

Kyzyl-Su. Three days after, I stood on the Kungey or northern shore of Issyk-kul Lake, and commenced exploring the high mountain-passes of the southern chain of the Trans-Ilian-Alataù.

My second journey into the heart of the Tian-Shan took me to localities of still greater interest. I succeeded in reaching the majestic and incomparable group of the Khan-Tengri, and the glaciers of the Tian-Shan, whose existence I had previously doubted. But the description of this journey I reserve for a future paper.

LIST OF THE MOUNTAIN-PASSES shown on the accompanying Map.

1. *Djungarian Alataù.*

*1. Tentek; *2. Lepsa; *3. Keissyk-Aùs (Hasford); *4. Aral-Djoé; *5. Uigen-Tash; *6. Altyn-Imel.

2. *Trans-Ilian Alataù.*

*1. Almatin; *2. Keakelen; *3. Suok-Tiubé; *4. Diurenyn; 5. Koish; *6. Oidjeiliaù; *7. Chin-Bulak; *8. Djaman-Bastan; *9. Seirik-Taz; *10. Turraigir; *11. Mai-Bulak; 12. Kùdargù; *13. Kuremety; *14. Shaty; *15. Tadbulgaty; *16. Santash.

3. *Tian-Shan.*

*1. Zakhù; *2. Kok-Djar; *3. Tekes-Bash.

The passes visited by the author are marked with an asterisk.

XXV.—*Brief Sketch of the Results of the Issyk-kul Expedition.* By Captain A. GOLUBEV, of the Imperial Staff of Russia. Translated from the Russian by JOHN MICHELL, Esq.)

THE region extending between the Tian-Shan and Altai mountain-ranges and Balkhash plateau, which forms the north-western boundary of the elevated portion of Asia, notwithstanding its great signification in the fate of mankind, has remained hitherto almost a *terra incognita*. It is only the constantly increasing power of Russia in this direction that renders it somewhat accessible to scientific investigation.

Previous to the year 1831, in which was founded the town of Ayaguz, on the right bank of the Ayaguz, the eastern tributary of the Balkhash, we are indebted for all information regarding this region to the learned labours of Humboldt, Ritter, and others. Their information, however, was drawn either from Chinese sources or from the itineraries of traders who had penetrated into Djungaria. Although several European travellers, among whom may be mentioned the Princes Yaroslaf and Alexander Nevski, had visited the northern boundaries of Djungaria during the middle ages, they have not left any records of their journeys; and even if such accounts do exist, they throw scarcely any light on the geography of these parts.

The learned Russian travellers Sivers and Meyer, followed, in 1828, by the great Humboldt, did not penetrate farther than Tarbagatai. But, after the foundation of Ayaguz, the astronomer Fedorof succeeded, in 1834, in reaching the southern shore of Lake Balkhash, at the mouth of the Lepsa. In 1840, 41, and 42, Karelin and Schrenk effected a survey of the Semirechinsk region, a part of Djungaria between the river Ili, Djungarian Alataù, and Lake Balkhash. In 1851 Kovalefski performed a journey to Kuldja—an important result of this mission being the consolidation of friendly relations between Russia and China on the west.

It was not until the construction of Fort Vernoé, in 1855, at the northern

base of the Trans-Ilian Alatau, that Russian scientific travellers were enabled to penetrate into the Trans-Ilian region, a part of Djungaria stretching from the river Ili to the Tian-Shan range. In 1858 the Russian topographical surveys extended as far as the southern shore of Lake Issyk-kul; and it was during this year that M. Semenov visited the Tian-Shan mountains, being the first European who had ever ascended them.

The region at present under consideration had long since been surveyed, and many of its points astronomically determined. After the conquest of Djungaria by China, in the reign of Tsian-lun, a learned commission, under the superintendence of European missionaries, was appointed for the construction of maps of the annexed countries. It is to the learned labours of M. Zakharof in particular, who, when at Pekin, had access to sources not available to all, that we are indebted for the list of places astronomically fixed by this commission. These determinations, however, were made in the middle of the last century; besides, the instruments used and the methods pursued are unknown, we having thus merely bare results, which are of course beyond all criticism. Their correctness, therefore, can justly be doubted. Moreover, in the western portion of this region, formed by the present Russian districts of Ayaguz, Kapal, and Alatau, we are only acquainted with two points—one at the mouth of the Kunur-nen, at its fall into Lake Issyk-kul on the south-west; and the other, on the Karatal, in the Kapal district.

Seeing the necessity of verifying the Chinese determinations, and in the absence of all data for constructing a correct map of Russian Djungaria, the Russian Topographical Department, in conjunction with the Imperial Geographical Society, organised a new expedition in 1859, with the view of filling up the existing blanks on the map of the above region. The direction of this expedition was entrusted to me; and, having now terminated it, I present a brief sketch of my labours.

On the 22nd April I proceeded from Fort Vernooé towards the eastern shore of Lake Issyk-kul, under the guard of a strong military escort. A detachment of Russian troops was at that time stationed at the mouth of the Tiuba for the defence of the tribe of the Kara-Kirghiz Bogus against the depredations of the Sary-Bagishes, as also with the object of affording protection to a Russian caravan which was then returning from Kashgar. My instructions were to join this detachment at the lake, and continue my journey under its escort. Seeing, however, the dangerous position of the detachment, which was surrounded by the Sary-Bagishes, who, perceiving its weakness, assumed a threatening attitude, I advised the commanding officer not to wait for me at the lake.

Crossing the river Tchilik, and the small mountain-passes Tash, Air (6300 ft. in absolute elevation), and Tiik-Tash, I reached, on the 4th May, the elevated plateau of Karakara (5900 ft. in elevation), where I joined the detachment which had returned from the lake. But, even with this addition to my force, which now consisted of 100 Cossacks, on the advice of those acquainted with the character of the Kara-Kirghizes, I resolved to await a further reinforcement before proceeding to the lake.

The shores of the lake were at that time occupied by the Sary-Bagishes, who were in pursuit of their foes the Bogins; while the latter, on whose friendship we could rely, were encamped at a considerable distance within the Chinese boundaries, on the banks of the river Tekès. A rumour had likewise spread that the Sary-Bagish tribe had summoned the Kokanians to their aid; this report we subsequently found to be correct; for, on reaching the lake, we met the last small party of Kokanians returning homewards, after having collected tributes from the Sary-Bagish tribe.

While expecting the arrival of a reinforcement from Vernooé, I resolved to visit the village of Sumbé. Leaving a part of my escort, therefore, at Karkara to guard the camels and luggage, I started thither on the 6th May. Proceeding

first along the Kegen valley, then passing the salt lake of Borodabsun-nor, I journeyed through valleys of the Kara-tau range, and reached Sumbé on the 10th May. Sumbé is situated on the river Sumbé, or Alvan, falling into the Tekès: a small Buddhist monastery stands among the hills on a high plateau (7200 feet in elevation), and is held in great veneration in the neighbourhood. On my way to Sumbé I first caught sight of the Tian-Shan; and from the Sumbé plateau, in the morning, I could see the Tengri-Khan, the gigantic peak of the Tian-Shan. The height of this peak, at an approximate calculation, is not less than 21,000 feet.

Leaving Sumbé, we arrived at the banks of the river Tekès. The broad valley of this river, elevated 5700 feet above the level of the sea, and abundantly watered, affords excellent pasturage. It was at that time filled with Bogins; beyond them, at the foot of the Tian-Shan, was an encampment of Calmucks; while still farther on appeared a Chinese picket, and a road leading to the Mussart Pass. From hence I returned by the same road to Karkara, which place I reached on the 16th May.

I selected the mouth of the river Karkara, at its fall into the Kegen, flowing on our frontier with China, as an astronomical point, connecting it with Sumbé village and a point on the banks of the Tekès, where the latter river receives the Mussart. The mouth of the Karkara I intended to unite with a point on the eastern shore of Issyk-kul Lake, and which I subsequently effected.

On my return to Karkara I found the expected reinforcement, and started for the lake. On the 19th May we crossed the Saatash Pass, celebrated for the legend connected with Tamerlane's expedition, and arrived at the lake on the 21st May. We encamped at the mouth of the Tiuba, near Isabeg's tomb, a spot affording safe pasturage for our horses, and protected more than any other from a sudden attack. This part of the Tiuba, at its embouchure into the lake, I selected for an astronomical point; and, wishing to connect it with the point mentioned on the Karkara plateau, I proceeded to the latter place, from whence I returned again to the lake on the 27th May. The mouth of the Tiuba I proposed to connect with the chief point in the Trans-Ili region, together with Fort Vernof. With this view I left the lake with a small escort on the 29th May, and reached Vernof on the 3rd June. On the 11th I again returned back to the mouth of the Tiuba.

On my onward journey I crossed the mountain-passes of Tobulgut, Tchon-bulak, and Turgen. The two first were still covered with snow, particularly Tchon-bulak, whose height is 10,400 feet. Returning, I took the shortest route through the Turgen, Tchon-bulak, and Kurmety Passes; the latter is covered with perpetual snows, and is one of the most difficult to traverse of the whole Trans-Ilian Alatau: its height I estimate at 13,000 feet.

We started early in the morning with the intention of clearing the Kurmety Pass. We first descended from the elevated Dalashik plateau (7900 feet high) in the direction of the Tchilik River, whose banks are very precipitous: it was with great difficulty that we succeeded in fording this very rapid and deep stream. Crossing the Tchilik, we proceeded up a cleft in the mountains, skirting first the Shenota, and then the Kurmety. The pathway did not present many obstacles at first; farther on, however, we encountered considerable difficulty in clearing the barriers of timber which the Kirghizes had thrown up to arrest the progress of the "Barauta" or pillaging parties. Ascending higher, we began to suffer from cold, and soon reached the snows. The path gradually became more impassable, and the landships more precipitous;—deceived by the surface of the snow, our horses frequently fell through large crevices between the crags. A fog prevailing at the time rendered our journey all the more tedious.

At the watershed the path trends to the summit of the peak, being bordered by huge masses of snow which conceal the chasms. After great labour and fatigue we at last gained the peak, and then commenced our descent to the lake along the Kurmety stream. The descent, which is difficult even at first,

becomes extremely fatiguing towards the end of the valley. Great rocks impede the traveller at every step, and compel him to dismount continually in order to pass between them. Late in the evening at last we reached the head of the valley, and passed the night in a cave pointed out to us by one of the Kirghiz guides. On the following day I joined the detachment which was waiting for me at the mouth of the Tiuba.

From hence I started along the northern shore of the lake, and arrived on the 20th June at the mouth of the Kulemaldy River, on its western extremity. I must here observe that a strong detachment, consisting of infantry, Cossacks, and artillery, had been despatched a little before from Fort Vernoe to make a military survey of the banks of the Tchu River. This circumstance had alarmed the Sary-Bagish, and made them decamp from the northern shore of the lake to the southern. The greater part of the tribe migrated beyond the Djirgalan River, on the south-east shore of the lake; while the other fled beyond the Kutemaldy, on the south-western. I was, therefore, enabled to proceed along the northern shore in perfect security.

The mouth of the Kutemaldy River was determined astronomically, its longitude I likewise ascertained by transporting the chronometers from the Tiuba. Astronomical observations give the magnitude of the arc from the eastern extremity of the lake, at the mouth of the Tiuba, to its western point at Kutemaldy, at $2^{\circ} 32' 4''$, or at 161, 4 versts (about 107 miles). The greatest breadth of the lake is 50 versts (30 miles), its area being 120 square miles, and receives into itself 72 rivers.

Confined within the greatest mountain-ranges in the world, the lake is elevated 5200 feet above the level of the sea, while beyond the Alatau, at a distance of 63 miles, is Vernoe, situated 2700 feet below the lake. The name of Issyk-kul (Warm Lake) and Tuz-kei (Salt Lake) is strictly correct: its surface never freezes, but the rivulets falling into it become covered with ice for nearly three months during the year. I did not find a great difference between the temperature of the water of the lake, and of the air; in the rivulets flowing into the lake it never exceeded 11° Reaumur. Their waters are salt but not unpalatable.

The river Tchu, which here bears the name of Kashkara, runs a few miles west of the lake. Between this river and the lake is the Kutemaldy channel, excavated at a very distant period. The water in it is nearly stagnant, and the barometrical levelling did not show any perceptible difference between the levels of the lake and Tchu.

On the southern shore of Issyk-kul, at a journey's distance from Kutemaldy, flows the Konur-Ulen rivulet; the astronomical point determined in the last century by the Jesuit missionaries is situated on it,—in all probability near its mouth.

Wishing to get back to Vernoe, and the detachment which had been despatched to make a military reconnaissance on the Tchu River having returned, I left Kutemaldy on the 22nd June; clearing the Turaigir and Duré-assy passes, we descended to the Kebin River, an affluent of the Tchu, and then penetrated across the northern chain of the Trans-Ilian Alatau by the Keskelan Pass. Both the Duré-assy and Keskelan passes, the height of the latter being 12,400 feet, are snowy and difficult. We lost seven camels in these passes: the poor animals, exhausted with fatigue from the previous journeys were unable to proceed farther; the Kirghizes were therefore compelled to kill them out of compassion. It is in this manner that every difficult mountain-pass is strewn with the carcasses of animals, and the birds of prey which hover near them serve as a guide to the traveller who has lost his way.

On the 25th June I arrived at Vernoe, and proceeded from thence to determine the position of the newly established Russian fort of Kastek, situated about 53 miles west of Vernoe.

This effected, I determined the position of the Ili Fort, on the left bank of the Ili.

This terminated my labours in the Trans-Ilian region.

The eight points astronomically determined by me are :—

1, Fort Vernoe; 2, mouth of Karkara River and Kegeu River; 3, Sumbé Monastery; 4, Point on Tekès River; 5, mouth of Tiuba River at Issyk-kul; 6, mouth of Kutemaldy at Issyk-kul; 7, Fort Kastak; 8, Fort Ili.

The approximate co-ordinates of Vernoe and of the extremities of the lake are :

	Longitude East of Ferro.	North Latitude.
Vernoe	94° 45'	43° 15' 5"
Eastern extremity of lake at mouth of Tiuba	96° 1'	42° 42' 5"
Western extremity of lake at mouth of Kutemaldy	93° 57'	42° 24' 2"

I must here observe that the map of 1855 founded on our topographical surveys shows Vernoe under 95° longitude from Ferro, making a difference only of 15' in the arc, or one minute of time. Mr. Zakharof's map which is at present considered the best, gives the longitude of Vernoe at 95½°, an error of 3 minutes. Mr. Zakharof's map is compiled from Chinese sources, but in what manner they were elaborated has not been ascertained.

On the 1st August I left Vernoe for the town of Kapal. I chose this place for a fundamental point in the Semirechinsk region, and determined its longitude absolutely. On the road I took observations at Altynimelak Picket and Koks Settlement, returning from Kapal again to Koks.

According to my instructions I was to visit the Chinese town of Kuldja. Our Consul, Mr. Zakharof, had not, however, arrived there yet; but the season being advanced, I resolved to lose no time in waiting for his arrival, as the mountain-passes leading from Kuldja through the Djungarian Alatau are extremely difficult to traverse in autumn. I started, therefore, from Koks to Kuldja with a party in charge of silver for our factory at the latter place.

Clearing the Yogen-Tash mountain-pass and Karasai defile we arrived at the first Chinese picket of Borogudjir. From here we received fresh guides at each picket, and following the shortest upper route, reached Kuldja on the 18th August. This town is situated on the right bank of the Ili, and has about 70,000 inhabitants, a considerable market, and is the seat of the residence of the Kee Roy or Tsian-Tiun.

My observations determined the position of the Russian factory at Kuldja in 43° 55' 8" latitude and 3° 54' east longitude from Vernoe, or 98° 39' from Ferro, which result again differs from Mr. Zakharof's maps. During my short residence in the town a sufficiently correct plan of it was taken by Mr. Matkof, the topographer who accompanied me throughout the expedition.

On the 23rd August I left Kuldja by the old route, determining the position of Borogudjir picket on the way. On the 30th August I made an excursion to Verkh-Lepsinsk, or Tchubar-Agatch, to determine the position of this settlement. In this excursion I determined the following six points :—

1, Town of Kapal; 2, Altynimel Picket; 3, Koks Settlement; 4, Kuldja; 5, Borogudjir Picket; 6, Tchular-Agatch Settlement.

Two points still remained to be fixed : Udjar Station in the Ayaguz district, and the Chinese town of Tchuguchak. These I proposed to connect with the town of Ayaguz, which had already been determined by Astronomer Fedorof.

A severe illness detained me a considerable time at Kapal, and it was consequently only in the middle of October that I could proceed to Ayaguz, which I reached on the 18th of the month; from Ayaguz I started on the 20th to Udjar Station, from thence farther on to the town of Tchuguchak. I returned to Ayaguz on the 29th October, adding thus two more points to those already fixed, they are :—1, Udjar Station; 2, Tchuguchak.

This terminated the expedition.

* Ferro West Ex. 18° 9' 42" W. of Greenwich.—Ed.