

JOURNAL
OF THE
ASIATIC SOCIETY.

Narrative of a Journey from Soobathoo to Shipke, in Chinese Tartary.
By Lieut. A. GERRARD, Bengal Native Infantry, in 1818.

From Soobathoo, in latitude $30^{\circ} 58'$ and longitude $77^{\circ} 2'$, situate about twenty miles from the plains, and 4,260 feet above the level of the sea, I marched to Mumleeg nine miles, three and a half miles from Soobathoo, crossed the Gumbur, an inconsiderable stream, but it had swollen so much from late rain, that its passage was effected with great difficulty. The road was a descent to the Gumbur, from which it slightly ascended.

22d September.—Marched to Simla thirteen and half miles. The road for the first eight and half miles was almost plain, then there was a steep ascent of one and half mile, and the last three were excellent, winding near the top of a range 7,000 feet high, and lying through a noble wood of many varieties of oak and pine.

23d September.—Marched to Bunee eleven miles. The road was level, leading amongst deep forests of pine, at the height of 8,000 and 9,000 feet above the sea. Thus far the path, which is practicable upon horseback, has been made by a company of Pioneers, for the facility of communication with the cantonment of Kotgoor, thirty-four miles further to the north-east.

24th September.—Marched to Pulana ten miles. Left the made-road six miles from last camp, and descended by an indifferent and slippery footpath to the village, which belongs to the Rana of Theog.

25th September.—Marched to the Kotkhaee eleven miles. The road lay along the bank of the Giree, one of the branches of the Jumna, and was often rocky and dangerous, the footpath being frequently overgrown with grass, and seldom half a foot in breadth.

Kotkhaee is the residence of the Kotgoor Rana, a hill chief under the protection of the British Government. It is situate on a most romantic spot, upon the point below which, two streams unite to form the Giree; on one side the rock is 182 feet perpendicular, and on the other there is a long flight of stone steps; neither of the streams, which are only twenty feet broad, are fordable, so by destroying the bridges, the place might be well defended against musketry. The Rana's residence is three stories high, and has a most imposing appearance; each story projects beyond the one beneath, and the top is crowned by a couple of handsome Chinese turrets, beautifully adorned with finely carved wooden work.

26th September.—Marched to Gujyndee eight miles. The road at first lay up the bed of one of the branches of the Giree, and there was a very steep and tiresome ascent of 2,400 feet to Deouree Pass, 8,885 feet high, from whence there was a descent to camp.

Gujyndee is in Nawur, a small district of Busahir, famed for its numerous iron mines; there are few spots here fit for cultivation, and the inhabitants, who are miners, live chiefly by their trade in iron. They work the mines only about three months in the year, and commence digging them in March, after the snow has sufficiently melted; at other times, they say, the earth falls in, and it is unsafe to work.

27th September.—Proceeded to Rooroo, a fatiguing march of thirteen miles, crossing a high range of mountains. Here we first came upon the Pabur, one of the feeders of the Tonse, which falls into the Jumna, and is a stream of considerable size. Barometrical observations give the extreme height of its bed 5,100 feet.

Rooroo is situate in Choara, one of the large divisions of Busahir, and the most populous and best cultivated spot I have seen in the hills; the dell is broad, and the ground is well adapted for rice fields, being watered by many canals cut from the river which winds through it.

Three marches more, or twenty-six miles, brought me to Jangleeg, the last and highest village in the valley of the Pabur, elevated 9,200 feet above the sea. The road latterly was extremely rugged and dan-

gerous, at one time many hundred feet above the river, with a horrid precipice on the right, at another dipping down to the stream which rushes with violence over the rocks interspersed in its channel; as you advance, the dell in which the Pabur flows becomes gradually more contracted, the mountains assume a more naked and abrupt appearance, and the rapidity and turbulence of the river increases. From Jangleeg proceeded ten miles to a halting place called Moondoor, within two miles of the Broocang Pass over the great snowy range. The road was good, and lay in a broad grassy glen, between two spurs of the Himalayas, with the Pabur running through it. The soil of this valley is composed of black vegetable mould, which produces endless varieties of Alpine plants to the height of 13,000 feet. Belts of birch and pine reach nearly the same elevation, beyond which, scarcely any thing is seen but patches of brown grass.

The height of my camp, which was pitched beneath an immense projecting granitic rock, was 12,807 feet. We left the last cluster of birch trees 3 miles behind us, so had to send back that distance for firewood. The thermometer was 38° at night, and water froze hard.

Next day, *2d October*, we pitched our tent on the crest of the pass, 15,095 feet above the level of the sea; the road was of the worst description, crossing the Pabur, which has its source near this, by an arch of snow of some extent, and then leading over huge detached masses of granite, hurled from the peaks above, and piled upon one another in the utmost disorder, with here and there some snow. The ascent was steep the whole way, and almost the only vegetation we noticed was grass in small tufts, which grew more scanty as we advanced to the pass, where it almost disappeared; above it was still seen thinly scattered, and interspersed with a few mosses.

Here I met my brother, who had left Soobathoo some time before me and travelled by a much more circuitous route.

We sent most of our servants down about five miles to a more genial climate, where wood was procurable, and remained ourselves at the top. The peaks immediately on either side of us were not more than 1,000 feet above us, but there were several not very far distant, which we could not then see, 18,000 feet high. We were lucky in getting the altitudes and bearings of the principal mountains across the Sutlej, which rear their white heads to the height of 20,000 feet and upwards.

The thermometer in a tent got up so high as 50° during the day, but at 4 P. M. it fell to the freezing point, and at 7 P. M. was 8° below it. We sat up till past 10 for the purpose of making astronomical observations, which in such a temperature was rather an uncomfortable occupation; our situation indeed in other respects was none of the most agreeable, we had but a scanty supply of firewood, which when kindled in the middle of the tent involved us in smoke, and we were somewhat incommoded by having to share our accommodation, such as it was, with our servants, whilst every now and then we were alarmed by the crash of rocks split asunder by the frost.

We had all severe headaches during the night, owing probably to the rarefaction of the air, but attributed by the natives to a poisonous plant said to grow most abundantly at the greatest elevations.

This pass is situate in latitude $31^{\circ} 23'$ and longitude $78^{\circ} 12'$, it separates Choara from Koonawur, another of the grand divisions of Busahir, which lies on both banks of the Sutlej, extending from latitude $31^{\circ} 30'$ to 32° , and from longitude $77^{\circ} 53'$ to $78^{\circ} 46'$. It is a secluded, rugged and barren country, seldom exceeding eight miles in breadth. It is terminated on the north and N. W. by a lofty chain of mountains covered with perpetual snow, upwards of 20,000 feet high, which separates it from Ludak; a similar range of the Himalayas bound it to the southward; on the east a pass almost 14,000 feet high divides it from Chinese Tartary; and on the west lies another of the principal divisions of Busahir.

The villages, which are elevated from 8,000 to 12,000 feet above the sea, are very thinly scattered, not more than two or three occur in a stage, and sometimes none at all for several days. In the summer season, from the reverberation of the solar rays, the heat in the bed of the Sutlej, and other large streams is oppressive, and quite sufficient to bring to maturity grapes of a delicious flavour, of which raisins and a spiritous liquor called *Rakk* are made. The inhabitants wear a frock of white blanket, often two-fold, reaching down to the knees, and having sleeves, a pair of trowsers and girdle of the same, a cap of black blanket like a bonnet, and shoes of which the upper part is woollen, and the sole alone leather. The people are very dark and extremely dirty, but they seem to enjoy a much greater degree of comfort in their habitations than any of the other mountaineers we have seen. The villages

are generally large, and the houses spacious and even elegant; they are built of stone and wood, and either slated or flat roofed, the last is most common. The temples of the *Deotas* (deities) are magnificent, and adorned with a profusion of ornaments. There are two or three in almost every village, and sundry miraculous feats are ascribed to the gods to whom they are dedicated, scarcely one of whom but has the credit of having removed some mountain or vast rock for the purpose of rendering the roads passable, or of some other like achievement.

The level spaces of land in Koonawur are few, the crops are extremely poor, and a want of grain pervades the whole country. In time of scarcity, small pears and horse chestnuts, after being steeped in water to take away their bitterness, are dried and ground into flour. There are, however, no marks of poverty, and the natives subsist by exchanging raisins and wool for grain; they have little else to do but look after their vineyards, and attend to their flocks, which in summer are sent to pasturage at some distance from the villages. Bears are very numerous, and commit great ravages; in the grape season, during the whole night, several people from each village together with their dogs, are employed in driving them off.

The dogs are of a large ferocious breed, covered with wool and extremely adverse to strangers, whom they often bite and tear in a most shocking manner; they are commonly chained during the day, otherwise it would be dangerous to approach a village. The winter is rigorous, and for three months there is no moving out of the villages owing to the quantity of snow; during this season the inhabitants employ themselves in weaving blankets. They early begin to collect their winter stock of fuel and food for their cattle, which latter consists chiefly of the leaves of trees, and they pile it upon the tops of their houses.

The Koonawur language, of which we made a collection of nearly 1,000 words, differs much from the Hindee, most of the substantives ending in — *ing* and *ung*, and the verbs in — *mig* and *nig*.*

3rd October.—The thermometer was fifteen degrees below the freezing point and the cold intolerable, we therefore waited till two hours after sunrise, and then proceeded to the village of Brooang, distant eight and a half miles; the road lay over a thick snow bed for the

* This vocabulary has fortunately been preserved, and will shortly appear.—Ed.

first mile, and then led through extensive woods of various sorts of trees, amongst which we recognised the hazel, plane, horse chestnut, and many other European plants. The way was often rugged, and a steep descent of 7,600 feet perpendicular height. On the road we found black currants and raspberries in the greatest perfection, of which we preserved a large quantity, and on our arrival at camp we feasted on grapes. Brooang is a small village in Tookpa, one of the subdivisions of Koonawur, under the Wuzeer Teekumdas. It is situate near the Buspa river, and about two miles from the left bank of the Sutlej.

4th October.—Marched to Pooree, a distance of twelve and a half miles. The road was extremely bad, lying often upon the face of a naked stone inclined to the horizon at a considerable angle, with a precipice of many hundred feet on the outer side; it was no great ascent or descent, but so much caution was necessary to prevent the traveller from slipping off the rocks into the river Sutlej, which lay close upon our left, that the journey took us up twelve hours. To-day we crossed the Buspa, a large stream forty two feet broad, whose source is amongst snow, five or six marches S. E. of Brooang.

5th October.—Proceeded to Rispe, a march of thirteen and half miles, likewise occupying us the whole day. The road which lay through thin forests of pine was not so dangerous as yesterday's, but consisted of several steep ascents and descents upon rocks of crumbling granite of 2,000 feet each. We had a grand view of the Kylas or Ruldung mountains from the large town of Reedung or Ribe, three and half miles before we reached camp; some idea of it may be formed by imagining an assemblage of pointed peaks presenting a vast surface of snow, viewed under an angle of twenty-seven degrees, and at a distance of not more than five miles in a direct line. The height of our station was 8,000 feet, and the Kylas peaks were 12,000 higher.

At Rispe we first saw Lamas, and near this place we passed several tumuli from ten to forty feet in length, two broad, and about four high, they are constructed of loose stones without cement, and upon their tops are numerous pieces of slate of all shapes and sizes carved with strange characters, they are called manè, like the *manes ai ψυχαι τῶν νεκρῶν*, or souls of the defunct, see verq. 3. Æ. n. v. 303. and are erected over the graves of the Lamas. There are invariably roads on each side of them, and the natives, from some superstitious custom, always leave

them on the right hand, and will rather make a circuit of half a mile than pass them on the wrong side.

6th October.—Marched to Murung five miles. The road was pretty good along the left bank of the Sutluj, crossing a river named Teedoong, whose source is in the Chinese dominions four day's journey to the eastward.

Murung is a Lama town of considerable size, consisting of seven or eight distinct divisions, and beautifully situated chiefly upon a southern exposure, in a glen which forms the greater part of an ellipse, through it runs a transparent stream, upon the banks of which are extensive vineyards and orchards, abundantly supplied with water by numerous rills. The dell is encircled by lofty mountains at an angle of twenty-five degrees on every side, except on the westward, where it is open towards the Sutlej, on the bank of which there is a small fort. The situation is extremely fine, and the approach to it highly picturesque, leading along the bank of a canal, and through an avenue of apricot trees. Near this place there are a great many piles of stones with inscriptions, and afterwards we met with them almost at every village, until we reached Pangee, on our return where they end. We also saw a number of temples called Chosten, which are likewise to be found in the vicinity of every Lama habitation; they consist of an enclosure formed of three walls with a roof and open in front, in the inside of them are one or more small white-washed buildings shaped like urns.

It was our intention to have proceeded farther, but the people told us the next village was at such a distance, and the ascent so fatiguing, with no water on the way, that we could not possibly reach it that night.

7th October.—Marched to Nisung eight miles. The road commenced with a very tiresome ascent of 5,300 feet perpendicular height; here we were delighted to find numerous beds of juniper and some gooseberries, which were the first we had seen for a long period of years; we were in great hopes we should have met with heath, but saw none. At the top of Toongrung Pass, 13,739 feet high, it began to snow, and the thermometer was below the freezing point, so we were glad to make the best of our way down; the foot-path was good, but a steep descent through juniper and thyme of many kinds to Nisung, a small Lama village situate near the Taglak'har, a large stream which rises in Chinese Tartary three or four marches to the eastward. The extreme height of

this village by corresponding barometrical observations is 10,165 feet, and grapes do not ripen here. There are many gardens of fine large turnips belonging to the village, fenced around with hedges of gooseberries; the latter are of the red sort, small and extremely acid, but make a capital tart.

8th October.—We were delayed till 2 P. M., in order to get grain ground for the consumption of our people, there being no village at the next stage. We marched only one and three-quarter mile, and the road at first was a descent to the Taglak'har, and then a steep ascent of 2,000 feet, most part of the way up a slope of forty degrees, and over rugged rocks. We were obliged to halt here, there being no water for many miles in advance.

9th October.—Marched ten miles to the bed of a mountain torrent, and did not arrive till an hour after dark. This day's journey was one of the most tiresome we had experienced, crossing two mountains of 12,000 and 13,000 feet, the ascents and descents, one of which was full 4,000 feet in perpendicular height, were steeper for a longer continuance than any we had yet seen, and the path was strewn with broken slate, which gave way under the feet. Neither tent nor baggage arrived, and we had nothing to eat but cakes of very coarse meal, which hunger however made palatable; upon this kind of food, together with a few partridges which our people occasionally shot, and without either plates and knives or forks, we lived for five days. We should have afforded an amusing spectacle, seated upon blankets near a fire in the open air, surrounded by our servants, dissecting the partridges with the *kookree*, or short sword worn by the Goorkhalees, and smoking plain tobacco out of a pipe little better than what is used by the lowest classes. Novelty however has its charms, and our being in a country hitherto untrodden by an European, gave us a delight amidst our most toilsome marches, scarcely to be imagined by a person who has never been in the same situation.

10th October.—Marched to Dabling six and three-quarter miles. The road was pretty good, lying near the river. We went a mile out of the direct way, to visit the Namptoo Sango, a wooden bridge across the Sulej. The river was here 106 feet broad, with large rocks in its bed, and the bridge seventy-eight feet above the stream, which rushes with rapid violence between blocks of granite. We in vain tried to measure its

depth, and although we had a heaving lead for the purpose, of no less than ten pounds weight, we could not effect it, for the force of the current was so great as to sweep it down long ere it reached the bottom. We found the bed of the river 8,200 feet above the sea.

11th *October*.—Marched to Numgeea nine miles. The footpath was good and even, lying upon the left bank of the Sutlej. To-day we made a circuit to look at the conflux of the Lee with the Sutlej. The Lee is a river of considerable breadth, coming from Ludak on the northward, but it is not very deep, and flows in a clear stream with a moderate current, whilst the Sutlej is muddy, and rushes with great velocity and a stunning noise.

Since leaving Pooree, the trees had gradually become more scanty; in the vicinity of Numgeea there is little vegetation, grass and thyme are but thinly scattered in small tufts, and a solitary dwarf pine appears here and there.

12th *October*.—Marched to Shipkè nine miles. The road ascended a little, and then there was a steep descent into the bed of the Oopung. Here the rocks are more rugged than any we had yet seen, they are rent in every direction, piled upon one another in wild disorder, in a most extraordinary manner not to be described, overhanging the path, and threatening destruction to the traveller. From the Oopung, the road was a tiresome and rocky ascent to the pass which separates Koonawur from the Chinese dominions, 13,518 feet above the level of the sea; here the scene was entirely changed, a more marked difference can scarcely exist. The mountains to the eastward were quite of another nature from those we before met with, they are of granite broken into gravel, forming regular slopes, and neither abrupt nor rocky. The country in that direction has a most desolate and dreary aspect, not a single tree or blade of green grass was distinguishable for near 30 miles, the ground being covered with a very prickly plant, which greatly resembled furze in its withered state; this shrub was almost black, seeming as if burnt, and the leaves were so much parched from the arid wind of Tartary, that they might be ground to powder by rubbing them between the hands.

The brownish tint of the furze, together with the bleakness of the country, have the appearance of an extensive heath, and would strongly remind a Scotch Highlander of his native land. Our course from

Brooang was about N. E., here we found we had reached the northern point of the Suttlej in latitude $31^{\circ} 50'$, it lay about two miles upon our left hand, and from this place its direction all the way to its source in the celebrated lake of Mansurowur is nearly E. S. E.

The wind was so strong, that we could with difficulty keep our feet, and it is said to blow with almost equal violence throughout the year. We saw some snow on our right a little below us, and beyond it a peak above 20,000 feet high, off which the snow was drifting in showers, from the force of the wind. From the pass to camp, the road was a moderate descent upon gravel, winding very much.

Shipkè is a large village in the district of Rongzhoong, under the Deba or Governor of Chubrung, a town, or rather collection of tents on the left bank of the Suttlej, eight marches to the eastward. The houses here are very much scattered, and are built of stone with flat roofs, there are gardens before each hedged with gooseberries, which give them a neat appearance. This is a populous place; we counted upwards of eighty men, who on our arrival came to meet us, being the first Europeans they had ever seen.

The Tartars pleased us much; they have none of that ferocity of character so commonly ascribed to them; they have something of the Chinese features, and their eyes are small; they go bare-headed even in the coldest weather, and have their hair plaited into a number of folds ending in a tail two or three feet long. Their dress consists of a garment of blanket, trowsers of striped woollen stuff resembling Tartan, and stockings or boots of red blanket, to which are sewed leather shoes; most wear necklaces, upon which are strung pieces of quartz or bone; they have also knives in brass or silver cases, and all carry iron pipes of the same shape as those used by labourers at home, and the higher classes have them ornamented with silver; in common with the inhabitants of Koonawur, the greater part of them have a flint and piece of steel for striking fire, attached to their apparel by a metal chain. The women whose dress resembles that of the men, were literally groaning under a load of ornaments, which are mostly of iron or brass, inlaid with silver or tin, and beads round their necks, wrists, and ankles, and affixed to almost every part of their clothes.

13th October.—Halted. My brother took a walk of about a mile farther on, with the perambulator and pocket compass, for we did not think it

advisable to use the theodolite in the presence of the inhabitants, knowing their extreme jealousy; he had proceeded a little way from the village before he was perceived, when immediately the people dispatched a couple of horsemen after him, and crowded round the tent, making a great uproar. My brother had begun to return before the horsemen overtook him; they told him they had come to bring him back, but seemed in perfect good humour, laughing whilst they spoke; they insisted upon his going before them, and would not dismount when he bid them.

About 9 o'clock, the Chinese Officers, of whom there are several to regulate the affairs of the country, brought sixteen seers of flour, which they requested us to receive as a present, and it was no unacceptable one, for our people had had but little food for the last three days. In the forenoon, the principal Officer shewed us a long piece of parchment, written in what we supposed the Chinese character, and gave us to understand it was an express order from the Garpan of Garoo, under whose authority the Debas are, prohibiting strangers from entering the country; he at the same time said, we had so many people with us, (having nearly 100,) that he could not oppose our progress, but it would cost him his head if he gave us the means of going on, so he would not supply us with provisions, which was the most effectual mode he could have adopted to stop us.

During the time we were at Shipkè it blew a complete hurricane, and the aridity of the wind dried up every thing exposed to it; the leaves of our books were more bent than I ever remember to have seen them in the hot winds, and no dew was observed.

The lat. of Shipkè by meridian altitudes of stars is $31^{\circ} 48'$, and the long. $78^{\circ} 48'$, its extreme height is 10,527 feet, and the thermometer ranged from 38° to 60° .

The people are affable and good natured, and allowed us to handle their pipes, knives, &c.; they thronged round our tent from morning till night, and we found it the most difficult thing to understand them even with the aid of interpreters, for the Koonawur words we had picked up, which were of the utmost use to us during our tour, were not intelligible here. This evening the articles that had been so long in the rear came up.

14th October.—At sunrise, when the thermometer was 31° , and before the inhabitants had risen, I set up the theodolite and took the bearings

and altitudes of the remarkable peaks; one of them covered with snow above 20,000 feet in height, is only 4 miles from the village from which it subtends an angle of 28 degrees; another called Tuzheegunj, 22, 488 feet high to the north of the Sutlej, was seen under an angle of $23^{\circ} 31'$, these elevations were observed with the sextant and artificial horizon.

We exchanged a gold button for a goat, which we took with us to Soobathoo; the wool is extremely fine, and almost equal to what is used for the manufacture of shawls; we were informed the best was procured further to the eastward near Garoo, which is the famous mart for wool. The goat scarcely differs from the common one, and it does not appear to be a distinct breed that produced the shawl wool, but its fineness seems to depend almost entirely upon the elevation and coldness of the climate. We ourselves had an opportunity of seeing this at Soobathoo, 4,200 feet above the sea, the wool is little better than in the plains of Hindoostan, but it gradually grows finer as you ascend, and in Koonawur, where the villages are more than 8,000 feet high, it is fit for making coarse shawls.

Garoo or Gartop, by the accounts of fifteen different people, is reckoned 11 marches from Shipkè, and the road consisting of gentle swellings, is described as being so good, that the trade is carried on by yaks.

After breakfast, we returned to Numgeea by the same road as before, and on the 15th of October struck off to the N. W. towards Ludak, crossing the Sutlej a mile from the village by a crazy bridge, constructed of ropes made of the bark of a tree, with basket-work of twigs forming a curve almost the sixth part of a circle. The breadth of the river was 74 feet, including a large rock in the middle occupying 42 feet, the extreme height of the bed is 8,600 feet. This day we travelled $7\frac{1}{2}$ miles, passing over a mountain of 13,186 feet, the ascent of which was very steep upon rugged rocks, and above 4,500 feet. We encamped near a stream at the height of 12,800 feet, and had but a small supply of fire-wood, the country producing nothing but the prickly bush before-mentioned, and another not unlike broom.

16th October.—Seeing high mountains to the eastward, which appeared to be practicable, and thinking the distance short, we resolved to attempt them whilst our baggage proceeded direct to Mako, only about 3 miles from our camp. We accordingly set off after an early break-

fast, and went up the face of a steep hill for $1\frac{1}{2}$ mile, sometimes over large misshapen masses of granite, sometimes upon a gravelly soil covered with brown furze and various kinds of aromatic shrubs. There was not the least trace of a foot-path, and the prickly bushes impeded us not a little, every moment running into the feet through the shoes which were of the kind used by the natives, our own stock, from the badness of the roads, having been long since worn out. The height of this station was 14,900 feet. There being another higher peak without snow that seemed near, we moved towards it, but were never so much deceived in distance, it took us full three hours to reach its top, and the ascent was very tiresome, lying over enormous detached blocks of stone, often resting upon small bases, tottering under the feet, and seeming ready to overwhelm us; the last 200 yards were still worse, and we were obliged to use both hands and feet, now climbing up almost perpendicular rocks, and now leaping from one to the other; a single false step might have been attended with fatal consequences, and we had such severe headaches, and were so much exhausted, that we had hardly strength sufficient to make the effort, and it required no inconsiderable one to clear the deep chasms which we could scarcely view without shuddering. I never saw such a horrid looking place, it seemed the wreck of some towering peak burst asunder by severe frost. After much delay, we got up the theodolite and a couple of barometers, at 4 P.M. the mercury stood at 16.170 inches, and the thermometer was 29° , which compared with corresponding observations made at Soobathoo, gives the height 16,921 feet. We observed all the surrounding peaks, and then proceeded to the village of Nako at a quick pace, the road for the first mile was a steep and rocky descent, afterwards a more gradual one to camp, where we arrived at dusk. The distance by perambulator was ten and half miles, but we must have travelled upwards of eleven, for the wheel could not be rolled to the top of the highest peak.

17th October.—From what we saw yesterday, we were convinced we could reach a more elevated spot, and thinking the attainment of a great height more desirable than a high latitude, we resolved to try it again, and rather defer our intended journey towards Ludak, than let slip such a favourable opportunity. From our experience of the slowness with which the perambulator can be rolled over the large

stones, we sent it together with the large theodolite a-head at 8, and moved ourselves at 10. The road at first was tolerably good, lying upon turf and passing some lakes which were frozen over, latterly it was rocky and the ascent fatiguing, but not near so difficult as yesterday's. We stopped several times to look out for our people, but not seeing any sign of them, we dispatched a man to Nako with orders to bring our bed clothes, a few bundles of fire-wood, and some food to meet us, whilst we proceeded on to a kind of break between two peaks. The last half mile was generally over snow, and both my brother and I felt completely debilitated, and were affected with severe headaches and pains in the ears; the highest vegetation we saw was a plant with leaves like sage, but without smell, it grows at the height of 17,000 feet, beyond which elevation we found no soil. At the top of our station between the peaks, the barometer shewed 15.075 inches, which gives the height 18,683 feet. The thermometer when first taken out of the case was 30°, but in less than a quarter of an hour, it fell to twenty-two degrees below the freezing point. After taking a few bearings, with all possible haste, we set out on our return, and at dark met our servants with our bed clothes $1\frac{1}{2}$ mile from Nako, and halted for the night at the height of 13,724 feet without a tent. Our people had brought wood, but not flint to strike a light, we therefore sent them back to the village for some fire. It was past 11 before they returned, and during an interval of near 5 hours, we sat shivering with cold, for the thermometer was 6° below the freezing point, and we had only a couple of blankets each to wrap round us. After we had lighted a fire, we made a large quantity of punch, which we continued drinking till near two in the morning, and I do not recollect any thing that ever refreshed me so much.

The length of our march to-day was about ten miles, and we ascended 6,800, and descended 5,000 feet perpendicular height. The people with the perambulator and theodolite missed the way, and did not arrive till midnight, and their hands and feet were almost frozen.

18th October.—The thermometer at sunrise was 16°, and the cold intense, we could not sleep much owing to it, for excepting a few sticks which we kept for the purpose of preparing breakfast, our firewood was exhausted.

We wished much to see the barometer below fifteen inches, and determined to make another attempt to reach the summit of a peak north

of our yesterday's station, which appeared 600 or 700 feet higher. Being now one and a half miles nearer to it than before, we had every hope of succeeding, so sent off the articles we required there as soon as we could prevail upon our people to move, which was not, however, before 9 o'clock. We were well equipped with instruments for making all requisite observations; we took three barometers, two thermometers, a large theodolite and a small one, a perambulator, a telescope magnifying eighty times, and a smaller one, together with a bundle of sticks to try the boiling water, and a sextant and artificial horizon, with us. We marched a little after ten, and overtook our people not a mile from our halting place; we had infinite trouble in getting them to go on, and were obliged to keep calling out to them the whole way, at one time threatening, and at another coaxing them; to tell the truth, however, we could not have walked much faster ourselves, for we felt a fulness in the head, and experienced a general debility, which together with headaches and pains in the ears and breast, affected us more than the day before. A cold wind that benumbed our hands sprung up, and increased with our height till about 3 p. m., when it died away. After much annoyance, we reached the place where we put up the barometer yesterday, here the man who carried the bundle of sticks sat down and said he must die, as he could not proceed a step further, and neither threats nor the promise of a handsome reward could induce him to move; we accordingly left him, and after an ascent of 700 feet, attained the top of the peak, 19,411 feet above the level of the sea. The road latterly lay over disunited blocks of granite, between which we found large lumps of ice transparent as crystal; we got up the last ascent without much difficulty, which is somewhat surprising. It was 4 p. m. when we gained the summit, so we had no time to make half of the observations we wished; the thermometer was not below twenty-two degrees, but from the wind on the way up, our hands were so numbed, that it was not until we had rubbed them for sometime that we got the use of them. Whilst I was setting up the large theodolite, my brother tried three excellent barometers, which we had the satisfaction to see stand exactly at the same point, 14,675 inches. The Tur-heegung mountain had an elevation of seventeen degrees, and was not more than two miles distant; the ink froze, and I had only a broken pencil with which I got on very slowly. It was twenty minutes to five before

we had finished our observations, the thermometer was eleven degrees below the freezing point, the cold increasing every instant, and we had 7,600 feet to descend, over a bad road, in a distance of six miles. We cautioned our people against delay, and moved downwards as fast as we could walk; we passed the bundle of sticks where it was left, but the man had disappeared, and we next day understood he had reached camp before us. Night overtook us two and half miles from Nako, and my brother had the misfortune to fall and hurt his leg so much, that we greatly feared he would be obliged to remain where he was until assistance could be obtained from the village; after sitting down for half an hour, he found himself able to proceed at a slow pace, so we moved on, and shortly after lost the road by going too far to the right. We got in amongst a confused jumble of gigantic masses of rock, from which we found it no easy matter to extricate ourselves; we wandered about amidst them almost as chance directed for one and half-hours, many of the stones shook under us, and we passed places frightful even in daylight. About nine we espied a light below us, and heard the roaring of the Lee river, which seemed quite close; it being then calm, this made us imagine we had gone beyond the village, but judging from the strange structure of the surrounding mountains which we could scarcely mistake, we thought it impossible we could have done so, more especially as we had seen no cultivation, and there are a good many fields around Nako; we therefore went on and arrived at a Lama's temple that we recognised about a quarter of a mile from camp; we called out, and were answered by some of our people, who came to meet us with a couple of lights. We reached camp at half-past nine, not so much tired as might have been expected; only four of our servants arrived that night, the rest stopped without firewood at our former halting place, and came up late next day, having their feet so much swollen by the frost, as to be unable to carry loads during the rest of our journey. The distance to-day was ten and a half miles. Our last three marches were fraught with accidents; three barometers, a perambulator, and thermometer were smashed in pieces, and the small theodolite, a very neat instrument by Dolland, was rendered unfit for taking elevations, the nonius having been broken off; we had remaining two theodolites, a surveying compass, four barometers, and as many thermometers, a strong perambulator, a couple of sextants, a reflecting circle, a repeating

one, and a chronometer, so we were still very well supplied with instruments.

We had great reason to be thankful, that during these last three days there was very little wind, and none at all when we visited the highest peaks, for had there been any when the thermometer was so low, it must have chilled us, so that we could not have moved, and to have remained at such heights for a night, would have been almost certain death.

19th October.—As many of our servants were unable to walk, from fatigue and sore feet, we halted. The village of Nako is situate about a mile to the east of the Lee river, and is the highest we met with during our tour, being not less than 11,850 feet above the sea; it is pretty large, and inhabited by Lama Tartars, rather different in appearance from those at Shipkè, and not so much resembling the Chinese; there is more cultivation about it than would be expected considering its elevation, the fields which are chiefly wheat and a kind of pulse, extend to the height of 13,000 feet, and have stone dykes around them; yaks are used here in the plough, they are hardy animals, but often vicious. The grain produced, as at most other villages in Koonawur, is insufficient for consumption, and the people subsist by their flocks; there is a pond near this, surrounded by apricot trees, upon which in winter the boys amuse themselves by sliding, but they do not know the use of skates.

This morning the thermometer was eighteen degrees below the freezing point, a shower of snow had fallen upon the adjacent mountains, and every thing indicated the sudden approach of winter; it was now time for us to think of returning, so we decided upon going no farther than Shealkhur. We here received a visit from the Wuzeer Loktus, who has charge of Humgrung, one of the subdivisions of Koonawur, containing ten or twelve Tartar villages, which lies on both sides of the Lee river from Shealkhur to the Sutej; he came here to collect the revenue, and brought us a couple of *chowrees*, and some fine purple grapes from Soongnum.

20th October.—Marched to Chango nine miles, the road was in general good and broad, lying about a mile from the left bank of the Lee river; we found a great deal of red clay at the height of 12,000 feet, and above the hills, were of granite and gneiss. Chango is situate on a pleasant spot between two rivulets near the Lee.

21st October.—Marched to Shealkhur, a fort and village belonging to Busehur, under charge of Loktus ; its distance from Chango is three and half miles ; the road was rocky upon the left bank of the Lee, until under the village, where we crossed it by a bad wooden bridge, the bed of the river is here 10,000 feet above the sea, and the breadth of the stream 92 feet ; but it is not nearly so deep or rapid as the Sutlej.

The fort of Shealkhur is situate in latitude 32° , and longitude $78^{\circ} 38'$, upon the confines of Ludak and Chinese Tartary ; it is in a most ruinous state, and the village is a poor place.

The first Ludak village was said to be a day's march to the northward, but as a single fall of snow might have shut the passes, we gave up the idea of visiting it.

From Koonawur to Garoo there are three roads, one from Shipkè has already been mentioned, another from Shealkhur not so good as the former, lies through Choomoortee, an elevated country under a Deba, where the people dwell in tents, do not cultivate the ground, but subsist by their flocks ; the third road from Nisung crosses part of the Himalaya range at a pass called Gangtung, which is represented as being extremely difficult. It is worthy of remark, that the Koonawurees estimate the height of mountains by the difficulty of breathing they experience in ascending them, which, as before noticed, they ascribe to a poisonous plant, but from all our enquiries, and we made them almost at every village, we could find nobody that had seen the plant, and from our own experience, we are inclined to attribute the effect to the rarefaction of the atmosphere, since we felt the like sensation at heights where there were no vegetable productions.

The traders who cross Gangtung Pass put on so many clothes to defend themselves from the excessive cold, that they can scarcely walk ; they wear a large garment with sleeves reaching almost to the feet, made of sheepskin with the woolly side inwards, trowsers and stockings of the same material, a kind of rude gloves of very thick woollen stuff, and caps and shoes of blanket ; they likewise occasionally wrap three or four blankets round them, and thus accoutred, set out on their perilous journey. No herbage is met with on the way for two days, and travellers are said to have dreadful headaches, and pains in the ears even when at rest ; many goats and sheep die annually, and it is no uncommon thing for the people that attend them, who also some-

times perish, to lose their fingers and toes. This road leads past Chubrung, and crosses the Sutlej at Chuksun *Sango*, a wooden bridge with a railing of iron chains, under Tooling a large collection of tents, where there is a temple with a gilt cupola roof held in great repute amongst the Lamas. Leh, or Leo, the capital of Ludak, on the right bank of the Indus, is reckoned sixteen day's journey from Shealkhur. There are several roads from Koonawur to it, one from Wangpo, another from Soongnam, and two from Shealkhur; they are rocky at first, but afterwards improve. Leo is about midway between Kashmeer and Garoo, being eighteen marches from either.

22d October.—Proceeded to Lee, a village on the right bank of the Lee river, near the junction of a small stream with it. The distance is twelve miles, and as it was late when we started, we did not reach it until upwards of an hour after dark, and half our baggage did not arrive that night. The road was bad, crossing two rivulets, the ascent from the latter of which was extremely tedious and dangerous, being very steep upon sand and gravel that seemed to have but lately fallen; it was a natural slope, and much caution was requisite to avoid putting the loose earth in motion, for there were no marks of a foot-path; with all our care, however, it was not unfrequent to slip back many yards, and sometimes near a hundred feet of sand gave way at once, carrying the traveller with it, but not very quickly; the greatest danger arose from stones displaced by our people who were a-head, which every now and then whirled past us with astonishing rapidity.

23rd October.—Marched seven and a quarter miles to Hango, situate on the bank of a stream flowing to the eastward to mix its waters with the Lee. This valley contains five or six villages, around which there is more cultivation than we had often seen in Koonawur. The road commenced with a steep ascent of 2,500 feet, and then was good and even to Hango, 11,468 feet above the sea.

24th October.—Marched to Soongnum nine and a quarter miles; at first we had an ascent of 3,400 feet by a good but steep road to the top of Hungrung Pass, 14,837 feet in height; this pass separates Hungrung from another of the divisions of Koonawur, named Sooè or Shouung, under the Wuzeer Budreedas; the mountains immediately on either side might be fully 1,000 feet above us, but there was little snow upon them.

and none at all in the pass itself. The wind blew with irresistible violence, and although the thermometer was four degrees above the freezing point, it chilled us so much, that the numbness of our hands continued almost until we reached camp, to which we descended by a good broad road cut into long zigzags, and crossed by some rivulets entirely frozen.

Soongnum is a town of considerable extent and beauty, it is situate on the point under which the Darboong and Bonkeeo unite, the former is a stream of some size, and comes from the N. W., the latter is small, and has its source near Hungrung Pass. The dell through which the Darboong flows is broad and level, and almost an entire sheet of cultivation for about three miles; it is a beautiful spot, and the extensive vineyards and number of apricot trees have a fine effect; it is shut in to the north and south by mountains not under 14,000 feet, to the N. W. is a steep and high pass to Ludak, and on the eastward lies the Sutlej, which the Darboong joins under the village of Sheasoo, four or five miles further down the glen.

Soongnum is inhabited chiefly by Lamas, and its extreme height is 9,340 feet. Trees which we had not seen since we left Numgeea, appeared in this vicinity thinly scattered upon the surrounding mountains, they consist of keloo or kelmung and ree, both varieties of the pine; the last kind which produces the neoza almond in shape, resembling the pistachio nut, and in taste not inferior, is peculiar to Koonawur, and does not grow to the westward of the Buspa or Wangpo rivers.

In the evening we were entertained with a Lama concert, which was far from disagreeable, the music was high and low alternately, one set singing the bass and another the treble.

25th October.—After crossing the Darboong by a good *sango* we marched to Lubrung, a distance of ten and a half miles; the road was good, winding very much, and crossing the Roonung Pass, 14,508 feet high, at the top of which the wind was as strong and cold as yesterday. We found a great deal of juniper on the way, and the berries were large and well tasted, having little bitterness.

Labrung is a large village upon the right bank of a rivulet called Zong, a couple of miles from the Sutlej, and 9,296 feet above the sea; opposite to it, and a mile distant, is the populous town of Kanum, where

the Wuzeer Loktus resides during winter; there are two brothers, named Buleeram and Busuntram, but they are both generally called Loktus, which word properly speaking, should be applied to their house, a building of great extent.

26th October.—Marched to Leepè six and a half miles, the road was bad, lying upon sharp rocks. The houses here, as well as at Labrung, are wholly composed of wood, they are small, and in shape exactly resemble cisterns. Leepè consists of an upper and lower division, both of which contain a good many inhabitants; it lies upon the left bank of the Teteè, a large stream, having its source amongst snow twelve or fifteen miles to the N. W. The vineyards are numerous, and the grapes large and of a delicious flavour.

27th October.—Marched to Akpa ten and three-quarter miles. The road was rocky, passing the village of Jangee, and for the last four miles led through forests of pine upon the right bank of the Sutlej, about a mile from the stream.

28th October.—Proceeded to Pangee ten and three-quarter miles. The footpath was rugged in the extreme, lying a great part of the way upon fragments of granite and gneiss, which appeared to have but lately fallen, and exhibited a heap of gigantic ruins, amongst which we saw many a noble pine lying prostrate, whilst a few with their branches broken off and otherwise disfigured, just barely peeped above the stones. Large portions of rock fall yearly, and their effects are truly dreadful, they sweep every thing with them, and sometimes stop the channels of the largest rivers for weeks.

From Leepè to this place there is a direct road not exceeding fourteen miles, but we chose to go round by the Sutlej, in order to have a better view of the Kylas peaks.

29th October.—Marched to Rogee nine miles. The road was first a very steep descent of 1,000 feet to the Mulgoon, a large stream descending at a considerable angle, rushing over rocks with rapid force, and forming a series of cascades; we crossed it by a couple of *sangos*, the current being divided into two; the ascent from it was fatiguing for a mile, the road then for the next five miles was excellent, leading upon soil through woods of pine, the trees of which attain a large size, but not quite equal to those near Brooang, one of which measured thirty-three feet in circumference; the last one and half mile was of an extraordi-

nary nature along the brink of a tremendous precipice, and often upon unsteady scaffolding that has been constructed with very great labour, this continues for several hundred yards together, and is formed of spars driven into the crevices of perpendicular faces of rock, with their other ends resting upon trees or posts and boards across. Now and then you meet with a rude stair of wood and stone, which must have required much trouble to erect; the rocks project above the path, and the traveller is frequently obliged to stoop in order to avoid them, whilst at the same time he must pay equal attention to his footing.

Part of the road was destroyed last rainy season, and had not upwards of twenty people been early sent off to repair it, we should have been forced to go by the Suttlej, which is nearly a whole march round; by the time we arrived at the place that had given way, they had made several clumsy wooden ladders, which answered our purpose tolerably well. The mountains latterly on either side of the river are craggy, rent in every direction, almost destitute of soil, and thinly wooded, but in the vicinity of Kuahbeer, which we passed half way, the ground slopes gradually to the Suttlej at some distance, and is thickly studded with hamlets and adorned with vineyards.

There are several orchards belonging to Rogee, which contain apples of an excellent kind, nearly as large as those brought from Kabool, which they far excel in flavour.

30th October.—Proceeded to Meero eight and half miles. The road was very uneven upon angular pieces of quartz, gneiss, and granite, often bordering upon a precipice about a mile from the Suttlej, here called Sumudrung. The rocks on our right hand were of the same cracked appearance as yesterday, frequently overhanging the path, and menacing destruction to the left; towards the river the declivity is more gentle, and generally clothed with pines, unless where they have been buried amongst rocks dislodged from above.

Meeroo is situate in the district of Raagramee, and is 8,550 feet high. Besides the subdivisions of Koonawur already noticed, there are three more, Utharabeesh on the southern bank of the Suttlej to the westward of Brooang, Pundrabeeah opposite it on the north side of the river, and Wangpo, containing only seven small villages to the N. W. of Meeroo.

31st October.—Marched seven and three-quarter miles, and encamped near a cave close on the right bank of the Suttlej. The pathway was

indifferent, ascending and descending alternately, and passing the village of Chegaon or Cholang, pleasantly situate near a stream five miles from Meeroo; half a mile on this side of it the road led through an arch formed of two stupendous rocks of granite, which meet at an angle.

1st November.—Marched to Nachar eight miles. The way was rough for four miles to the Wangpo, a large mountain torrent that rushes down a steep declivity, forming a succession of waterfalls in its course, and dashes against the huge masses of rock in its bed with a noise like thunder, throwing up the spray to an amazing height; we crossed it by a good *sango*, and proceeded half a mile upon level ground to Wangtoo Jhoola, a rope bridge over the Sutlej; it consists of five or six cables close together, upon which is laid half a hollow fir tree, about two feet long, with pegs driven through it to prevent its coming off; from this hangs a loop of three or four ropes in which the passenger takes his seat, it is pulled across by two pieces of rotten twine, that from constantly breaking occasion this to be a tedious mode of transporting baggage. The conveyance is a pretty safe one, but greatly alarming to a novice, for the Jhoola is elevated twenty feet above the stream, which runs with great rapidity and a deafening noise. Near this are the remains of a wooden bridge, such as described in Captain Turner's Narrative, that was destroyed on the Goorkha invasion of Busahir. We found the breadth of the Sutlej at the bridge eighty-eight feet, and the height of its bed 5,200 feet, in some parts it is scarcely fifty feet broad, and it was in attempting to swim over at a narrow place that one of my servants was drowned here last year.

After much delay, we got every thing across without an accident, and ascended for three and a half miles to Nachar, where there are a few grapes which seldom ripen; the degree of cold does not depend nearly so much upon the absolute height of the place, as its elevation above the bed of a river, for vines come to maturity upon the banks of large streams, 9,500 feet from the level of the sea, and Nachar does not exceed 7,000 feet in height.

2nd November.—Proceeded eight miles to Turanda in Utharabeesht, and three miles from the western limit of Koonawur. This day's march was beautiful, for the first three and a half miles upon soil and through shady groves of lofty pines, from twenty to twenty-seven feet in circum-

ference, the road then was a rocky descent of one and a half mile to the Syldung, a rapid torrent dashing over large stones, and coming from the Himalaya mountains to the southward; we crossed it above the union of two streams by a couple of bad *sangos*, and then ascended from its bed by a rocky footpath, winding amongst extensive forests of oak, yew, pine, and horse chesnut to camp.

3rd November.—We were detained by a heavy fall of snow and hail, which lay around us in large quantities many hundred feet below the village; had this shower come on ten days ago, we should have been prevented from crossing the passes near Soongnum, which together with those above 13,000 feet, are blocked up for four months in winter.

4th November.—Marched to Soorahun thirteen miles. It took us almost the whole day to perform the journey, for the path which is at all times dangerous from often lying near a precipice upon smooth stones, by the late shower of snow, now frozen hard, had become so slippery, that we could get on very slowly.

We crossed four streams of some size, besides many smaller ones, they are all rapid, but of no great depth. The mountains near this are heavily wooded to their summits, the cultivation increases at every step, and the villages are most thickly scattered.

Soorahun is 7,248 feet above the sea, in Dusow, one of the large divisions of Busahir; it is the summer residence of the Rajah and most of his Wuzeers, who stay here six or seven months in the year to avoid the great heats at Rampoor; it contains several good houses, and a temple attended by Brahmins.

5th November.—Marched to Dhar nine and a half miles. The road was bad crossing the Munglad, a rapid torrent, by a rotten *sango*, consisting of two fir trees, about a foot apart, with small twigs and slates laid across, one of the spars is much lower than the other, and the bridge is both unsteady and unsafe; the descent to the stream was at such a great angle, that we frequently slid many feet at a time, the ascent was equally bad, lying upon pure mica, shining with a bright lustre, and extremely slippery.

6th November.—Marched to Rampoor, distant eight and a quarter miles. The road was sometimes rugged; but more commonly even; part of the way it was a complete swamp, lying through rice fields intersected by many rills.

Rampoor is situate in latitude $31^{\circ} 27'$ and longitude $77^{\circ} 42'$, on the left bank of the Sutroodra or Sutlej; although the capital of Busahir it is not near so populous as might be expected. There are several fairs here during the year, to which the Koonawurees bring blankets of various sorts, coarse shawls, wool, raisins, salt, borax and chowrees, and exchange them for wheat, tobacco, sugar, swords, &c. The houses may be about a hundred in number, they are large, well built, and covered with thick slates of a brownish colour, which form very heavy roofs; upon a few of the houses the slates are cut into oblongs, and laid regularly, which give them a neat appearance, but by far the greater number are of all shapes and sizes, and put on without any regard to order. Under the rajah's palace, a handsome edifice at the northern angle of the town, there is a rope bridge similar to the one at Wangtoo across the Sutlej leading to Kooloo, the breadth of the river is here 211 feet, and the *jhoola* is elevated thirty feet above the stream, which in the rainy season is said to come within four feet of it. In December and January when the river is at its lowest, people sometimes cross upon inflated skins. We found the bed of the Sutlej by barometrical observations 3,260 feet above the level of the sea.

The site of Rampoor is low and much confined, and one of the worst that could have been fixed upon, and from its being encircled by high mountains subtending an angle of between twenty and thirty degrees, a breath of wind can scarcely ever reach it; there is little soil and no wood upon the surrounding hills, and large portions of naked rock appear on every side of the town, which being once heated, retain their warmth for a long time, so that in summer the nights are not much cooler than the days, and from there being no circulation of air, the place for several months in the year is like an oven.

7th November.—Marched to Nirt upon the left bank of the river. The distance is twelve and a half miles, and the road for the first four and a half consisted of short rocky ascents and descents to the Nougwee, a large stream coming from the eastward; we crossed it by an excellent high *sowgo* with a railing, and the rest of the way was quite plain, lying near the Sutlej.

The extreme height of the bed of the river opposite to the village is 2,912 feet, and as this is the last place where we had an opportunity of

measuring it, I shall now endeavour to give some idea of the probable height of Mansurowur Lake.

The Suttlej has a variety of names, being called Sutlooj, Sutroodra, Sumudrung, Sampoo, Langzhing-kampa, Muksung, and Zung-tee in different parts of its course; Sutroodra is most commonly used, by which name it is known from its source to the plains. In the Koonawur language, the words Sampoo, Sumudrung, Kampa, Muksung and Tee, all signify river. Zung means gold, and with the addition of the latter word is applied to the stream at a sandy place near Murung, where gold dust is found. By the accounts of many people who have travelled along its bank to its source, it issues from Lake Rawunrud, called also Rawathud and Lanka, which was confidently said by every body I saw that had been there, to communicate with Mansurowur, although Mr. Moorcroft could not discover the outlet of the latter lake; the circuit of Rawunrud was represented to be no less than seven days' journey, but it is most likely both lakes were included.

From Nirt to Sundum Sango under Numgeea, the horizontal distance by the map is seventy-two miles, although by the road it is almost 140, the difference of level of the bed of the Suttlej in this space is about 5,690 feet, which gives the fall of the river nearly eighty feet per mile in a direct line, from Numgeea to Mansurowur, which is placed agreeably to Major Hearsey, (I fancy not far from the truth, as its position with regard to Shipkè agrees well with the accounts I received,) the horizontal distance is about 167 miles; if therefore only thirty-five feet per mile be allowed for the fall of the river from Numgeea upwards, it will give the extreme height of Mansurowur or Mapang Lake above 14,000 feet, and I am inclined to think this estimate rather under the truth than otherwise, for Mansurowur is unquestionably very elevated, from the circumstance of four large rivers, and perhaps five, taking their rise in that quarter.

1st.—The Suttlej issuing from the lake itself.

2d.—The Sind or Sing-kechoo, known likewise by the name of Sindke Kampa, has its source N. E. of Mansurowur. It is described as a very large river, and the principal branch of the Indus, being frequently called Attuk even near Caroo, three marches to the eastward of which it passes, running close south of the capital of Ludak, and three or four days' journey to the northward of the valley of Kashmeer.

3d.—The Tamjoo Kampa springs from the mountains east of Mapang, and at first flows towards the eastward.

4th.—The Manja-choo, or Kampa, rises south of Mansurowur and runs S.E. The latter two rivers I conclude to be the Bruhmapootr and Gogra.

I likewise heard of a fifth river (but only from the accounts of one person, which however I have not the least reason to doubt, as he travelled the road twice,) said to be crossed eight or ten marches E. N. E. of Garoo; its source is reckoned near Mapang, and it runs N. E., so is perhaps one of the great Chinese rivers.

8th November.—Marched eight and three-quarter miles to Kotgoor, where there is cantonment for two companies of the 1st Nuseeree Battalion. The road at the beginning of this-day's journey lay close upon the left bank of the Sutlej, and then was a steep ascent of 3,500 feet, latterly winding amongst beautiful woods of oak, yew, and pine.

10th November.—Proceeded seven and quarter miles to Kutoo, in order to make some astronomical observations, and get the bearings and altitudes of the surrounding objects. The ascent from Kotgoor is not less than 4,000 feet, the road at first was good, but afterwards steep and rugged. Kutoo consists of two small forts upon the top of a hill, 10,600 feet above the level of the sea, connected on the N. E. with the snowy mountains. The prospect from this spot is very extensive; upwards of fifty forts, with from four to six towers each, may be distinctly counted in the Rajships of Kooloo, Sooked, and Munde, N. W. of the Sutlej, beyond these are seen high mountains covered with eternal snow; to the N. E. and East, appear the outer range of the great Himalaya chain, extending until it is lost in the horizon, whilst to the South and S. W. the hills decrease in height to the plains, which are clearly distinguishable at a distance.

We were detained here until the 16th, for we were involved in mist for several days, during which time we could not see half a mile on any side; the thermometer did not get above 34° in a house, with a large fire for two snowy days, and at sun rise was 28°, but when the clouds cleared away, it rose to 40° and 41° at noon.

After completing our observations, we returned on the 16th to Kotgoor, where we stayed a couple of days, and on the 19th marched to Jeemoo nine and half miles. The road for about four

miles was generally good, passing many villages, and lying upon the face of a left hand range covered with dark forests of various sorts of trees to a small stream, from whence there was a steep ascent of 2,400 feet through a thicket to Nagkanda Pass, 9,000 feet high, here we found a great many hazel trees, but all the nuts were rotten; from the pass to camp, we had a moderate descent of three miles upon the slope of a grassy range that lay upon our right.

20th November.—Marched to Muteeana nine miles. The road for near six miles was good, upon the right bank of a rivulet, and crossed by many brooks to Mandunee, where there is a handsome temple built in the Chinese style; after leaving it, we crossed the Kuljehur, a stream coming from the northward that divides Koomarsaen from Keonthul, two small states under chiefs called Ranas. Keonthul is largest, and extends from Muteeana to the vicinity of Soobathoo. The descent to the Kuljehur was steep, and the ascent equally so, each about 1,000 feet. The mountains we passed are wooded with pines and oak in the vallies, but above produce little except grass.

22nd November.—Marched to Bunee fourteen and three-quarter miles. The road consisted of easy ascents and descents near the top of a range upon soil, and through a very highly cultivated country abounding with villages.

23d November.—Proceeded to Simla eleven miles, and next day made a forced march of twenty-two and a half miles to Soobathoo; the latter part of the road has already been described.

Throughout the above mentioned tour, the road was surveyed with some care, and a number of points were fixed trigonometrically, which agree well together; we were very lucky in having clear weather, and always managed to get two, but most commonly three or four meridian altitudes of stars, both north and south, contained in Dr. Pond's catalogue, at every halting place except one.

We had two sextants, and a Troughton's reflecting circle having a stand, with the last of which instruments the latitudes were usually observed. We carried no less than fourteen excellent barometer tubes with us, only two of which returned in safety. The mercury was revived from cinnabar, and was well boiled in the tubes, the last indeed was a most laborious business, for we broke upwards of a dozen of tubes in the operation. The most convincing proof that the air was entirely expelled,

is, that the mercury in the tubes of thirty-two and twenty-six and a quarter inches stood exactly at the same point, although the vacuum in the short ones was not more than three-quarter of an inch, and on applying a candle to the top, the mercury rose a little, whereas had there been the least air, it must have sunk from the expansion, which would have been clearly perceptible in so small a space.

The largest theodolite was constructed by Troughton, and is graduated, both vertically and horizontally, to twenty seconds; the elevations of most mountains subtending small angles were taken with it, and those above ten degrees, were observed either with the sextant or circle and artificial horizon.

At every camp we tried the height of the boiling point with two good thermometers, which very seldom indeed gave the altitude of the place 300 feet different from the barometer, and had we arrived at our ground in sufficient time to distil water, I have every reason to think the disagreement would have been less, for wherever we had an opportunity of using snow, the coincidence of the two methods was most satisfactory.

The height of the colossal Tuzheegung, whose summit is almost 22,500 feet above the level of the sea, was determined by angles of elevation between four and twenty-four degrees, taken at eight different stations, varying from 9,000 to 19,000 feet in height, and from two to about thirty miles distant from it, and allowing one-fifteen terrestrial refraction, the extreme difference between any two of the observations does not amount to 250 feet. The Kylas Peaks, besides several others, were calculated from many stations at various distances, and none of them differ above 500 feet from one another. The next highest peak to the Tuzheegung is above 21,000 feet, it was seen from Hutoo fifty-three miles distant under an angle of $1^{\circ} 47'$, and its altitude deduced from this comes within 200 feet of what the observation at Rogee gives it, where the distance was eight miles, and the elevation about fifteen degrees.

The altitudes of our stations were calculated by M. Ramond's method above Soobathoo, where the barometer was observed five or six times a day during most part of our absence, and the height of the column was invariably measured from the surface of the mercury. By the mean of a whole year's barometrical observations, Soobathoo was found to be 4,205 feet above the level of the sea.