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*Russian Geographical Operations in Asia.—Communicated by Lieut.-
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TRANSLATION OF A PORTION OF THE "COMPTE RENDU DE LA SOCIÉTÉ
IMPÉRIALE GÉOGRAPHIQUE DE RUSSIE" FOR 1864.

The Society has never failed to profit by every opportunity that has presented itself, for extending our geographical knowledge of the countries bordering on Central Asia; consequently, in the month of February last year, M. Severstow, a distinguished Naturalist, who was accompanying an expedition into the countries beyond the Ili and the Tchou, was charged to collect information, with a view to preparing a physico-geographical description of all the countries through which the expedition would pass.

* Of the two accompanying papers, one is a translation of a portion of the "Compte Rendu de la Société Impériale Géographique de Russie," for the year 1864, while the other is a translation from the 4th volume of the Journal of the Russian Geographical Society for 1864.

In the first the names are spelt as in the original French memoir.

The Society has just been enriched by highly interesting geographical materials, thanks to the cordial co-operation of its honorable members M. Milioutine, the Minister of War; M. Duhamal, the Governor-General of Eastern Siberia, and Admiral Boutakow.

We have been furnished with a very interesting manuscript chart prepared by the Staff Major. It represents, on a scale of 40 verstes (27 miles) to the inch, the southern portion of the Kirghiz Steppe, or, approximately speaking, the region between the Eastern shore of the sea of Aral, and the Chinese frontier, extending from 76° to 102° of longitude, and from 40° to 50° of latitude, and comprising the northern half of the district called Touran. On this map we have the result of all the geographical operations of the past few years represented for the first time. Until now they had remained isolated, and almost unknown to the scientific world. They greatly modify the general geographical aspect of this region. There are now determined a sufficient number of astronomical points to serve as a basis for an exact cartographic representation of the region above mentioned. We must observe, however, that the fixed astronomical points are as yet very irregularly distributed. They are comparatively numerous in the western part of the map, along the road from Orenburgh to the Syr-Daria, and along the lower course of that river, also along the Chinese frontier in the Eastern part of the map, but, about the middle, they are very sparsely scattered.

We now possess many orographic and hydrographic data, thanks to the military expeditions, and reconnoissances of 1864, and to the operations carried on for several years in the basin of the Syr-Daria by Admiral Boutakow. These data serve to correct the hitherto confused notions of the countries situated within and around this region. We have also received more accurate information regarding the races that people these countries, their mode of life, their migrations, the remains and traces of their ancient condition, and the possibility of their future civilization. We can here only point out the most salient geographical features of the mass of materials we have received, and of which the Society will avail itself for its future publications. The geographical position of all the region above mentioned will have to be considerably altered, more especially as to western Turkestan, and the Khanat of Khokan. For instance, Aouliéta, a town

of Khokan, ought to be shifted, on the map, half a degree towards the south, and one degree towards the east; the town of Turkestan at least a degree and a half towards the south, &c. Similar changes are equally necessary for many other points. The eastern part of this region is essentially mountainous. The principal chain of mountains is found to be a western branch of the Tian Chan; its direction is from east to west from the lake Issik Koul, down to the lower course of the Syr-Daria; these mountains were vaguely known under the general name of Karataou. They may be divided into three groups, the chain of the Kentchi-Alataou, the chain called Alexandrowskaïa, and that of Kazikourt.

The Kentchi-Alataou consists of two parallel chains, which follow the northern bank of the Issik Koul; they are separated (on the east of the Issik Koul) from the Tian Chan by the Pass of San Tasch; their greatest height is 14,000 feet. From this range, a lower range trends in a north-western direction, separating the waters of the Ili from those of the Tchou.

The second group, the Alexandrowskaïa, or the Alataou-Kirghisyn chain, whose summits are covered with perpetual snow, joins the first at the defile of Baoum, on the western extremity of the Issik-Koul; thence it stretches due west towards Aouliéta, separating the river Tchou from the river Talas; its greatest height is 15,000 feet. To the west of this chain, other hills, rising not higher than 5000 or 6000 feet, stretch as far as the Syr-Daria, following the direction of that river down to Djoulek, and forming, so to say, a prolongation of the Alexandrowskaïa chain. It is to these hills that the name of mount Karataou, which has been wrongly given to the whole system of mountains in this country, properly belongs.

Lastly, the third group forms the Kazikourt chain and lies to the south of the Alexandrowskaïa, from which it is separated by the basin of Talas. The Kazikourt mountains appear to be a continuation of the principal branch of the Tian Chan; winding along the southern bank of the Issik-Koul, they fill the territory of Khokan with their southern ramifications. The disposition of these chains of mountains fixes the watersheds of the basins of the Tchou and the Syr-Daria, the two principal valleys of this country, lying almost parallel to each other. The valley of the Syr-Daria trends, with many

windings, from the south-east to the north-west. The Tchou flows in the same direction. Conformably with the general disposition of the whole mountain system of this region, these great basins are much narrowed towards the east, near Issik Koul, where all the above mentioned ramifications of the Tian Chan are concentrated. It must be observed, that the predominant direction of these chains of mountains, not only in this country, but in all mountainous parts of Central Asia, is always to the north-east. We now have more accurate data concerning the course of the Tchou, especially about its various sources, also its relation to the Issik Koul, from which it does not take its source, but with which it is connected by its affluent, the little river of Koutemalda.

- The central portion of the basin of the Syr-Daria has been explored in detail, and with much success, thanks to the expeditions made during many years by Admiral Boutakow, who has quite recently communicated to us the general results of his enquiries, but especially of his late explorations between Fort Perowsky, and the locality called Baildir Tougai.

It is impossible to set forth here all the accumulated data of these countries of Central Asia, but seeing the interest that they excite, we must add a few more words about their population. It consists chiefly of nomadic Kirghises, and a rather restricted number of Khokans. Their mode of life and degree of civilization correspond with those of the Kirghises who inhabit the country north of the Syr-Daria and the river Tchou.

Their chief wealth consists in cattle, horses and camels. They also cultivate their land and sow wheat, barley and tobacco.

After the military expedition of 1862, a great part of these Kirghise wanderers, from beyond the Tchou, passed into our territory.

To retain these tribes in subjection, the Khokans constructed forts, called Kourgans, in great numbers. Tho four chief ones were Pichpek, Merké, Aouliéta, and Souzak. Aouliéta on the Talas (between the valley of the Tchou, and the chain of mountains which trend from Issik Koul towards the west) has an important position, for it is situated on the grand commercial road from Tachkend and Turkestan, towards the fortifications of Vernoi, Kouldja and Sémi-palatinsk. It is by this road that the caravans come from the southern

regions of Central Asia to go to China, as well as to Russia. On a branch of this road, which stretches towards the north-west, at a junction of the roads of Orenbourg, Troïtsk and Oufa, is situated the town of Turkestan which encloses within its walls a sacred edifice, the mosque built over the tomb of Azret Sultan.

Passing now to the topographical operations executed in these Kirghise steppes of Siberia, we will mention the surveys that were effected on the western borders of China, under the direction of Colonel Babkow. These operations embrace two distinct circles,—the northern parts of the Tarbagataï mountains, and the valley of the river Borokhoudzir. In the first of these circles, Captain Nilantiew of the Topographical Corps, surveyed the region that is bounded on the *west* by the road which crosses the Khabar Assou Pass, and by the course of the river Tamyrsk; on the *south*, by the chain of the Tarbagataï; on the *east*, by the line of the Chinese posts, and on the *north*, by the Kitchkiné Taou mountains, branches of the Manak, and of the Tarbagataï. This region includes an area of 5,270 square verstes.

In the country beyond the river Tchou, the topographers who formed part of the detachment with the expedition, surveyed the following localities. 1st, From the post of Kastek, by the pass of the same name, to the mouths of the little Kebin, and thence re-ascending the river Tchou, to the mouths of the great Kebin, then 40 verstes of the lower course of this last river. Then again, from the mouths of the little Kebin, along the river Tchou, to the ford of Tchoumitch. All these surveys have been mapped on a scale of 250 sagènes (or 1750 feet) to the inch. 2nd, From the river Talas, crossing mount Kara Boura, to the river Tchotkala (Tchirtchik). 3rd, The marching roads along the valley of the Arys, and those from Tchemkent to Aouliéta, also from Tcholak Kourgen to Aouliéta, have been drawn on the scale of 5 verstes to the inch. 4thly, Plans of the forts of Tokmak, Merke and Aouliéta have been drawn out, on a scale of 250 sagènes to the inch.

We have received from M. Bésac, the Aide-de-camp General, a map of the topographical operations, executed and projected in the country of Orenbourg, from the year 1861 to 1865, with a Memoir.

The total survey is 17,687 square verstes done in detail, and 3,928 in half detail; 168,178 reconnoitred, and 2,100 triangulated. During

a period of four years, the total amount of survey operations is 212,019 square verstes.

These surveys embrace the following localities ; 1st, the two banks of the river Yany Daria ; 2ndly, the left bank of the Syr-Daria, from the fort Perowsky to Yany Kourgan, a destroyed fortress belonging to the Khokans, and thence to the place called Baildyr Tougai ; 4thly, the northern and southern slopes of the Karataou chain ; 5thly, the mouths of the river Emba, and the Bay of the Caspian Sea at the mouth of this river. Among the newly made maps, the principal are, the map of the country of Orenbourg, on a scale of 50 verstes to the inch ; a new map of Central Asia and the country of Orenbourg, 200 verstes to the inch ; and 24 sheets of a special map of this country, on a scale of 10 verstes.

The Society is continuing the publication and translation of the 7th Vol. of Ritter's Geography of eastern Touran. M. Grigoriew is compiling and making the necessary additions for completing this work, and is carrying on his labours with such activity, that we may look for the first part of his work during 1865.

However short our account may seem of all the important geographical operations in Asia, it is nevertheless sufficient to show that they embrace a large extent of this part of the world, and give rise to questions of both local and general interest. The several expeditions and explorations, in which our Society has taken part, form an uninterrupted chain which extends along our Asiatic frontier, from the Pacific Ocean to the Caspian Sea ; from the valley of the Onssouri and the peninsula of Corea to the Oust Ourt, Turkestan and Khorasan. With the exception of some conflicts with the Khokans, our enterprises along the frontier have been of a strictly peaceful, scientific or commercial character, and our commerce has been considerably developed. These friendly relations are strengthened by an event of great importance which marks the past year, viz., the final pacification of the Caucasus, the point of our Asiatic frontier that is nearest to Europe.

We must now pass on to the hydrographic operations executed in the Caspian Sea, which have always greatly interested our Society.

Last year, our honorable member, M. Ivachinzew, who is the chief of these operations, read out to the Society, at a public meeting,

a remarkable Memoir on the question of the variations of the level of the Caspian Sea. The same persons who carried on these hydrographic operations in 1863, continued them in 1864. At the beginning of the year, the Surveyors were concentrated in the southern parts of the sea, between Bakow and Lenkoran, a region bristling with rocks and volcanic islands. From January up to May, they explored and fixed the positions of several isolated volcanic reefs, which, as they undergo frequent change from the action of subterranean forces, often become very dangerous to navigators, and consequently require frequent soundings and examinations. The materials thus collected, regarding this volcanic region, may some day serve as valuable contributions towards the composition of a complete monograph of this extremity of the Caucasus.

In the month of May, the hydrographic expedition crossed over to the eastern shore, between Tub-Karagane and the gulf of Karabougaz. During the subsequent five months, an extent of more than 200 verstes was surveyed and sounded, chiefly between the isthmus of Manguich-lac and the gulf of Krasnovodsk, under the command of Lieut. Phillipow and Lieut. Dournew of the Pilot Corps. Soundings were also taken by Lieut. Oulsky, in the middle of the Caspian Sea, with an apparatus specially constructed for bringing up specimens of the different soils, and the fossil and animal life they contain.

In June and July Captain Phillipow's party explored the entrance to the gulf of Karabougaz. At the same time, Lieut. Staritzki made some interesting observations on the speed of an uninterrupted current of water directing its course through the Gulf towards the Sea.

The object of these observations was to determine the quantity of water which enters the gulf of Karabougaz, and the quantity of saline particles which is brought there. The exploration of the mouth of the Karabougaz will serve as a basis for a complete study of this interesting gulf. It is the opinion of M. Baer, the Academician, that this study will lead to a solution of the question regarding the variations of saltness in the Caspian Sea. No one will doubt the economical importance of this question, which is intimately connected with the future fisheries of the Caspian. The results of the hydrographic operations are developing gradually, and are partly published. In addition to the maps and plans of different parts of this sea

that have already appeared, a report of the astronomical and magnetic operations is being actually printed.

In speaking of the favourable results that have been obtained by the activity of our Society, we have not had the least intention to attribute it to one more than to another of its functionaries. Among us, individuals change and succeed each other so rapidly, that we cannot say the progress and strength of our institutions rest with them. It is the general conditions of our activity, and the liberal spirit by which they are pervaded, that unite and attract a constant succession of individual labourers. Besides the actual operations of the Society during the past 20 years, a vast amount of labour has been undertaken voluntarily, and without remuneration, by members of the Society, as well as by strangers, in private and in official capacities. Such are the public lectures, which many of our colleagues have delivered without any remuneration, and which have attracted large audiences to our reception Halls. We need not mention, in this place, the number of persons who, during the past and many preceding years, have disinterestedly brought accounts of their labours to the Society. It is doubtless through the liberal spirit which unites and animates all our members and constitutes our strength, that this great amount of work has been accomplished. Religiously to preserve this spirit should be our first duty, and our most sacred obligation.

TRANSLATION OF A PORTION OF THE JOURNAL OF THE RUSSIAN GEOGRAPHICAL SOCIETY, VOL. IV. 1864.

At a meeting of the Society on the 2nd and 14th December, 1864, Rear Admiral Boutakof read a paper on the subject of his last exploration on the Syr-Daria, between Fort Perovski and Baidyr-Tugui (a locality in the Tashkened territory). In 1863 Rear Admiral Boutakof steamed 538 miles up the Syr-Daria, from Fort Perovski. This officer has now explored, determined astronomically, and mapped 1003 miles of that river's course, beginning from its mouth. He expresses his conviction that the river is navigable still higher up, although, for want of fuel, he could not this time proceed further. The general ascending direction of the river from Fort Perovski is towards the south-east as far as the parallel of 43° of latitude; thence it is directly to the south. Throughout the whole distance of 538 miles,

from Baidyr-Tugai to fort Perovski, the river flows in a magnificent mass of water between depressed banks of an argilo-salinous and sandy character, for the most part inundated at high water; there was nowhere either a *break* in the banks, or a stone, for the observation of the geologist. The swamps, after the subsiding of the waters, afford excellent pasturage whereon numerous Aouls of Kirghizes settle for the winter. In the midst of these meadow patches there occur here and there like *islands*, sand hillocks differing in height, from 30 to 40 feet, and overgrown with tamarisk, &c. The dry argilo-salinous banks rise from 7 to 10 feet above the level of high water, and are covered with tamarisk bushes with thorn (growing high and thick), and in some places with the "Turanga" and "Djida." Nearer to our own possessions, large tracts are covered with the "Saxaul." Vegetation is most abundant on the islands, many of which are two miles long. Upon these the "Djida" grows 4 fathoms high, and the thickness of the "Turanga" reaches 10 inches in diameter. Almost all the islands are covered with a dense, almost impassable brushwood, where the Kirghizes declare there are tigers, drawn thither in pursuit of wild boars. The breadth of the river is from 150 to 400 fathoms; the depth from 3 to 5 and 6 fathoms; the current ran at a speed of 7 verstes ($4\frac{2}{3}$ miles) an hour, the average being from $4\frac{1}{2}$ to 6 verstes (3 or 4 miles); the water was of a dirty yellow colour, but when allowed to settle, was very soft and agreeable to the taste. Admiral Boutakof found no evidences of a settled life throughout the whole of the river's course. Patches of soil, cultivated by the poorest of the Kirghizes, occurred at extremely rare intervals; and these were irrigated by water from canals replenished by hand from the river. The Kirghizes generally sow millet, sometimes barley, water-melons, and musk melons in their fields. There are two principal reasons for the absence of population along the banks of this river: firstly, the absolute want of any guarantee for personal security and for the protection of property and labour in the face of perpetual disturbances in Turkestan, Tashkend and Khokan; and secondly, the greater advantage of settling along the rivulets running from the Kara-tau mountains; these afford better facilities for irrigation than the Syr-Daria, which inundates and washes away its banks, and consequently demands an enormous amount of labour for the construction and maintenance of the necessary

embankments. This splendid water-course, navigable to Fort Djulek (the extreme eastern fort on the Syr-Daria line of frontier) which would be a picturesque feature in any other place, is surrounded by a bleak desert, and is now only occasionally enlivened by migrating hordes of Kirghizes, whereas the remains of the ancient towns of Otrar (where Tamerlane died) and of Tunent (destroyed by Tamerlane) which were seen by Admiral Boutakof, and the traces of a once extensive system of irrigation surrounding the ruins of these places, and occurring also in many other parts, are evidences of a once numerous, industrious, and settled population. The shores of the Syr-Daria, above and below Fort Djulek, present a striking contrast. Above Djulek is a howling desert; below, and particularly commencing from Fort Perovski, all is life and activity along the banks. Corn fields and melon fields occur continually, with populous Aouls of well-appointed tents, animated by the presence of herds of cattle. The Kirghizes assemble by hundreds to dig fresh canals for irrigation. Vast tracts of swamp and reeds, which were impassable in 1848, have been protected by embankments against the overflowing of the river and converted into corn fields which now engage the labour of thousands: and all this is exclusive of the localities within 50 or 100 miles of our Forts, especially the neighbourhood of Fort No. 1, where, in the excellent gardens surrounding the Cossack settlements, grapes are grown, and cotton has been sown not without success. Kirghizes and sometimes Karakalpaks constantly migrate from the Khivan territories to the lands under Russian protection, so that they at length find themselves cramped for space. The Khivan and Khokandian forts which stood on the grounds now occupied by the Russians, were the centres of the most merciless and barbarous persecution. The Russian forts, on the other hand, are now guarantees for security, and serve to promote traffic and the general well-being of the natives.

The advent of the Russians did certainly produce a most beneficial crisis in the condition of the Kirghizes of the Syr-Daria.

Within 8 miles of Baildyr-Tugai, Admiral Boutakof's highest limit of ascent, there are the ruins of a small Khokandian fort, Bair-Kurgan, demolished, according to Kirghiz tradition, about 100 years ago. At a distance of 40 miles higher up, on the left bank, are the remains of the town of Tunkat (raised by Tamerlane). This place is

now called Tskilleh, after a saint of that name whose tomb is close by.

There are more Kirghizes grouped about Tunkat than over the entire extent of country traversed by Admiral Boutakof; and to all appearances these were opulent, being possessed of immense studs of horses and camels, and of droves of horned cattle and sheep. Above that place, *i. e.* nearer to Tashkend, he fell in with two rich migrating Aouls, one encamped by the side of the river.

Descending the Syr towards the river Arys, an open space becomes visible beyond the zone of reeds, at 4 or 5 miles from the river, studded with clayey sand mounds that are covered with a scanty and low brushwood. Some of these mounds are evidently artificial. On a sort of tableland, within 7 miles in a direct line, and almost due north from the mouth of the Arys, are seen the remains of what may have been the citadel of the ancient town of Otrar.

From the mouth of the Arys to the little fort of Utch-Kayuk, abandoned two or three years ago by the Khokandians, and built on a marshy soil, the distance is $84\frac{2}{3}$ miles. The character of the river here is still the same, the same bends and islands, the same depressed banks, mostly flooded, the same vegetation along the shores and on the islands. The forts Utch-Kayuk, Din-Kurgaon, Yang-Kurgaon, Djulek and Ak-Mechet, (now fort Perovski), Kumysh-Kurgaon, Chin-Kurgaon, and Kash-Kurgaon (the three latter below fort Perovski,) were the rallying points of the Khokandians, for the subjugation of the Kirghizes, and the centres for the collection of tribute and the general merciless oppression of that people. Yang-Kurgaon, raised by the Khokandians in 1857, and Din-Kurgaon, erected in 1860, were the last points of Khokandian resistance against the spread of Russian influence; here also the last attempts were made by the Khokandians to retain under their yoke the Kirghizes who passed over in masses to place themselves under our protection. Yang-Kurgaon fell in 1860 to the Russian arms; Din-Kurgaon in 1861. Utch-Kayuk is the nearest place to the town of Turkestan; it was visible from the river, being situated in a hollow of the foreland of the Kara-tau mountains.

The only affluents of the Syr seen by Admiral Boutakof are the rivers Arys and Sauran-Su, falling into the Syr on its right bank

opposite the An-djar settlement, $8\frac{2}{3}$ miles below Utch-Kayuk; other rivers emerge from the Kara-tau mountains, namely the Tuitchke whereon Turkestan is situated, the Karaichik, 6 miles lower down, and the Sart-Su; these do not reach the Syr-Daria, but lose themselves in the marshes formed by its inundations.

Below Utch-Kayuk the country at first is inundated, and large wet meadows, or more correctly morasses, extend along both banks of the river, but further on, especially on the right bank, land is firmer.

Nearer Djulek the trees on the banks are higher and thicker than along the whole remaining portion of the river's course. In the immediate vicinity of this Fort, there is a very pretty avenue of tall and thick willows, looked upon by the Kirghizes as a sanctuary (Aulie).

Between Djulek and fort Perovski the banks are generally firm and salinous, but not elevated. The "Saxaul" is very abundant at the Kasakty-Syra, Chagounon and Kushsant settlements, and opposite Burinbai. The islands and the continuing banks are covered with the "~~alja~~," "turanga," and occasionally with willows, and the margins are usually clothed with high dense thorn and reeds. Sandy hillocks occur beyond the saline plains, and in many places Kirghiz tombs and the remains of long neglected irrigating canals are met with.

From the 14th July, when the expedition was proceeding upwards and was within 67 miles of Utch-Kayuk, the waters were visibly subsiding, and daily decreased, though the heat continued to be great, up to 30° R. in the shade. This was doubtless owing to the exhaustion of the supply of snow which accumulates on the mountains, where the river takes its rise. At fort Perovski the water began to fall only from the 30th of July, and at Fort No. 2 from the 5th of August (N. S).

Notwithstanding that Admiral Boutakof's expedition had to halt at night close to marshy lands, there were no cases of ague, and so far as he was able to judge, the climate on the Syr-Daria, in its upper as in its lower course, was healthy. His astronomical observations disclose great inaccuracies in this portion of the map of Central Asia which is founded on the determinations by the Persian Missionaries of the 18th century.

The communication made by Admiral Boutakof, who has long distinguished himself by many years of labour in this region, was listened to with great attention, and received with great enthusiasm. We could not give here more than the mere outlines of the paper, which he is now preparing for the press, and which will appear with a map of the Syr-Daria. There is no doubt that Admiral Boutakof's work will be an agreeable acquisition for modern geographers.

Kashmir, the Western Himalaya and the Afghan Mountains, a geological paper by ALBERT M. VERCHÈRE, Esq., Bengal Medical Service; with a note on the fossils by M. EDOUARD DE VERNUEIL, Membre de l'Académie des Sciences, Paris.

[Received 11th March, 1865.]

INTRODUCTION.

Of all the great chains of mountains on our Planet, the most stupendous is, singularly enough, the least known to the geologist. Many fossils have indeed been collected by travellers in the Himalaya, and a few have been determined; but satisfactory sections and careful descriptions are very scarce, and it has not yet been found practicable to attempt any general grouping and arrangement of the rocks and beds of these mountains. Jacquemont's researches in Kashmir have not, I believe, much advanced our knowledge of the geology of the country. Mr. Vigne was no geologist, and his observations were not sufficiently accurate for scientific purposes; the same remarks apply, more or less, to most visitors who have published what they saw amongst the higher ranges. Captain R. Strachey, R. E. in his papers on the geology of the Himalaya, between the Sutlej and the Kali rivers, gives a map and two sections which are of great interest; they do not, however, refer to the portion of the Himalaya which I have studied, and they leave yet a vast field for more precise investigations. I regret not having been able to consult Capt. R. Strachey's paper