as far as Sakar-bazar, the country is thickly inhabited by Bokharian Sarts, and further up the river by Ersari Turkomans divided into four tribes,—Kara, Karabeksuli, Ulutepe, and Günesht. This population occupies a belt of land from 3 to 10 miles wide, so richly cultivated, and well irrigated from the Amu, as to have the appearance of a continuous garden for upwards of 50 miles. A similar tract of fertile soil extends to Kelif. According to the guides there are five wells along the only road between Merv and Burdalyk, 118 miles long, and only one of these, Beyur-Deshik, contains fresh water.

Besides these ten topographers, the Frontier Commission under the command of Col. Kuhlberg was at work. English engineers surveyed from Daulat-abad along both sides of the Russo-Afghan frontier, through Andkoi in a north-easterly direction as far as the Russian surveyed belt along the Amu-daria valley, on the scale of 2 English miles to the inch. The whole area surveyed by the Commission amounted to 25,909 square versts, a tract of dreary arid desert without any inhabitants, and only covered with grass in the spring, when a few nomads pasture their flocks and herds there. After the severe winter, accompanied by snow and frost (reaching -23° Fahr.), a short spring set in followed by a sultry summer with a burning sun, and a temperature in the shade of 113° Fahr. There were several cases of sunstroke, and the members of the Tedjend and Merv sections suffered from a scarcity of provisions and water. The Tedjend topographers could only obtain supplies at Sarybend, and those of the Merv district at Merv itself.

The Omsk Military-topographical Department.—The geographical positions of 22 points have been chronometrically determined in a region bounded on the north by the Ishim, from the town of Akmolinsk through the Stanitzza of Atbazar to the village of Chelkar; on the east, by the road from Akmolinsk to the whilom fort Aktaf; on the south, by the parallel of Ulatau; and on the west by the border of the district of Turgai and the Government of Orenburg. This region, from the Kokchetaf Mountains to the parallel of Akmolinsk, is a perfectly level plain, almost destitute of trees, but with a fertile soil well watered by the Ishim. Here

settlements are frequent and the roads are excellent. South of Akmolinsk, towards the Sary-su, the aspect changes, as the country becomes an undulating plain. From the eastern borders of the Akmolinsk district towards the centre of the tract sketched out, there occur craters of extinct volcanoes known by various names. These become more frequent towards the Turgai district and form the rocky Ulatau Mountains. Here, again, the soil is prolific, and the country well watered, though there are no settlers. The lords of these wide lands are the nomadic Kirghiz of Akmolinsk and Atbazar districts. The rivulets here are very difficult to cross.

In 1886, a series of levels was completed from the town of Petropavlovsk through Kokchetav and Atbazar to Akmolinsk. Surveys were made—(1) In the Akmolinsk district along the borders of the Governments of Tobolsk and Orenburg. (2) In the Barlyk Mountains and in the valley of the Emel; and (3) In the Khan Tengri expedition. In the Akmolinsk 39,367 sq. versts were surveyed on the 5-verst scale. Here the nature of the ground required a large number of contour lines; thickets are frequent, serving to shelter the wintering stations of the nomads; lakes, both fresh and salt, as well as desiccated lake-beds, are numerous; and a network of roads gives access to the heart of the country.

The survey and astronomical observations in the valley of the Emel, from the frontier pillar at Manitu to Dowbuljin with the steppe lying to the south of it in the eastern part of the hilly country of Barlyk,* and along the hitherto unknown Djair mountain range and valley of the Namyn-gol, was entrusted to Captain Zakrjefsky and topographer Bogdanof. In the hills of Barlyk there are no carriage roads, and the instruments had all to be carried on pack-horses. The 5-verst scale was adopted; the angles were measured by the Stephan compass and the distances by intersections or by the eye. Bogdanof surveyed the northern part of the valley of the Emel along its left side, the course of the Ak-su and its head-water; the western spurs of the Urkashar range, the western Djair Mountains, and the south-eastern part of the Maili Hills. Captain Zakrjefsky, besides fixing a series of astronomical points, surveyed the northern slope and eastern part of the Barlyk Mountains, the valley of the Kup, the plain of Konur-obo together with the contiguous southern slopes of Barlyk and part of the Maili Hills. About 10,000 sq. versts were mapped in this way, and this little known and interesting part of Dzungaria described.

GEOGRAPHICAL NOTES.

Geography at Oxford.—It is announced that the successful candidate for the important post of Reader in Geography, in the institution of which the Royal Geographical Society has taken such persistent interest, is Mr. Halford J. Mackinder, M.A., whose geographical lectures have attracted large audiences during the past two seasons at the chief centres of the Oxford University Extension in the north and west of England. The interests of geography as an important and definite branch of knowledge and as a necessary element in education will be safe in Mr. Mackinder's hands.

* That part of Chinese territory, bounded on the north by the Emel, on the east by the Bogdokhan road, on the south by the Maili range, and on the west by the Russian frontier, is known generally as the Barlyk hilly country.