

mouth extending to below the anterior third of the orbit, lower jaw shortest.

Teeth, pharyngeal,—pointed, 5, 4, 2/2, 4, 5.

Fins. Dorsal commences midway between the snout and the base of the caudal, its osseous ray strong, and coarsely serrated. Caudal lobed in its last two-thirds.

Colours. Purplish silvery along the back, becoming silvery white from about four rows of scales above the lateral line.

*Hab.* Central India, attaining 6 inches or more in length.

(*To be continued.*)



ACCOUNT OF A VISIT TO THE EASTERN AND NORTHERN FRONTIERS OF INDEPENDENT SIKKIM, WITH NOTES ON THE ZOOLOGY OF THE ALPINE AND SUBALPINE REGIONS, Part I,\*—by WILLIAM T. BLANFORD, F. G. S.; C. M. Z. S. &c.

(With a map, plate XXIV.)

[Received 28th July, read 5th August, 1871.]

The extent to which the interior of Sikkim has been neglected by Anglo-Indians is very remarkable. It is true that the country does not present attractions in the way of sport, and this alone is the inducement which takes nine-tenths of our countrymen into the Alpine regions of the Western Himalayas. It is true also that there are no roads, that the tracks along which it is necessary to climb are frequently such as require the use of one's hands as well as legs, that but few supplies are procurable, and that everything must be carried on coolies, who must be taken from British territory; it is also true that the discomforts arising from frequent rain, and the attacks of leeches and insects are, during part of the year, a great drawback to travelling; still it is a curious fact that since Drs. Hooker and Campbell first explored the country in 1848-49, but one European had penetrated to the passes of Donkia and Kongra Lama before the visit I am about to describe, although the country has been open to travellers during at least half the in-

\* This part contains the description of the journey, the second part will consist of notes on the fauna, especially on the birds.



MAP  
OF THE  
EASTERN AND NORTHERN FRONTIERS OF  
**SIKKIM**

Shewing the route of Captain  
Elwes and M<sup>r</sup>. Blanford  
in 1870.

Scale 1 Inch = 8 Miles.

Route marked thus ++++++

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tervening period. Captain Chamer, the solitary visitor who reached the Northern passes, made a rapid journey in search of sport in the spring of 1870, but was not very successful.\*

It had for a long time appeared to me that the fauna of the alpine portion of Sikkim was far less known than that of most other accessible regions of the Himalaya. Much novelty, amongst the vertebrata at least, was not to be expected, because Mr. Hodgson's collectors had ransacked for years the neighbouring regions of Nipál. But still no one, except Dr. Hooker, had ever observed the animals of the country, and the attention of that veteran Himalayan traveller was mainly devoted to the botany, although numerous notes on the fauna are scattered through his delightful "Himalayan Journals." I believe that the popularity of that model naturalist's note book has rather tended to prevent further exploration of the country. Few people can conceive how very little is really known of the fauna of upper Sikkim, despite the number of years that have elapsed since its leading features were first described, or that the animals of the upper Láchén and Lá-chúng valleys are no better known than those of the Pangong lake and Ladák.

The vertebrate fauna of British Sikkim, one of the richest, if not the very richest in the whole world, has been pretty completely explored by Hodgson, Tickell, Jerdon, Beavan and others, but not one of these observers penetrated to the snows. The only travels in Sikkim since the time of Hooker and Campbell, of which accounts have been published, are those of Captain W. S. Sherwill, (J. A. S. B. 1853, XXII, pp. 540, 611,) and Major J. L. Sherwill, (J. A. S. B. 1862, XXXI, p. 457). Both relate to the Singalélá range and the higher valleys south of Kanchanjanga. Several visits have been made to the Cholé and neighbouring passes, but no accounts have been published of any of them, and neither of the Sherwills makes more than passing mention of the fauna of the country.

In the autumn of 1870, I had at last an opportunity of devoting three months' leave to the interior of Sikkim. At the same time I

\* I learn from Colonel Haughton that an account of Captain Chamer's journey has appeared in the "Sporting News" of the present year. I have not had an opportunity of reading it.

learned that Captain Elwes, who had come from England mainly in order to study Indian ornithology, had been staying at Darjiling since the commencement of the monsoon, and was anxious to penetrate into the interior, and that Colonel Haughton, the Commissioner, had written to the Rájá of Sikkim to ask him to give Captain Elwes all the assistance in his power. As we had nearly the same objects in view, we agreed to travel together.

The time at our disposal, August, September, and October, was decidedly unpropitious. All travellers in Sikkim have described the disadvantages of the rainy season; both Dr. Campbell's and Captain W. S. Sherwill's accounts of their journeys in the autumn are a record of constant discomfort. But there was no help, an Indian official must take leave when he can get it, although that be at the worst season of the year.

Our principal object was to reach the upper branches of the Tista valley, where the rains are lighter, and the climate cool in consequence of the elevation. Here we expected to find a very different fauna from that of Sikkim proper, and belonging to the dry central Asian region. A glance at the map of Sikkim will shew that the long hot tedious march up the valley of the Tista might easily be avoided, and Láchúng reached, by crossing the Cholá range, which forms the eastern boundary of Sikkim, by the Yák-lá, or one of the neighbouring passes, marching northwards along the flank of the Chúmbi valley, and recrossing into Sikkim by the Tankra-lá. The only difficulties in the way are the necessity of avoiding the Tibetan guard when entering the Chúmbi valley, and the finding of a road from the one pass to the other without passing through the town of Chúmbi. As regards the first point, Mr. W. S. Atkinson and Mr. Clarke, who visited Yáklá in 1867, found no guard whatever there, and were led to believe that none was usually stationed at this pass. The other difficulty would certainly have appeared the more formidable of the two, had we had much experience of the Sikkim mountains, but having none, we scarcely troubled ourselves about it, supposing that it must be possible to march along the flank of the range without descending into the deep valleys.

Elwes, after much trouble, debate, and enquiry, had learned that the plan was feasible, that there was a pass nearer to Darjiling and easier than Yáklá by which we could cross, and he secured the services of a man, a native of Chúmbi, named Chúdá, who promised to shew us the road from one pass to the other. This man subsequently proved to be an arrant impostor, he did not appear to have any acquaintance which the Cholá range, and we afterwards learnt that he had hired himself as our guide on the strength of two journeys he had made between Chúmbi and Darjiling as a salt carrier. He did not even know the road by which we went, the marches along which, as given to us in Darjiling, proved quite inaccurate. This well illustrates one of the difficulties in the way of travelling in Sikkim. Very little confidence can be placed in any statements as to roads, and especially as to distances, made by Bútias at all events. This is partly due to untruthfulness, but more perhaps to that want of accurate ideas about time and distance which is so characteristic of savage and semi-savage races.\*

Our plan was therefore to march across part of the Bútán Dúars east of the Tista, and through the south-eastern corner of native Sikkim to a pass called Jelep-lá, and thence, if practicable, to make our way to the Tankra-lá along the east side of the Cholá range.

The arrangements about coolies and provisions had been pretty nearly completed by Elwes, before I reached Darjiling, thus saving much trouble and delay. I mention them because our experience may be of service to future travellers. The coolies were partly Nepálese, partly Bútias and only a few Lepchas. The headman or sirdar, Gúruk by name, was a Sikkim Bútia, and a good specimen of the race, tall and stout. He proved an excellent man,

\* Few, if any, savage and semi-civilized races have any conception of distance, as we understand it. They consider places far or near in proportion to the time necessary to reach them. I once had a good instance of this in Sikkim itself, when ascending Tonglú. As I was going up I asked one of the coolies the distance to the summit from the monastery at Simonbong. He said ten kos. When returning and about one kos below the top I asked the same man how far we had to go to the monastery, and he replied three kos. Why, I said how is this, yesterday you told me it was ten kos to the top, to-day you make only four. Oh! said he, it is ten kos to go up, but only four to come down. In connection with this, it may be borne in mind that it is the practise of many civilized nations to reckon their distances by hours.

hard-working, and not given to making difficulties. We had also a second head man or daffadar who, in charge of sixteen coolies, Lepchas and Bútias, with rice and spare stores, was sent direct to Láchung viâ Tamlúng. Another daffadar was in charge of the Nepálese coolies, of whom we took ten, in the hope that they would go with us into Tibet, if the Bútias were afraid to cross the frontier. Neither of these daffadars proved of much use.

Most of the provisions were packed in bamboo Lepcha baskets, lined with leaves to keep out the wet, and each man had a "goung," a cane mat about  $4\frac{1}{2}$  feet by 3 in size, made of leaves between two net-works of split bamboo, serving to protect both him and his load from the rain.

We had arranged to start from Ging on the 13th of August, but as I was not very well, Elwes went on to catch up the coolies, who had preceded us by three days, and I left next morning. I quickly rode down to the Rangít bridge and along the road on the right bank of the Rangít leading to the Tísta. But before I had proceeded far beyond the Rangít bridge, I had to send my pony back, for the road was blocked up with landslips, and the bridges had been washed away by the rain, and from this point I walked on to the Tísta bridge, about  $1\frac{1}{2}$  miles below the junction of the Rangít. The heat was great, as the sun was shining brightly. After crossing the fine cane bridge over the Tísta, I found my Bútia shikari and a mule which Elwes had sent down for me from Kálingpúng. He had found nothing to carry him up, and was nearly knocked over by the heat in the steep climb of 4000 feet without a break.

I ascended easily enough, thanks to the mule Elwes had with some difficulty very kindly procured for me, and I reached the rest house at Kálingpúng about 4 p. m. The left bank of the Tísta is here in the Dáling Dúar, formerly part of Bútán, but annexed after the war of 1864. The rest house, or dák bungalow, is a large bamboo hut. Elwes had gone on some sixteen miles to a place called Phýdong, where we had arranged to overtake the coolies, and he had promised to wait there for me next day.

Kálingpúng is a civilized place with a police guard. It is not visible from Darjiling, but can be seen from the Lebong spur west

of the Rangnú valley. It is on the crest of the spur immediately east of the Tísta, and just above the confluence of the Tísta and great Rangít rivers.

*August 15th.* I again borrowed a mule and started as soon after daybreak as I could get the three or four men who were with me to move. The road led for about ten miles in a north-east direction along the flank of the great spur which runs up to Damsong, passing mainly through clearings in which maize, marwa and hill rice were growing luxuriantly. At length the path ascended to about 6000 feet, leaving the clearings and traversing the splendid open forest which clothes the outer hills of Sikkim at this elevation. Here as usual leeches abounded, but as the day was fine they were not troublesome. I found three or four land shells and a very remarkable slug of an undescribed genus allied to *Vaginulus*, pale brown in colour with a carinate back.

I now sent back the mule I had been riding and walked on, leaving the road to Damsong on my left. After about four miles through the forest, the path descended to clearings again and I met Elwes coming to meet me. He had found everything in order, and we soon reached Phýúdong, a small cluster of good houses with a little open flat covered with grass on which our tents were pitched.

We had two tents, one for ourselves, the other for our men. The first was made out of an old Jabbalpúr *shildári* by cutting it down to 8 feet square and 6 feet high in the middle, removing the lining and replacing it by blanket, and fitting very light bamboos instead of the absurdly heavy ones which are usual in the plains of India. This tent proved both warm and waterproof; it had but one fault, weight, as when wet it required two coolies to carry it. The other tent for our men, of Darjiling manufacture, was much larger and made of American drill. It was light enough certainly, but it was far from waterproof. We had dispensed with tables, chairs and cots, in order to travel as lightly as possible.

Phýúdong is rather a pretty place on the southern slope of the Rishet valley which here forms the boundary between the Bútan Dúars and Independent Sikkim. The stream at the bottom of the valley runs west towards the Tísta, through dense tropical jungles:

from about 1000 feet above the stream or between 2500 and 3000 feet above the sea up to nearly 6000 feet of elevation, the greater portion of the slopes, where they are not too steep, are either actually under cultivation or bear marks of having been so recently, whilst, above about 6000 feet, the head of the valley and a dark stripe on the crest of each spur consist of magnificent unbroken forest. This is the invariable appearance of all valleys in the outer ranges of Sikkim, except where, as around Darjiling, they have been ruined by reckless woodcutting.

16<sup>th</sup>. On preparing to start next morning, Elwes found, to our great annoyance, that a very nice mountain aneroid, which he had brought, had disappeared, having doubtless been stolen. This was very unfortunate, for it was our only barometer, and although the elevations in the upper Tista valley were all determined by Hooker, this is not the case on the Cholá range. Our route led in a sloping direction down to the Rishet stream, and thence up the opposite side of the valley to Rhinok, which, from Phydong, looked barely two miles distant. We started about 8, which was the earliest time at which we could collect our coolies, for all the hill men, like Burmese and other Indo-Chinese races, and like several of the pseudo-aboriginal tribes of India itself, but unlike the Hindús, always eat before starting. We rapidly descended to the river by a road, bad after the carefully zigzagged paths of British Sikkim, but which was magnificent as compared to the tracks we encountered subsequently. On my way down I captured a snake and just escaped being bitten by it, which made me feel uncomfortable for the moment, for it was a most venomous looking brute. It proved to be *Psammodynastes pulverulentus*, a snake which appears made to prove that it is by no means so easy to distinguish between venomous and non-venomous snakes as is commonly supposed and asserted. Really it is not dangerous, but not only has it the flattened head and broad jaw which are usually characteristic of the venomous snakes, but it possesses a pair of long fangs in front of the jaw, so that even after capturing it and examining the teeth, it is difficult to distinguish it from a poisonous species.

The stream afforded a delightful bath, the water not being so cold as to be unpleasant in the hot steaming valley. There were



but few birds, the little plumbeous redstart, *Ruticilla fuliginosa*, was running over the rocks like a dipper, and a superb *Ceryle guttata*, the large black and white kingfisher of the Himalayan valleys, flew past. We halted at the stream for breakfast, and I should have preferred waiting there till the afternoon, but we found that so long as we halted, the coolies did the same, and that when ordered to go ahead, they did so to the distance of perhaps 200 yards and then sat down to wait for us. Rain was threatening, (the weather hitherto had been fine) and we therefore started up the steep ascent to Rhinok. It proved a hot climb through old clearings now overgrown with wormwood, through the close masses of which no wind can penetrate, whilst it affords no shelter from the sun's rays. We camped at Rhinok in an open clearing, surrounded by wormwood bushes. Our coolies got into houses and sheds scattered about in the neighbourhood. We were informed that a Kájí (the Sikkim corruption for a *qázi*) had been sent by the Rájá of Sikkim to meet us here at the entrance to his territories, rather an evil omen, as shewing that the whole of our intended route, which we had tried to keep secret, was perfectly well known to the people in Chúmbi. I had fully expected this, however, for before I left Darjiling I found the story had oozed out some weeks previously.

17th. A night's rain was succeeded by a dull morning with a steady downpour, and our coolies commenced a series of most amusing manœuvres to gain a day's halt. First we had to receive the Kájí, who appeared about 8 o'clock, accompanied by another official who brought us a large present of vegetables, rice, flour and marwa. The Kájí produced a letter from the Rájá written in Tibetan (the court language of Sikkim) on tough silky Tibetan paper, and wrapped in a handkerchief of white Chinese silk, the proper style of envelope in good Tibetan society. The letter was read by the Kájí and, where necessary, interpreted by him into colloquial Tibetan, and then repeated to me in Hindustani by our headman Gúruk, who understood ordinary Tibetan well, although some of the more flowery court phrases were evidently not familiar to him. The purport of the letter was, that the Rájá was greatly pleased to hear that we were coming to visit his country, and that

he would afford us every assistance in his power, but that he begged us not to attempt to cross the Tibetan frontier. The Káji was to accompany us to the Cholá range and to take care of us, which, being interpreted, of course meant to see that we did not cross into Tibet.

The interview lasted some time; after it was over, we determined to breakfast and start. But it was useless sending for the coolies, one man after another appeared with some excuse or other. The rain would cease soon, the road ahead was impassable from its slipperiness, the leeches were terrible and we should be eaten alive, &c. &c. Time went on till it was 11 o'clock, when a Nepálese cooly, who had been over the road before, declared that it was useless to start now as we could not possibly reach Chúsáchen, the next halting-place, before night, and at length we had to give in. I went out and shot two or three birds, but nothing rare: *Ægithaliscus erythrocephalus*, *Grammatoptila striata* &c. In the afternoon there were some large landslips in the valley, and although they were two or three miles distant, the noise was like that of thunder.

18th. There was an improvement in the weather, and we started early. One of the coolies was ill, and I remained behind for some time to make arrangements with the village *mandal*, or head man, to take the poor fellow in for a day or two. Whilst waiting, a flock of hill monkeys, (*Innuus pelops*?) climbed into some trees above the camping ground and I watched them there for some time. They are far less active than the common Indian *I. rhesus*.

Starting at length I climbed to the crest of the range north of the Rishet, perhaps 1000 feet above Rhinok, and found myself on the slope of a deeper valley, that of the Rangchú, on the opposite side. The path led for a mile or two along the side of the hill through high forest swarming with leeches, until after passing a spur it descended rapidly to the valley of a large tributary of the Rangchú; the road beyond this to the Sikkim frontier lay up a long spur between the Rangchú and this tributary.

After a bath and breakfast we proceeded to climb the opposite side, and to our surprise reached Chúsáchen in about an hour. The march was in fact a very short one, and might with the greatest ease have been accomplished the day before. We went

about 1500 feet up the slope of the hill above Chúsáchen to a hut, in which we had a bamboo platform or machan built to sleep upon.

From just above the place where we encamped there was a fine view, much impeded by clouds, over the Tista valley to the westward. On a hill in front, the slopes of which were for Sikkim unusually gentle, stood the large village of Dikiling, its houses and clearings scattered over three or four square miles of country. Throughout lower Sikkim the houses of a village are not placed close together, as in India, but are scattered about, each house apparently in the midst of its own fields; and different houses in the same village are frequently long distances, as much as one or two miles, apart. The only exceptions to this which I saw were in the villages of the Láchen and Láchúng valleys. As the usual object in placing houses together is mutual protection, this appears to indicate that the attacks of enemies have been uncommon, except in the valleys close to the Tibetan frontier, which, in fact, belonged to Tibet formerly.\*

*August 19th.* Our route lay up the spur: rain began almost immediately after we started and continued steadily throughout the morning; it had also poured nearly the whole night. We soon entered the usual high forest, with but little underwood, which marks an elevation of 6000 to 8000 feet above the sea, and in which the leeches are met with in the greatest profusion. They can be kept off to a considerable extent by tying tobacco leaves round one's ankles. In addition to this, I used to powder the inside of my gaiters with snuff, but it is impossible to escape them altogether. After traversing forest for four or five miles, we descended about 1000 feet into clearings, and emerged into a small side valley, leading into that we had left behind at Chúsáchen. The rain had ceased and we breakfasted at some Bútia houses. The coolies had made up their minds to halt at this place, however we induced them to go on and reascended into the forest. After three or four miles we reached Kaphú, the last permanent village on the road; beyond this we were told we should meet no one until we arrived at the upland pastures to which the cattle had been taken for the summer.

\* Hooker's Himalayan Journals, II, 42. (2nd Ed. II, 64.)

At Kaphú there were but two houses. In one of these there was some person sick, and as we could not find a spot on which to pitch our tent, we established ourselves in the other, and our people esconced themselves beneath the house.

20th. Leaving Kaphú, the path, so well worn as to prove the very considerable traffic which passes by this route, led rapidly upwards. The weather was fine at first, but everything was soon shrouded in mist, which not long afterwards became rain. We climbed steadily for about four hours, passing from the open forest to an underwood of dwarf bamboo, which became shorter and closer as we advanced. We passed one small marshy open glade with a log hut standing in it, and soon after coming amongst tree rhododendrons, we came to another very small opening, apparently natural, in which was a second shed, a roof of logs without sides. In this spot, which bears the name of Jelúk, we determined to halt, although our march had been short, as the coolies had had a steep climb. The afternoon passed in steady rain and mist, and the air was chilly. As Elwes's aneroid had been stolen at Phýdong we could but guess at our elevation; but the circumstance that we had fairly entered the rhododendron forest with an underwood of dwarf bamboos, and that we had left nearly all the leeches behind, together with the close resemblance of the forest to that on the top of Tonglú led us to estimate our height at about 10000 feet, or perhaps a little more.

In the afternoon Elwes climbed somewhat higher and came upon pines and junipers. He also shot a female of the Sikkim horned pheasant, *Ceriornis satyra*, a very rare bullfinch, *Pyrhoplectes epauletta*, and some other good birds. I meantime had met with nothing but one or two common *Leiotrichinae* such as *Siva strigula* and *Yuhina occipitalis*, but Elwes's shikari brought in the rare *Cochoa purpurea* and 2 male *Ceriornis*. The pheasants were fine birds though in very poor plumage. All the Darjiling Bútias and Lepchas call them Monál, distinguishing *Lophophorus Impeyanus*, which is also found in Sikkim, as the blue Monál.

We pitched our tent in a marsh, leaving the shed for our men, and we had a small platform-like cot or *machan* of bamboo built inside the tent upon which to sleep. We also determined to make

a short march the next day into the juniper region, and to halt there.\*

21st. It was clear at sunrise, but soon clouded over, indeed from the first the only view was towards the Tista. We went only about a mile up the steep path, coming soon upon dwarf juniper, *Juniperus recurva*, and silver fir, *Abies Webbiana*, which soon increased in size and abundance, until at about 11000 feet, (estimated) the dwarf bamboos for the most part disappeared, and the forest, no longer so high as below, consisted of the silver fir and rhododendrons of various kinds. At about this elevation, we came out into an open space, on the narrow ridge of the spur, gay with a brilliant yellow composite flower, on which many of the peculiar red-tailed green honey-suckers, *Æthopyga ignicauda*, were feeding. The lovely *Myzornis pyrrhoura* was common; I also shot *Conostoma amodium*, a thorough crateropodine in its habits despite its thick bill, *Pyrrhula aurantiaca* and *Trochalopterus subunicolor*, a common Darjiling laughing thrush, which I was rather surprised to find at this elevation. I obtained a few land shells amongst the dead leaves, including a species of *Alycaeus*, a *Diplomatina*, and a discoid *Cyclophorus*, the two former certainly undescribed, a peculiar green *Helix* and a *Glossula*. I do not know of any previously recorded instance in which *Cyclophoridae* have been found at so great an elevation, and as *Alycaeus* and *Diplomatina* are typically Malayan, none being known in the plains of India, their presence at this height affords a remarkable instance of the extent to which this damp-loving fauna has crept up the slopes of the Sikkim Himalaya.

August 22nd. The name given to us by our men for the night's encampment was Lingtú. I suspect this is really the name of a summer cattle station farther up the ridge. It poured all night, and as our coolies had no house to get into they improvised huts of boughs. All the men we had were Bútias and Nipalese, who are both hardy races, and stand cold much better than the Lepchas.

\* At this place and at many others on our road we met Bútias carrying heavy loads of salt and coming from Chúmbi. There is a considerable traffic between Chúmbi and Darjiling entirely carried on by coolies. The exports into Chúmbi are, I believe, sugar, rice, and a little English hardware. The import of Darjiling tea into Tibet is absolutely prohibited.



The path continued steep for another 1000 feet, and led up a craggy spur, too steep for trees in most places. Had the weather been fine, the view over Sikkim would, in all probability, have been magnificent, but, unfortunately, a dense mist shrouded everything. On the top there was much rhododendron scrub, but the road now led along the crest of the spur through small rhododendron trees, and then emerged into open grassy valleys with patches of forest formed of rhododendrons and silver fir. Here, at an elevation of 12000 feet, I first came upon traces of former glaciers in the shape of small pools in marshy hollows dammed up by what were evidently little moraines. I had been carefully watching for marks of glacial action at a lower elevation, but could find none whatever; if any ever existed they have long since been obliterated by the tremendous rainfall and consequent disintegration and denudation of the surface. In the interior of Sikkim, as will be seen hereafter, this is not the case; there glaciers have left unmistakable marks at least 6000 feet lower.

Elwes was, as usual, ahead; I had marched along quietly, shooting birds, looking for landshells, &c. On my road I met the Kaji's servant bringing me a bamboo pot of marwa, which was very agreeable, even in the cold climate we had now reached at 12000 feet. The Kaji had been very polite, and had supplied us with marwa at each day's halt, by no means eschewing the beverage himself. Almost every one who travels in Sikkim takes a liking to this most refreshing drink, however much he may despise it whilst soda water is still available.

In the grassy valleys were large herds of cattle driven up to this elevation for pasturage in the summer; in the winter they are taken down to the warm valleys. During the rainy season I doubt if any terrestrial animals can exist in the forest between 4000 or 5000 and 9000 feet, they would be in all probability destroyed by the leeches. It is certain that the only mammals found are squirrels, monkeys, and a few other arboreal forms; even the pheasants are wanting, after the Kalij, *Gallophasis melanonotus*, is left at about 5000 feet\*, until *Cerionis* is met with at nearly 10,000 feet.

\* Jordon gives for the range of this *Gallophasis* 3000 to 8000 ft., Beavan (*Ibis* 1868, p. 381,) 2000 to 7000. I suspect this is in the cold season, when I

We entered an open grassy valley with rounded down-like hills on each side, and no high mountains in sight. Patches of fir and rhododendron forest were scattered about, and down the centre, marshy in places, a stream ran over pebbles and rounded blocks of rock. The scenery was more like the mountainous parts of Europe than anything familiar to dwellers in India. It looked a paradise for a sportsman, but unfortunately there were no deer in the forest, nor trout in the river. At a halting-place called Gnátong, where was the usual wooden shed, we pitched our tent, after clearing away a space amongst the flags and shrubs which covered the marshy ground, but it was so swampy that we were compelled to make a *machan* to sleep upon.

The Kaji told us that the pass was one march ahead from this, and that from the foot of it a path led along the Sikkim side of the range to Chúmanáko close to the Cholá pass, also that he had just received orders from Chúmbi to accompany us along the range, on the Sikkim side however.

23rd. We resolved to go ourselves to the Jelep pass, as if to visit it, and to see if there was a guard or not, taking our camp only to the foot, or Lagyep. We accordingly started early and walked up a long gentle ascent and over some grassy hills, and then descended through rhododendron scrub to the banks of a pretty little lake,  $1\frac{1}{2}$  to 2 miles long, called Bidan-Tso. This lay in a valley between the hills we had just crossed and the steep, high and craggy dividing ridge between Sikkim and Chúmbi in Tibet. A line of watershed crossed the valley just where our road traversed it, the lake discharging its waters to the south-east, whilst a stream, coming down from the frontier range just above the head of the lake, runs to the north-west down the valley. Our road led to the north-east up the valley of this stream. Hitherto we had not ascended much since starting in the morning; at any rate the descents had very nearly equalled the ascents, but from this spot we began gradually to rise. The lateral valley we had entered was much more craggy than those left behind, its southern or

have myself seen them decidedly higher than in the rains. During the monsoon I think they keep below 5000, and that *Arboricola rufigularis* does the same, whilst *Ceriontis* rarely descends below 9000.

rather south-eastern side being a dense mass of rhododendron scrub up to an elevation of perhaps 14,000 feet, while the north-western hill side was bare. Here we first caught sight of the giant Sikkim rhubarb, some idea of which may be gained from Captain W. S. Sherwill's figure in J. A. S. B. 1853, p. 618\*, its "pale pyramidal towers," as Hooker calls them, being very conspicuous, scattered over the hill sides more than a thousand feet above, and looking in the distance like white posts. Gradually ascending, we started from amongst the rocks a flock of snow pigeons, *Columba leuconota*, but birds were not numerous, *Calliope pectoralis* and *Propasser thura* being the most conspicuous.

We slowly ascended to a barren ridge forming the crest of the Jelep pass, at about 13,000 feet or rather more; to the south-east was a little lake amongst high crags, to the north some steep masses of rocks; no snow was visible. On the crest of the ridge some 20 Tibetans were posted to oppose our passage; they were quite unarmed, except with their knives, and remained seated around the pile of stones which marks the frontier; their Jong or Captain, a round-faced rosy Tibetan, with by no means an intelligent countenance, in the centre. He appeared to take no notice of us, and seemed solely occupied in muffling himself in his huge cloak to keep off the wind, which blew piercingly over the exposed ridge we were on. We subsequently learned that the guards, Jong and all, I believe, were merely villagers, who were ordered up to guard the frontier, and singularly enough, neither on this nor on any subsequent occasion did we meet with soldiers such as Hooker describes.

To the east, the view was poor, everything at a distance being enveloped in cloud. Elwes, who reached the top a few minutes before I did, had a glimpse during a partial break of a broad valley, thickly covered with forest. Immediately beneath was a small lake, around which yaks were feeding. Many flowers grew in tufts amongst the stones on the crest of the pass, and we appeared to be nearly on a level with the giant rhubarb plants,

\* The upper bracts are usually a very much paler yellow than they are represented in Captain Sherwill's figure, and in the distance they look quite white. The upper portion of the spire too is often longer and more cylindrical than in the plate.

whilst masses of scrub rhododendron ascended all hills with a northern exposure to a little above our level; we consequently estimated the elevation of the Jelep pass at between 13,000 and 14,000 feet. Two ravens perched on some stones not far from us.

We sat down and eat some breakfast we had brought with us, and then Elwes became disgusted at the stolidity of the Tibetans, and determined to see if they could be induced to recognise our existence. I should have mentioned that two or three questions put to them through one of our own men had only elicited short replies from one or two of the guard, the Jong remaining as insolently abstracted as if he expected immediate absorption into Nirvana. So to teach them a lesson of politeness, Elwes walked rapidly across the frontier and began descending the opposite side. The men were utterly taken by surprise, they stood up and crowded round me, then with one accord rushed after Elwes, scrambling rapidly over the rocks, despite their long cloaks, and, finding that expostulation was useless, they flung themselves down in the path before us, beseeching us to return, and expressing to us by most emphatic gestures, that all their throats would be cut if we persisted in entering Tibet. With all this there was no attempt at violence or threats, they got in our way as much as they could, but that was all. Hereupon we halted and explained to them as well as we could, through a very bad interpreter, that it was not polite to sit and stare at strangers without taking any further notice of them.

I believe that this little incident had an excellent effect, for, in all subsequent visits to frontier posts, we were received with the greatest civility and politeness, and I am convinced that we rose in the estimation of the Tibetans by insisting on their treating us with proper respect.

We walked back from the pass, climbing up to the little lake already mentioned on our way. It is one of the small rock basins which are so often found beneath peaks of mountains, and which are of apparently glacial origin. I suspect that they are formed when the snow line extends but a short distance below the peak, and the glacier is just sufficiently long to hollow out the rock basin in which it rests. At least I have seen a very small glacier

in Norway, terminating in the basin of a lake apparently hollowed out by itself.\*

After examining some of the huge rhubarb plants, the seeds of which were unripe, and looking at some yaks which were browsing in the little alpine valley by which we had ascended, we retraced our steps and found our tents pitched in the broad valley we had traversed in the morning, on a nice patch of dry turf, close to the stream which runs down from the pass. We determined to halt at this place for a day, and examine the neighbourhood.

*August 24th.* It poured all night, and in the morning there was snow on the peaks to the north of us, around the Yaklá.† We walked round the Bidan-Tso, which proved one of the best examples of a glacier lake I have ever seen. Just at the upper or north-west end, there is a horse-shoe shaped moraine, which has formerly enclosed a second lake, now converted into a marsh. At the south-east end of the Bidan-Tso is a second well marked moraine, damming up the lake. From the end of the lake a stream runs down into Bútan, the frontier of which is only a mile or two distant, so that at this spot, the Sikkim, Bútan and Tibetan territories all meet.

Birds were not numerous, and *Raptores* singularly scarce; I only once saw some vultures sailing far overhead. Once or twice swifts appeared, doubtless *Collocalia fuciphaga*, which indeed I shot a few days afterwards, and the Cashmere martin, *Chelidon Cashmiriensis*, was common. I once or twice saw the Nipal wren, *Troglodytes Nipalensis*. In the scrub *Trochaloxypterus affine*, *Phylloscopus lugubris*, and one or two other species, *Merula albocincta* and *Propasser thura* were the principal birds; and on the hill sides *Calliope pectoralis*, *Anthus rosaceus* and *Ruticilla frontalis*. On the banks

\* There is a considerable similarity between these hollows and the "cirques" of the Alps and Pyrenees. In the last number of the Quart. Jour. Geol. Soc., 1871, p. 312, the Rev. Mr. Bonney has shewn reasons for believing that such hollows are due to the action of running water, and not to glaciers. But it is simply impossible for running water to excavate a lake basin, and very difficult, so far as I can see, for it to have formed the vertical cliffs which usually surround the hollows. On the other hand Mr. Bonney is probably quite right in supposing that these and similar results of erosion are due to a combination of different causes, such as rain, streams, and glaciers, and not to one alone, but I cannot help believing that glaciers have aided and very considerably aided in producing the present contour.

† Lá is a pass.



of lakes and streams *Chimarrhornis leucocephala* was far from uncommon, but there were no waders nor wagtails. The only natatorial bird we saw was the "Brahmini duck," *Casarca rutila*, which doubtless breeds around these lakes.

Both ravens and crows were seen, and I came across two choughs, *Fregilus graculus*, a few days later. In the pine woods were blood pheasants, *Ithaginis cruentus*, and on the trees three kinds of crested tits, all rarities, *Lophophanes Beacani*, *L. dichrous* and *L. amodius*. The only mammal noticed was a *Lagomys*,\* and not a single fish, amphibian, or reptile was observed. Indeed the fauna of this elevation appears decidedly poor, and this, so far as the avi-fauna is concerned, is a matter of no small interest, for it goes far to prove that the large majority of the migratory birds, which visit the plains of India during the winter, cross the Himalayas and breed in Tibet and Siberia during the summer. This has lately indeed been confirmed by the discovery of several Indian *Phylloscopinæ* in Siberia, yet many *Phylloscopi* and *Reguloides* breed in the rhododendron scrub of the Sikkim mountains, for we found them with their young. Indeed it is probable that all the birds which we noticed on the Cholá range breed on the hills, because the range does not come in the path of the migratory species, which of course pass down the north and south valleys such as that of the Tista.

The whole of the rocks are very felspathic pale-coloured gneiss, the foliation having a general but varying dip to the eastward. At the Jelep-lá the dip is N.10 E. about 20°, and usually on the crest of the range the angle of inclination is very low. Near the Yák-lá it is in places quite horizontal. A similar horizontality of the gneiss has been noticed on the Singale-lá range by Captain W. S. Shorwill (J. A. S. B., 1853, p. 618, and sketch No. 3, beside the map, p. 540). Curiously enough, the remarkable horizontal foliation appears only to have been observed, both on the Cho-lá and Singale-lá ranges, upon the very crest of the dividing ridge.

\* Of course others occur, but they are nocturnal or burrowers. A day or two afterwards I shot a snow pigeon, *C. leuconota*, and left it in a hole amongst some rocks whilst climbing a small ridge. On redescending I found only feathers remaining, the pigeon having been carried down the hole probably by a weasel or some other small carnivore.

*August 25th.* A lovely morning, the first really fine one we had had since leaving Phyúdong. From our position we could only see a few peaks in the neighbourhood; on one of these only there was snow. It was probably Chúmanáko, known in Darjiling as Cholá.\* We had determined to march north along the range, as far as we could, in the hopes that we might thus find a road to Láchung without descending into the hot, steaming, leech-infested valley of the Tista. Our course led north-west across a pine-clad valley, down which to the south-west we had a view of the Nemi-Tso, one of the largest and loveliest lakes in Sikkim, about 2-miles long, lying in a deep gorge, all the sides of which are covered with dark pine forest. Reascending we came upon an open marshy plain, chiefly a peat moss with a tarn in the middle; evidently a lake bed dammed at the end by a glacier moraine and nearly filled up. On the drier grassy hillocks I found three kinds of butterflies,† tempted out by the fineness of the day. From the opposite end of the marshy ground, a path leads eastward to the Gnatui-lá, a pass said to be intermediate in height between the Jeləp-lá and Yák-lá, but which is not much used for traffic. Rain now came on and after climbing for 2 or 3 miles around the head of a deep ravine, we halted at a spot called Sharáb where some overhanging rocks, forming a "lháp," or cave, afforded good shelter for our men. A small stream running from a little lake close to our camp supplied water, and our men had a wonderful power of discovering firewood in most unpromising places. We here heard that the Rájá of Sikkim was on his road to Chúmanáko, on the Sikkim side of the Cholá, to meet us, but that it was still two marches from the place where we halted.

Here we had an illustration of the short distance of all these passes from Chúmbi. We had despatched a man on the preceding morning to fetch some flour. A messenger came with a bag of flour about 2 o'clock in the day, and assured us that he had left Chúmbi with it after the arrival of the messenger on the previous

\* Cho-lá is the pass, Chámanáko or Dobendikhán the peak north of it.

† *Parnassius Jacquemontii*, a peculiar small variety of *Satyrus Padma*, and a new species of *Argynnis*. I am indebted to Mr. W. S. Atkinson for the names.

afternoon. The distance can scarcely be more than 20 miles at the outside. In fact the town of Chúmbi, the summer residence of the Sikkim Rájá, appears to be little more than a day's march distant from any of the eastern Sikkim passes from the Tankra-lá, close to Láchung, to the Jelep-lá. If this be the case, it is evident that by far the nearest road from Darjiling to Láchung is *via* Chúmbi.

26th. From a ridge near our camp, Kinchinjanga was visible in the early morning; it was the first time I had seen it since leaving Darjiling. Our road on starting led over this ridge, and into a large valley in which is a fine lake, the Tanyek-Tso.\* It lies higher than the Nemi-Tso and above the limit of trees. The stream running from it is said to join the Rangchú.† Near this lake 3 monals flew up from the hill side, and settled amongst the rhododendron scrub. As this scrub covers some most difficult ground, chiefly consisting of immense blocks of rock, often loose, and concealed by thick bushes, I sent my shikarí after the birds, but he failed to shoot them.

Another longish ascent led to the verge of a deep valley up which passes the road to the Yáklá. Like all the other glens on this part of the Cholé range, the southern side is covered with rhododendron scrub, the northern being bare. The scrub abounds in the Scotch parsley fern, *Cryptogramme crispa*. We descended to the bottom and encamped at a spot called Byútán, most of our coolies joining some yak herdsmen whose black blanket tents were pitched on the slope above us. We were just above the highest trees, consequently above 12000 feet, but I found a toad (*Bufo viridis?*) and a large slug near our camp.

The Yák-lá is only a few miles from this spot and must be above 14000 feet high. It is said to remain open after the Cho-lá is closed by snow, but the Jelep-lá and Gnatui-lá remain passable still longer, indeed the latter is rarely interrupted for many days together.

27th. At Byútán we heard positively that the Rájá‡ was

\* The three lakes Bidan, Nemi and Tanyek are not marked in any map. All I believe far exceed in size Catsuperrí lake, which Hooker was told was the largest in Sikkim, (Him. Jour., vol. i, p. 363.)

† The Rinkpo of Hooker's map.

‡ I use the term Rájá because it has been invariably applied to the ruler of Sikkim, although it is not correct to give a Hindu title to a Buddhist Indo-Chinese chief. I learn from Colonel Haughton that the correct Bútia title is Denjong Gydy-bo.

awaiting us at Chúmanáko. On a lovely morning, we climbed up beside the yak herdsmen's tents to a rather high ridge, whence there was a superb view of the Cholá peak or Dobendikhán, in one direction, and of Kinchinjanga in another. This was the last really fine day we had for a long time. On the ridge we shot two large rose finches, *Pyrrospiza punicea* and *Procarduelis Nipalensis*. A long descent, the road down which had been cleared for us, led to the Cholá valley amongst firs and rhododendrons, and after crossing the stream we found two of the Rájá's officers in flowered blue silk dresses, awaiting us with a couple of mules, on which we rode about two miles up the valley to Chúmanáko. This is the spot where Campbell and Hooker were seized by the Rájá's officials in 1849. We found a tent pitched for us and the Rájá's half brother awaiting us; he had brought us a quantity of very good biscuits, far superior to Hindu "mitai," and dried fruits. The Rájá's tents were about a mile farther up the valley, and his brother asked if we would go thither in the afternoon, or would prefer deferring our reception till the next morning. We agreed to pay our visit in the afternoon, and about an hour afterwards two mules were sent for us, on which we rode up to the camp.

A durbar tent was pitched some distance below the Rájá's encampment, and, on entering it, we were again met by the Rájá's brother and conducted to the Rájá, who sat behind a kind of altar, on which joss sticks were burning, at the extreme end of the tent. Chairs were placed for us on the left; every body else, including the brother, remained standing. Both the Rájá and his brother were dressed in long robes of flowered yellow silk. The Rájá\* stared at us and paid no attention to our salutation, indeed during the whole interview he remained abstracted, gazing steadily in front, and only once or twice looked up when any remark of ours was repeated to him by his brother; and even then he did not utter a word. I do not believe that any discourtesy was intended; I have no doubt that the whole of his behaviour was in complete accord with Tibetan ideas of sanctity. The highest human attainment, according to the Buddhist creed, is

\* The present Rájá is, I believe, the son of the man who imprisoned Hooker and Campbell; he succeeded in 1863-64.

complete abstraction from all sublunary matters, and meditation; and the poor old Rájá, who appears to be a mere puppet, acts up to the Buddhist ideal. His brother, on the contrary, a much younger man, is a fine tall intelligent Tibetan, whose face beams with shrewdness. He is the picture of a diplomatist, and is probably the real ruler of Sikkim. Hooker's old enemy, the Dewan, or Pagla Dewan, as he is called in Sikkim, is no longer allowed to enter the country, but he is still a powerful man and holds the post of Governor of Chúmbi. He is greatly esteemed by all Tibetans, and all whom we afterwards met spoke of him with great respect. Doubtless the Rájá is much influenced by him, and it is to be hoped that he has learned by experience the folly of a policy of opposition to the British Government.

Our whole conversation was with the Rájá's brother, of course through an interpreter, Gúruk officiating in that capacity. We were first assured of the Rájá's satisfaction at seeing us, and then followed a string of questions as to our ages, occupations, families, &c. After this we requested to be allowed to proceed through Chúmbi to the Tankra pass, but we were assured that our entertainer had no power to permit us to go through Tibetan territory, that the orders of the Tibetan government, and still more of the Chinese government, were imperative, and we were begged to prosecute our Journey *via* Tamlúng and the Tista valley to Láchúng, and promised that the Rájá, in his own dominions, would give us every assistance, and have all the roads repaired. We were assured that there is no road along the range from the Cholá to the Tankra-lá, that it is only possible to go from one to the other *via* Chúmbi, at the same time it was admitted that the distance is very trifling, not more than 3 or 4 days easy marching, by Chúmbi, whilst there is a long circuit to be made by Tamlúng and Chúngrám. Of course we had to yield, though it was disgusting to be obliged to return to the hot valleys, and to lose so much time in them. Our assurance that the Chinese government had by treaty consented to allow Europeans to travel in all parts of its dominions was met by the reply that orders to the contrary had been received from Lhassa and Pekin, and was evidently not believed. It is to be regretted that no steps have been taken by the British Govern-



ment to convince the Tibetans of the existence of this treaty with China. This is not the fault of the Government of India, but of the British Government and its representatives at Peking.

We returned to our tent after about an hour's interview, somewhat disgusted at the result, though it was only what we had expected. We determined to halt the next day and then start for Tamlóng.

28th. We borrowed mules from the Rájá in the morning and rode up to the Cho-lá, nearly 15000 feet above the sea. It is scarcely worth visiting, as it is in a hollow between two hills, and there is no view over Chúmbi. At the frontier chait we found an officer and a guard of about 15 men, who were civil, and greatly relished some whiskey we had with us. The morning was misty, and the peak of Chúmanáko or Dobendikhán completely concealed by clouds. On our way down we found the Rájá's brother waiting for us at the Durbar tent; he excused the Rájá's absence on the plea of ill health. We had again a long conversation, with enquiries upon all kinds of subjects. In the course of it, fuller details were given to us of the Rájá's position, and of an application he wished to make for an increased allowance from the British Government; some allusion had been made to this the day before, but I replied that we were simply travellers and had no authority to receive any communications intended for the Government; that all such should be made to Colonel Haughton, the Commissioner. Of course we could only repeat this. At the same time we added that doubtless the Government would learn with pleasure that we had been so well received and aided in travelling through the country, and that they would have been still more pleased had we been allowed to go through Chúmbi. Meantime cups had been placed before us and kept constantly supplied with buttered tea, not a bad drink in a cold climate, and after some time breakfast was brought. The first dish was little dumplings filled with chopped meat; after this we had large cups of a kind of macaroni stewed with a very nice gravy and some meat. Small plates also were placed before us containing red pepper, garlic and radishes, the two latter cut into small strips, and a pair of chop sticks, our endeavours to make use of which were only moderately

successful. Rather to my surprise, both dishes were excellent, as well flavoured as if prepared by a good European cook, with none of the excess in grease and spice which renders most Indian cookery so unpalatable to the European taste. After the meal a large present of blankets, carpets, silk, vegetables, dried meat, eggs, butter, honey, arrack and 6 sheep was brought for us. We had already apologized for having no present with us for the Rájá, for, not having any expectation of meeting him, we had left a vase and some glass ornaments intended for him at Darjiling, to be forwarded to Tamlúng, so as to meet us there on our return journey.

Later in the day the Rájá's brother came to see us at our tents. We shewed him guns, books, &c., and, like all the people in Sikkim, he especially admired the plates in "Hooker's Himalayan Journals," probably because he could understand them. Finally he took his leave, having deputed a fat round-faced little Lama named Kechú to accompany us to the Láchúng and Láchén vallies.

29th. We started down the valley on the following morning. For 5 or 6 miles the path leads through one of the loveliest valleys I have ever seen, the abundance of rhododendrons recalling an English shrubbery. It was here that Hooker collected in two days seeds of 24 different species. A pika (*Lagomys Roylei*), abounded in the underwood, and birds became very numerous as we descended. I shot *Collocalia fuciphaga*, *Ianthia rufilata*, *Chelidorhynch hypoxantha*, *Siphia strophciata*, *Lophophanes Beavani* and *L. dichrous*. The day before, Elwes had secured the Cashmere dipper *Cinclus Cashmiriensis* at Chúmanáko, and the two water redstarts, *Chimarrhornis leucocephala* and *Ruticilla fuliginosa*, were common on the banks of the stream.

We breakfasted at Barfonchen and then walked on to Lagyep. The path soon leaves the valley, and, after a long ascent of 1500 feet, we climbed down a steep spur to our halting-place, a small open space in an excessively swampy condition. It had poured all the afternoon and continued to do so all night.

30th. It was raining in the morning and only ceased to do so about 9 o'clock, by which time we had descended rapidly by a steep road from the rhododendrons to the oaks and chesnuts, and

from them to the subtropical flora. On the road I had a snap shot at a *Ceriornis* running away through the trees, but I was, as usual, unsuccessful. We halted at the Rájá's rest house at Rangpo opposite to Tamlúng. The change from the cold of Chúmanáko was by no means unpleasant, but I imagine our coolies enjoyed it more than we did.

31st. We crossed the valley to Tamlúng, an easy march apparently, but really a very tedious one, being a descent of about 3000 feet, and an ascent of the same amount. At the bottom we crossed two streams, near their confluence, by cane bridges, and then climbed up through rice and marwa fields to Tamlúng. Here we put up in a large monastery, or Gúmpa, some distance west of the Rájá's palace. In front of the central building of the monastery there was a square grass plot, to the west of which a covered gallery, enclosed on one side, had been prepared for us. The monks or Lamas live in little houses scattered around the Gúmpa.

In the afternoon we visited the Gúmpa, which consists of two chapels, one on each floor. On the lower floor, in front of the chapel, is a verandah, with a row of praying-wheels along the railings which run along the front of it, and the rattle of these praying-wheels was incessant, as every monk walking along the verandah gave each of them a twist with his hand as he passed. In a side room one Lama was constantly employed turning a large praying-wheel by means of a treadle. Each chapel contains gilt figures of various Buddhas behind an altar, on which stand numerous brass cups of water; these are emptied every day at sunset and refilled in the morning. Immense trumpets, cymbals and other noisy instruments are employed in the acts of worship. In each of the chapels are libraries of Tibetan books, none of which are manuscript, but all printed in Tibet, mostly it is said at Jigatzi, from wooden blocks. The books consist of separate leaves of *Daphne* paper printed upon both sides, and all are either tales of Buddhist saints, or works on religion. The leaves of each book are secured between two boards, and the whole enclosed in a cotton cover.

Around the chapels hang the masks used by the Lamas at their great festival, when all belonging to the monastery collect from

the different places where they are dispersed, and a solemn dance takes place on the grass plot in front of the monastery. The masks are chiefly those of devils, the most gorgeous of all, with much gilding, being no bad imitation of the Satan of mediæval Christianity. The great festival, we were told, takes place in December, and is doubtless no other than our own Christmas, or, to speak more correctly, Yule.\*

But few of the Lamas were at the monastery at this time of the year, and the chief Lama himself was absent. Indeed during the greater part of the year many of the monks reside in their own villages.

In the afternoon we visited the Rájá's palace, which has been described by Hooker. It is surrounded by a wall, and the principal room within is a chapel.

*September 1st.* After much opposition we were obliged to allow our men to halt for a day, Kechú Lama promising to take us to Láchúng in 5 days, (which, I may add, he failed to do). I spent the day, a fine one, in labelling birds, writing up my diary and writing letters, for by good fortune we had found our postman here with letters from Darjiling for us. Several presents of vegetables, rice, fowls and the never-failing marwa were brought to us. Amongst the people who came to see us was Meepo, Hooker's old guide, now no longer a young man.

*2nd to 5th.* I shall describe very briefly our march to Chúngtám, which occupied 4 days. It was a very unpleasant one, through much rain and swarms of leeches. We took the wrong road at starting, owing to some mistake of the coolies, and instead of going directly over the hill behind Tamlúng to Selim and Ringám, we took the longer route *vid* Tingchem. Our first halt was at that place, in a village which had been deserted on account of dysentery, which all the people in Sikkim dread greatly and look upon as contagious. Here we had not been expected, but as soon as we came upon the direct road at Ringám we found a Dewan awaiting us in an excellent bamboo house, which had been built for our accommodation,

\* Compare Journ. As. Soc. Bengal, Part I, 1865, p. 71, for an account by Major Godwin-Austen of the use of similar masks in a mystery play in Ladak. These festivals took place in spring and autumn.

and a large present of a goat, fowls, vegetables, rice, &c., and above all the carcase of a pig. This was the third present we had received in the day; we were in the most populous and the richest part of Sikkim, and the greater part of the population were Lepchas, who, whether from natural good nature, or greater friendliness for Europeans, were always conspicuous by their efforts to assist us. Throughout the Dewan's estates we found an excellent road cleared for us. We went on to Singtám (where we found another house ready) to sleep. Here the Tista valley becomes suddenly narrow and steep, and for some distance there is but little cultivation. We should scarcely have reached so far as Singtám, but for the pig, the promise of which brought on the coolies at a wonderful pace, the Nipalese especially, who love pork as much as a Chinaman.

Above Singtám, near Níngá, the deep gorge, in which the Tista (here called the Láchen Láchung) flows, first assumes the appearance of a glacier valley, an appearance which is increased at every turn, until above Chúngtám, at about 7000 to 8000 feet above the sea, all the sides of the valley are, in places, masses of bare rounded rock with the typical contour of "roches moutonnées." I must here pause to say that the views of this part of Sikkim in Hooker's *Himalayan Journals* do not convey by any means a correct impression. Like most lithographs of foreign scenes printed in England, the characteristic features are lost, the dense forest has vanished, and every thing is Europeanized, to coin a word. No one would conceive from the view of the valley below Chúngtám in Vol. II, p. 21, that the hills to the right and left of the woodcut are 5000 feet above the stream, and that the valley is really a deep gorge, clad in places with the densest tropical jungle. This, of course, in no way detracts from the excellence of Hooker's descriptions of the country and scenery.

From Singtám to Níngá the road is bad, from Níngá to Chúngtám it is worse, being partly over landslips, and for some distance in the bed of the river. A great landslip, about 1000 feet high, from the opposite bank, had converted a long reach of the Tista into a pool opposite Níngá. I found a few landshells, including 2 or 3 *Alycæi* and a *Diplommatina*, but searching for them was



impossible in general on account of the leeches, which at every halt swarmed upon us. I saw a large Agamoid lizard about 2 feet long, which I failed to secure, but two fine *Japalurae* were brought to me and one or two snakes (*Tropidonoti*). Between Nimgá and Chúngtám we found some of our coolies from Láchúng, and their duffadar. These men had been waiting for us for several days, and the duffadar had gone across the Tankra-lá to Chúmbi to look after us.

Hooker mentions terraces along the banks of the Láchen-Láchúng, the name here applied to the Tísta, near this; I could only find traces of them, and they appeared to me due to deposits in the bed of the river when it has been dammed up by landslips, which it is occasionally to a great extent, as observed by Hooker and by ourselves. For upwards of a mile, in one place, we walked in the bottom of the valley over a great flat, in places nearly half a mile broad, of boulders and gravel, evidently deposited in this manner. The extreme steepness of the hill sides and the narrowness of the river valleys in this neighbourhood renders landslips more common and more effective in damming up streams than in most other parts of Sikkim.

*September 6th.* We marched from Chúngtám to Kedám, a short march up the Láchúng valley, but involving a considerable ascent, from 5200 to 6600 feet.\* There is a very marked change about this in the fauna and flora. As far as Chúngtám the common birds are the usual Sikkim forms, but at Kedám we found flocks of the Himalayan Siskin, *Chrysomitris spinoides*, and a titlark, *Corydalla striolata*, abounded in all open spaces. Indeed this may be considered the boundary between the Malay and Palearctic faunas, a boundary which, on the Cholá range, is 3000 to 4000 feet higher. Elwes climbed up the hill sides after ghoral, which inhabit the grassy and precipitous west slope of the valley, but although he saw some, he was unsuccessful in bagging any. Rain at night as usual.

*7th.* A dull misty morning with a little rain. We started about 7 o'clock and climbed over a very indifferent road, crossing the

\* These elevations and all subsequently mentioned are taken from Hooker's Himalayan Journals.

Láchúng river by the last cane bridge in this valley ; for beyond this the bridges which we saw were of wooden planks. The path soon led into open glades covered with high grass and shrubs. It was curious to note the difference in the two sides of the valley ; to the eastward all was dense forest, firs appearing at about 8000 feet, not far above our heads, whilst on the western slope grass prevailed, the trees being mainly restricted to patches of forest beside the ravines, somewhat like the "Sholas" of the Nilgiri and other hills in Southern India.

About 7 or 8 miles from Kedám, on crossing a small stream, we suddenly left our enemies, the leeches, behind, a little below the elevation at which firs begin to appear in the bottom of the valley. These trees appear at an elevation between 3000 and 4000 feet lower than on the Choló range, but the species are different, that seen lowest in the Láchúng and Láchén valleys being a very handsome tree, *Abies Smithiana*, which Hooker calls the spruce. It is far inferior in size to the silver fir, *A. Webbiana*, which only makes its appearance at about 10000 feet, but its elegant conical shape renders it a very beautiful and conspicuous object. A third pine *A. Brunnoniana*, also a handsome dark foliaged tree, appears at nearly the same elevation as the spruce, and around Láchúng, these two trees, with rhododendrons, form the greater part of the forests.

Láchúng well deserves Hooker's encomiums. It is in a broad part of the valley with, on all sides, the remains of the enormous glacier moraines noticed by Hooker, Vol. II, p. 103. These are peculiarly conspicuous from being, without exception, covered with grass, no forest apparently growing upon them.

We found the provisions sent forward from Darjiling a month before safe and in good order. Our men had put up in some stone sheds, with roofs of fir planks, on a grassy flat west of the Láchúng. The main village, built of fine houses raised above the ground in the usual Indo-Chinese fashion, is to the east of the river. The houses are close together as in Indian villages, not scattered over a large area as in tropical and subtropical Sikkim. This may be due to the people of Láchúng being Tibetans, but is partly in consequence, I should think, of their being agriculturists only to a very moderate extent. In fact the population of the Láchén and

Láchúng valleys have two principal sources of livelihood: 1st. Their yaks, of which they possess large herds. These, at the time of our arrival at Láchúng, were far away in the mountains around Momay Samdong and Yeomatong. 2nd. The sale of fir timber and trade. The whole traffic between the upper Tista valley and Tibet is carried on by these people, and they have an extensive traffic in wood for building, which they supply to the treeless regions of Tibet. Twice in the year they cross the Donkia and Kongra Lama passes, and proceed to Kambajong or Jigatzi with their bullocks and yaks, generally laden with timber, less frequently with rice and other tropical products. At the Tibetan marts they exchange these for salt, which, on their return, they again barter with the Sikkim people for rice and other grains. South of Tamlung the traffic with Tibet takes place by the various eastern passes communicating with Chúmbi, from which place a road, said to be good, leads north-north-east towards Lhasa.

8th to 10th. I halted for three days at Láchúng. Elwes went off to visit the Tankra pass on the second day, but I had been so much punished by the leeches in the hot valleys that I thought it advisable to rest a little. Meantime we purchased a yak from the people, that is to say, the Phipun presented the yak to us, and we presented him in return with sixteen rupees, which was, I believe, rather more than its value. To save time in killing, I shot the yak through the neck, its throat was immediately cut, and in less than three hours it was distributed amongst the coolies, who divided every portion, which could by any possibility be eaten, amongst themselves. At the same time we reduced the ration of rice to half a seer, so that our provisions might last the longer.\* The yak meat was slightly tough, but excellently flavoured.

I occupied myself in collecting for a couple of days. Crows (*Corvus culminatus*) abounded, and there were many red-billed choughs, *Fregilus graculus*, both appearing at a decidedly lower elevation than on the Choló range. In the pine forests were nutcrackers, *Nucifraga hemispila*, numerous tits, *Trochalopterum affine*,

\* The ration usually given to coolies in Sikkim, one seer of rice per diem, is very large, and from the quantity of carriage required, a great impediment to travelling. It would, I think, be a better plan to give the men only a small load with additional pay and to make them provide their own food.

*Ixuli* and *Yuhinæ*. *Lanius tephrodornis* was common in the open glades, coming, I think, from beyond the mountains, but I am not certain. However, a few weeks later all had gone down to a lower level. One or two migratory birds were beginning to make their appearance; *e. g.* *Pratincola indica*, which I first saw on the 9th, and Kestrels.

I could only find one landshell, a *Macrochlamys*, and of that but 3 or 4 specimens, all of which had closed the mouths of their shells with an epiphragm, and, I suppose, had retired for the winter. Indeed the nights were slightly frosty when clear, which they rarely were; usually it rained more or less every day. One morning was very fine, and there was a beautiful view of the snow peaks up the valley and those around the Tankra-lá, on which fresh snow had fallen, but long before midday heavy clouds came up the valley and concealed everything.

Mammals were scarce. There were some bears, and I frequently saw their fresh tracks on the hill sides, where they had torn up the turf to get at roots and grubs. The species was doubtless *Ursus tibetanus*. There were a few goral on the steep hill sides above the houses in which we were living, and serow (*Nemorhædus bubalinus*) in the fir forests, but we only saw the tracks of the latter. A langúr monkey (*Presbytes schistaceus*) was not rare, and two or three were shot by a shikari of Elwes's who had been two months in Láchúng, but had not collected much. We heard of *Ailurus fulgens* but did not see it.

Butterflies were numerous on the grassy banks, and appeared whenever the sun shone, the most conspicuous being *Papilio Machaon*, *Satyrus Padma*, and *Argynnis Issæa*.

*September 11th.* I determined to go up the valley to Yeomatong and there await Elwes's return from the Tankra. Gúruk had a severe attack of fever, I therefore left him to come on with Elwes. We had discharged several of our coolies, and the useless Nipalese duffadar, and by giving the men meat as part of their rations, we had sufficient rice to last us for about 20 days, after which we hoped to get a fresh supply from the Tista valley.

A pony was brought for me, on which I rode part of the distance. The roads were much better than in the low regions, but

still the climb over the great moraine just above the fork in the valley was a severe one. All this country has been so admirably described by Hooker that anything I could add from my much shorter visit would be mere recapitulation so far as the scenery and general features are concerned.

After passing the great moraine, the road was much better and more level; patches of the winter's snow were still lying in places in the ravines to the west of the valley, although there was scarcely any on the peaks that were visible. I first noticed larch at about 10,000 feet. My shikari shot a woodpecker, *Picus hyperythrus*, which is very rare in Sikkim, although common in the north-west Himalayas. Wagtails appeared, perhaps coming from beyond the passes, but more probably residents in the Himalayas; I saw one or two *Motacilla* which had not quite lost their summer plumage, and at Yeomatong I found a flock of short-toed larks, *Calandrella brachydactyla*.

Yeomatong is a very pretty place at nearly 12000 feet elevation, with some grand peaks visible when there is not too much mist, but the noble mass which Hooker calls Chang-o-Khang\* was rarely clear whilst I was there. The valley is very straight just here, glaciers descend to within a very short distance, and the whole combination of the deep alpine valley with the crags around, the bluish glacier ice, and the dark pine woods, forms a very striking scene. On the whole I should be inclined to give the preference to this place for beauty, even over Láchung. There is nothing equal to it in the Láchen valley.

I put up in a good sized house built of fir planks, but it was pervious to the rain from above and the cold winds from the side, and therefore I had the tent pitched as a sleeping apartment on the close velvety turf, which was not swampy here as on the Cholá range. Yeomadong is only inhabited in the spring, summer and autumn; in the winter all the people go down to Láchung, or, in severe winters, even farther, taking their yaks with them.

\* This name is used by the Láchen people, and, as so frequently happens in mountain regions, it is not that by which the mountain is known on the opposite side in the Láchung valley. Indeed I could get no definite name for the mountain on this side.

12th. It was clear in the early morning, but, about sunrise, clouds came up the valley, and some rain fell. This cleared off in about an hour, but meantime all the hills around, down to within 1000 feet of the valley, had received a light covering of snow. I started up the east side of the valley about 10 o'clock, and after climbing through firs and rhododendrons for about 2000 feet, emerged amongst grass and rocks; about 1500 feet more took me to the bottom of a small glacier. The giant rhubarb was scattered here and there about the slope, and on my way down I shot one of the grouse-like snow-partridges, *Lerva nivicola*, and an accentor, *A. Nipalensis*. The great glacier which extends nearly to the valley was far beneath me here. At its termination is a peculiar moraine disposed in a terrace. Another glacier which terminates to the northward of the large one, exhibits the same peculiarity in a more striking manner, for lateral moraines, arranged in a double terrace, run for some distance up the side of the valley in which the glacier lies. The cause of the peculiar conformation in the latter case is clear; it is due to the gradual decrease in size of the glacier, and the filling in of the space left between the ice and the sides of the valley by moraines at two successive different elevations at which the ice has stood, but the terrace at the bottom of the great glacier is less easily accounted for.

I had a very slight headache from the climbing, but it soon went off, the men with me suffered more, as indeed they usually did, I think.

13th. A glorious morning. At sunrise there was a little fleecy mist about the peaks, but all above was clear blue sky, and the valley was exposed in all its grandeur. Looking downwards on the west side, a series of crags appeared, of most fantastic shape, terminating in a multitude of pinnacles, here and there set off by the snow which had fallen in the night, and relieved by a few larger snow-covered mountains. Up the valley the huge snow mass of Chang-o-khang rose above all the surrounding peaks, and a big glacier ran down from it which closed the end of one of the forks of the valley. Between the two forks were black rocks with a snowy peak or two rising over them, whilst the eastern slope of the valley was a black mass of fir and rhododendron forest, capped by

sparingly snowed crags and only broken by the huge glacier which descends below all the others, and to which reference has already been made.

I again climbed up the east side of the valley, and shot several snow partridges. On my road up I bagged two blood pheasants (*Ithaginis cruentus*) and I saw some monal, but they were too wary to be shot. On my return I found Elwes who had come from the Tankra-lá; he had been disappointed in his expectations of *Oris ammon*, but he had obtained several good birds, *Lerva*, *Accentor Nipalensis*, *Fringillauda nemoricola* and *Alsocomus Hodgsoni*, the speckled wood pigeon, which it was rather surprising to find at an elevation of 13000 or 14000 feet. He had, however, unfortunately had a touch of fever the day before.

September 14th. We devoted the day to collecting in the fir woods around the valley. The most common birds were the crested tits, *Lophophanes Beavani*, *L. dichrous* and *L. aëmodius*, the first being by far the most abundant. They kept in flocks, and with them were associated many *Phylloscopi* (*P. lugubris*) and *Certhia Nipalensis*. This curious association I noticed in numerous instances; sometimes one or two other little birds were also mixed with the flocks, but the abovenamed species were always together, and I never saw the creeper away from the tits. On the edges of the forest *Ianthia rufilata*, *Tarsiger chrysæus*, and *Trochalopteron affine* were met with, and my shikari brought in the rare *Dryomochares stellatus*. In the open ground *Corydalla striolata* and *Calandrella brachydactyla* abounded, but scarcely any finches appeared. There were several of the red-billed curlew, *Ibidorhynchus Struthiersi*, scattered about the edges of the river; one or two families had probably bred in this spot, as most of those we shot proved to be young birds. Dippers, (*Cinclus Asiaticus*) *Chimarrhornis* and wagtails were common, but no swimming birds, nor any waders except *Ibidorhynchus*. In fact the paucity of water birds, of waders especially, appears characteristic of this part of the Himalayas.

Amongst the moss-covered stones, the Himalayan wren, *Troglodytes Nipalensis*, was common, running in and out of the crevices, and frequently disappearing for some seconds into cavities beneath the rocks. I shot another bird also which for a long time puzzled me,

until at last I found it was *Horeites brunneifrons* of Hodgson. Its actions are singularly wren-like, and I at first thought it must be a *Tesia*, to the neighbourhood of which genus it was also referred by Blyth.

There was a great paucity of Raptores; the common sparrow hawk and kestrels being more frequently seen than any others. Kites (*Milvus govinda*) were common, crows and choughs were abundant as usual. A piping hare or Pika (*Lagomys Roylei*) abounded in the fir forests, but as usual there were very few Mammalia.

*September 15th.* We marched up the valley to Momay Samdong at above 15000 feet, the highest spot in the Láchúng valley at which there are houses. The road leads through forest for some miles, then ascends over the large moraines at a fork of the valley, where the stream joins from the Chang-o-Khang glacier, and, turning up the eastern fork, rapidly rises above the forest. For 4 or 5 miles more the ascent is very gentle, through rhododendron scrub, but finally all vegetation except grass and very small shrubs is left behind. The eastern slope of the valley is grassy and less precipitous than the western, but on each side, here and there, there are glimpses of snow fields and glaciers upon the heights. We traversed more than one fine ancient moraine stretching partly across the valley; and all the projecting rocks at the sides, with many in the bottom of the glen, were rounded by old glacier action. The rounding is most conspicuous just below Momay, but, although I hunted carefully for it, both here and amongst the blocks of stone in the moraines, I could never detect any polished or striated surfaces, such as are so common in Europe. Hooker has also noticed this, and my friend, Mr. Medlicott, tells me that he could never find any of these fine surface markings in the western Himalayas. I do not know whether the erosion of the surface of rocks, to which the disappearance of glacial scratches is due, should be attributed to their mineral character, or to the climate, but the former differs so little from that of many of the best marked rocks in Europe that I suppose the climate must be credited with the alteration.

The dip of the gneiss foliation in the low Tista valley is very



high, or vertical, and as far as Yeomatong it is still considerable. But at Momay it is very low, and just below the village almost horizontal. In the hills to the westward it dips to the west or southwest at an angle rarely exceeding  $10^{\circ}$  to  $20^{\circ}$ . The gneiss is in places granitoid, and often traversed by granite veins; both gneiss and granite consist chiefly of white felspar with but little quartz and black mica.

We selected for our tent a plot of grass in a position sheltered from the wind; our men finding places in some of the houses. There were many people at Momay with their yaks when we arrived, but all left in a day or two afterwards for places lower down the valley.

16th. We heard that a Tibetan officer had come to the Donkia pass, which was about 10 miles away, to meet us, and we arranged to go and see him on the following day. Meantime we resolved to visit the Sibú-lá, the pass which leads from Momay to Phálung and Tangú in the Láchen valley, in order to see if it was practicable for coolies and if we could cross it in case the Tibetans would not allow us to go over the Donkia-lá. We had scarcely gone a mile when we met a man who told us he had just seen a flock of wild sheep, and a sharp-eyed shikari declared he could see some lying down upon a shoot of stones. Neither Elwes nor I could distinguish them, even with the telescope, but whilst we were watching, 16 burhel (*Ovis pahlura*) walked out from amongst the stones, and began feeding in a small plain. Elwes crept in and shot the largest, a young ram. It was about the bulk of an English sheep, but with much longer legs, and proved a grand addition to our larder. We subsequently found that the "*Ovis ammon*" of which we had heard so much were all burhel, and Hooker, I think, must have been mistaken in supposing that he saw the former in this neighbourhood, for, by the unanimous evidence of all the Tibetans, none occur to the south of the Donkia and Kongra Lama passes, although they are to be met with a little farther north in Tibet.

Sending a man back with the burhel, which, I may remark, was the only four-footed game secured by either of us during our trip, we proceeded on our road to the Sibú-lá, passing over the gigantic moraine at the termination of the Kinchinjhaio glacier, and climb-

ing beside another small glacier, partly over grass, but chiefly over piles of stones, many of them loose. At the top was an open barren plateau with some small lakes. I went on till I came to the base of the last ascent; another most difficult pile of loose blocks of stone. It was quite evident that the pass was impracticable for loaded coolies. Here at above 17000 feet I turned back; I felt perfectly well until I did so, but I had a bad headache all the evening from the elevation.

17th. There was a little snow over the whole valley in the morning. We got ponies and started for the Donkia pass. The road led up an open stony valley for 5 or 6 miles, and then ascended rather more rapidly over barren slopes, leaving the Láchúng to the right. We passed flocks of that peculiar bird, *Grandala calicolor*, scattered over the hill sides, and I succeeded in shooting a male in gorgeous blue plumage. We also saw a large lark, probably an *Otocoris*, but it was a cold misty day and a piercing wind swept up the valley, bringing sleet with it, so we had little inclination for ornithology. As we came to the base of the last ascent over a low rocky saddle connecting two higher ridges, all unsnowed, we found the Tibetan encampment, and two officers received us very politely in their tent and offered us the usual buttered tea. After a time there were brought some pieces of cold mutton and flour of roasted corn (*sátú* in Hindustáni) which was eaten by being mixed with buttered tea in each man's cup and made into little balls of dough. We requested that they would allow us to cross the pass and proceed *viâ* Cholámú to the Kongra Lama pass, in the same manner as Hooker and Campbell had been permitted to travel in the reverse direction from Kongra Lama to Donkia. Captain Chamer, to whom I have already referred as having visited these passes a few months before we did, and who was the first who had penetrated so far since Hooker's time, had been told that he might traverse this small portion of the Láchen valley, and he would have done so, but at that time (May) the snow was too deep. We were therefore rather surprised and disgusted at being told that we could not possibly be allowed to go, the Tibetan officers said that especial orders had come from Lhasa, and that their heads

would be cut off, (the assertion was accompanied by a conventional gesture significative of decapitation), if any European crossed the frontier. Expostulation was useless, at every remark, their hands were drawn across their necks to typify their fate if we passed the frontier. At the same time there was no threat of stopping us by force; the people only said "If you choose to go by force we cannot stop you, but all our heads will be cut off." Finally we left them and returned down the valley to Momay. A present of sheep, flour, &c., had been brought for us, but we positively refused to receive anything, as we could only consider people who prevented us from passing a short distance over a tract of country already traversed by our countrymen as enemies.

*September 18th and 19th.* We remained at Momay endeavouring through Kechú Lama to bribe the Tibetans to allow us to go by Cholamú. At first there seemed every probability of success; we were told that the chief fear of the people was that we should want to penetrate farther into the country. We explained that this was not the case, our sole object was to go by an easy route to the Kongra Lama pass and descend the Láchen. We had examined the Sibú-lá, and found it impassable for coolies, and to go round by Chingtám was more than a week's journey. But, on the 19th, we heard that a much higher official had arrived at the pass, and we determined to try reasoning once more.

During these two days we had collected several birds. Ravens and choughs (*F. graculus* only, not *Pyrrhocorax*) abounded, there were also pipits, short-toed larks, *Chimarrhornis*, a beautiful redstart, *Ruticilla erythrogastra*, and flocks of young birds of *Grandals cælicolor*, of which we never saw a full plumaged male, except near Donkia pass. A day or two after the yaks left, many birds also took their departure. Læmmergeyers appeared occasionally, and amongst the migratory birds were kestrels and hoopoes (*Upupa epops*).

On the 18th there was an inch of snow in the morning over the whole valley, and upon our tent it was still thicker, but we were well protected by the blanket lining, and our people were warmly clad and in good houses. We had to send down the valley for firewood however.

On the 19th I went to the Kinchinjhae glacier. This remarkable mass of ice absolutely loses itself at its foot under piles of stones, over which I climbed for more than a mile before I came to any ice, and then I only found some exposed beneath a pile of angular blocks of rock in consequence of the surface having fallen in, I suppose from the melting of the ice beneath. It is evident that some of the hills of moraine debris, such as those to the northwest of Momay, have been formed in this manner, at the termination of glaciers.

*September 20th.* We moved our camp about 5 miles up the Láchung valley, hoping to be able to cross the Donkia pass next day, and encamped at a fork at nearly 17000 feet, where some yaks had been kept earlier in the year, and an abundance of their dried dung supplied fuel. Elwes, who at first had apparently escaped the effects of the leech bites better than I had, but who had been walking much more than I, now found himself rather lame from their effects, and he therefore remained behind at our new camp whilst I rode up to the Donkia pass again. I found the tents of the Tibetans still closer to the crest of the pass than before, indeed they were not more than 200 feet below the top, on the Sikkim side. I was received by an officer in a yellow silk dress, and wearing a conical Chinese hat, capped by a white glass button, the mark of his rank. This was Soná-wándje, the Súbá or governor of Kambajong, and by far the best specimen of a Tibetan gentleman whom we met. He was very polite, but perfectly firm on the point of giving us no permission to cross the frontier; he produced letters which he said had been sent to him from Chúmbi, Jigatzi and Lhassa, ordering him on no account to permit us to enter Tibetan territory.\* An enquiry as to how information of our journey had been received elicited the fact that it had come from Chúmbi, and coupling this with a previous remark of the Súbá's that he had recently received a letter from the governor of that province requesting him to shew us every attention, it appeared to me high-

\* I am inclined to believe that orders had really arrived to stop us. The Tibetans had heard that one European had visited the passes in the spring, and that two others were on their way to them, and so unusual a visitation, in a place in which no white man had been seen for more than 20 years, had alarmed the celestials.

ly probable that this stubborn opposition to our traversing a small uninhabited valley was due to Hooker's old enemy the ex-Dewan of Sikkim; now governor of Chumbi, as I have already mentioned. I, of course, pleaded that there could be no objection to our going where Hooker and Campbell had been before us, but the Súbá replied that the Dingpan who allowed them to pass had been beheaded and his property forfeited.

This story I had never heard before, and I fully believe it to have been invented, indeed I expressed myself unable to put faith in it. It is simply incredible that it should never have been told to us at Chumanáko, when we enquired as to our being permitted to cross the Donkia pass, that no such story should ever have been heard by any previous traveller in Sikkim, and that no rumour of such an occurrence should have penetrated to Darjiling; above all that Captain Chamer should have been allowed to cross Kongra Lama only a few months before our arrival.

But although I doubt whether my friend the Súbá was quite truthful in this matter, it was impossible to be insensible to his politeness. He said he wished very much that no European travellers would come to the Sikkim frontier, for he had just obtained leave of absence and started for a visit to see his relations whom he had not met for years, when he was suddenly ordered back to the frontier to stop us from passing. Indeed it was no sinecure to be perched up on a bleak barren mountain pass at upwards of 18000 feet elevation for several days.

After a long conversation, I expressed a wish to see the view from the pass, but even this was opposed, and I was assured, with the usual pantomime of decapitation, that the Súbá dared not allow me even to look upon Tibet. As I knew this was absurd, the only effect was to make me disbelieve every word I had been told previously. I insisted upon seeing the pass at any rate, promising not to go beyond the chait which marks the frontier, and no further opposition was made. It is not easy to climb a steep path at 18500 feet, and we all made several halts in ascending the short distance which separated us from the crest of the mountain. All on the side by which we ascended was mist, but on the other side it was clear, the only impediment to sight being the clouds which were blown up from behind us.

The scene that bursts upon the eye from the crest of Donkia is one of those which can neither be described nor represented. Cholamú lake is in front beneath the feet of the spectator, beyond is a desert with rounded hills. Farther away range after range of mountains, some of them covered with snow, extend to a distance which the eye cannot appreciate. The total change of colour and form from the valleys of Sikkim, the utter barrenness, the intense clearness of the atmosphere produce such an effect as if one were gazing upon another world in which the order of this is no longer preserved; where a tropical desert is seen amongst snow-capped peaks, beneath the unnaturally clear atmosphere of the arctic regions.

Hooker's description, Vol. II, pp. 123-128, and the view in Pl. VIII, of his *Himalayan Journals*, (larger edition,) give a faint idea of a scene which it is beyond the powers of either art or language to convey faithfully. It is doubtless one of the most remarkable landscapes in the world, and alone worth the journey from Darjiling in order to see it.

I rode back in the afternoon rather disgusted at the prospect of not crossing the pass; not only did I wish to see something more of the Tibetan plain, but the fauna, as described by Hooker, is peculiar and quite different from that of the neighbouring valleys in Sikkim. I especially wished also to see the fossiliferous limestone which Hooker noted, and which, singularly enough, appears just beyond the Tibetan frontier.

On arriving at our camp I found Elwes had not returned, nor did he do so until half past 7 o'clock, an hour after dark. He had strolled out up the side valley which branches off from the Láchúng to the west close to our camp, and leads to a little known pass called Sàng-lá, two or three miles west of Donkia pass. He had gone out without any intention of doing more than looking at the valley; indeed, being rather lame from leech bites, he had stayed behind in order to rest, but he found himself so close to the frontier that he went on to the top of the pass, and then, seeing Cholamú lake beneath him, and no Tibetan in sight, the temptation to go on was irresistible and he descended to the lake, partly by a snow slope, partly over a shoot of stones. There he could find no one;

he had expected to meet with the Tibetan encampment, but that was high upon Donkia, so after firing 3 or 4 shots, of which no one took any notice, he was obliged to climb back by Donkia Pass and to astonish the Tibetans by appearing from the north.

*September 21st.* A bitterly cold morning, hard frost and a little snow. The coolies had esconced themselves amongst the stones in an extraordinary manner, and contrived some kind of shelter, but they chiefly kept warm, I fancy, by huddling together. We called all the men together and sounded them as to whether they, or any part of them, would follow us if we forced our way across the pass. The Tibetans had no arms, and had evidently no intention to use violence, and we could either give them the slip, or push past them. But all, Nipalese and Bútias, alike refused to follow, alleging that the Tibetans would be revenged upon them at some future time. There was no help but to return, and ascend the Láchén to Kongra Lama.\*

Meantime the Súbá of Kámbajong and his men arrived from the frontier, very indignant at what they considered the trick played upon them the day before, for they very naturally concluded that the story I had told them of Elwes being lame was false, and that I had occupied their attention whilst he slipped over the frontier. They were especially angry with Kechú Lama, who had accompanied me. I may add that I believe the indignation was in part assumed, as they all declared that their heads would be cut off, which I took and still take the liberty of disbelieving; their main object being throughout to induce us, by all means in their power, not to attempt to cross the frontier. After a little conversation we persuaded the Súbá that Elwes had only gone from one pass to the other, and pacified him, the more so that, seeing it was hopeless, we promised

\* I should say here, lest it be thought that, in attempting to cross the frontier by pushing past the guard, or giving them the slip, we risked either bloodshed, or the severe punishment, by their own government, of men who had treated us with civility, that I firmly believe both fears were utterly groundless. The Tibetans guard their frontier from the entrance of Europeans because it is the traditional custom, and because the Chinese government orders it. Dozens of sportsmen have crossed at one time or another into western Tibet, but no ill results have ever been heard of. Had we crossed, I believe that the Súbá and his guard, after bewailing their imaginary fate for a reasonable length of time, say an hour or two, would have marched on with us in the most friendly manner to Kongra Lama.

not to enter Tibet, but to go to the Láchen valley by Chúngtám; we finally parted promising to meet again in a few days at Kongra Lama. We offered the Súba some cloth and a few other small presents, but he assured us that he could not receive anything, as it was not allowed by the Tibetan government. A map of the Tibet frontier and a photograph of Elwes he would apply for permission to accept when he met us at Kongra Lama. After the interview was over we marched back to Momay.

22nd. We had a lovely morning, and all the peaks, Kinchinjhaio and the Matterhorn-like Donkia included, were free from mist. We started down the valley, Elwes, who had over-exerted himself in crossing two passes above 18000 feet in one afternoon, and who was consequently very lame, on horseback. On our stopping to breakfast about half way to Yeomatong, I was surprised to see the Láchung Phipan, who was with us, produce a good sized piece of raw mutton, about half a pound in weight, and proceed to eat it without either cooking or sauce, or any addition whatever. I have often seen dried meat eaten raw, but I had supposed that a taste for fresh uncooked meat was peculiar to the people of Abyssinia. It was rather amusing to note that our friend, the Phipan, imitated the Abyssinians not only in the material for his meal, but also in his mode of eating it: siezing the end of the meat in his teeth and cutting off pieces by an upward sweep of his knife. It only required the curved Abyssinian scimitar to have completed the resemblance.

When two or three miles from Yeomatong, I rambled into the forest, and came suddenly upon a flock of blood pheasants in a mossy hollow amongst the fir trees; I shot one or two on the spot, and following up the others, which were far from wild, I killed 5 altogether.

*September 23rd and 24th.* Elwes was so lame that we halted for a couple of days, and I collected several birds, the most interesting being a specimen of that rare buzzard, Hodgson's *Buteo plumipes*, which was brought in by a shikari. The weather was not very fine. On the second day I visited the hot spring below Yeomatong on the banks of the Láchung, described by Hooker, Vol. II, p. 116. The road to it, along the river banks, was one of the very worst I ever traversed, even in Sikkim.



Some migratory birds which we had not met with at first now made their appearance, amongst them *Ruticilla rufiventris*, *Pratincola Indica*, and *Pipastes maculatus*.

*September 25th.* We returned to Láchúng through mist and rain, and re-established ourselves in the house east of the river. On the road I saw some *Cerriornis*, and shot a hen, but the cock again got off. I had no luck with pheasants.

*26th to 28th.* Elwes being still too lame to walk, we were compelled to halt. His leg was so queer at one time that it became a question whether he should not rig up a dhúli or "man-chil,"\* and make the best of his way to Darjiling. But at length he was sufficiently recovered to march.

Meantime I had rambled about the neighbourhood and shot a few good birds, the best being some small Sylviads, *Reguloides*, *Phylloscopi*, *Abrornis*, &c., and a rare long-tailed tit, *Ægithaliscus iouschistus*. I also obtained some nutcrackers, *Nucifraga hemispila*, and several Leiotrichians, such as *Minla ignotincta*, *Siva strigula*, and *Yuhina occipitalis*. *Lanius tephrodornis*, which was abundant a fortnight before, had departed, and the higher hills were becoming richly coloured with autumnal reds and browns.

On the 27th, some of our men took a bees' nest hanging from the rocks, and we obtained a large supply of honey. Curiously enough, although the honey had no effect upon me nor on any of the servants, a very small quantity made Elwes ill. It is notorious that honey in Sikkim is sometimes poisonous, Hooker mentions this, (Vol. I, p. 201,) and all the natives are acquainted with the fact, but in this instance only one out of a large party was affected by it.

*29th.* We got away at last, and marched rapidly down the valley. At Kedam, which we reached about midday, we found quantities of ripe peaches, they were, however, very inferior and tasteless. The marwa was fast ripening on the flats around the village. We did not halt here, but went on to Chúngtám, and put up in the monastery, instead of the little hut where we had previously slept. The monastery is at the base of the hill between the Láchén and Láchúng and overlooks the junction of the two

\* A litter slung to a bamboo as used in Canara and Malabar.

rivers. The weather had greatly improved since we had been in the Láchung valley.

30th. Men had been sent to repair the road, which is never traversed in the monsoon between Chúngrám and Lámteng, the village in the Láchen valley corresponding to Láchung. We started up the Láchen valley on our way once more to the Tibetan frontier. We seemed at last to have a spell of really fine weather, and our only regret was to lose such a day in the bottom of the hot Láchen valley. However, we escaped leeches to some extent in consequence, and certainly not because of their paucity. The path soon crossed the Láchen by a cane bridge, and then led over steep banks, climbed by means of bamboo ladders and poles with notches cut in them. Afterwards the road led for miles through marshy flats. The east bank is for some distance rocky and grassy, the west alone being wooded, but forest afterwards appears on both slopes, which do not rise abruptly to nearly so great a height as in the Láchung valley. The marks of glacial action also are much less distinct, although smoothed and rounded rocks appear here and there. About four o'clock, after a tedious march, we reached Látong, where several dirty houses, uninhabited at this season, were nearly buried in thickets of shrubs. One house was the only place we could find habitable, and this was detestably filthy, whilst there was no place to pitch the tent. All the hills just above us were covered with pine trees.

October 1st. The road up the valley was very much like that of the day before, execrably bad in places, traversing precipices by means of bamboos and notched poles. The bridges, however, had been repaired. We twice crossed the Láchen by cane bridges. The greater part of the route lay through dwarf bamboo underwood, in which leeches were numerous, despite the fineness of the day. At length we came upon pine trees and left the blood-thirsty Annelides behind. The road crossed two gigantic moraines, parts of which were open and covered with grass, and beyond the second we came in sight of a very pretty reach of the valley, looking up to the Zemú fork and presenting an exquisite landscape, although inferior in grandeur to the Láchung at the same elevation. Turning round a corner we came suddenly upon Lámteng, a large village,

with the houses near each other, and all supported on piles as at Láchung. We put up in one of them. The village is at a rather higher elevation than Láchung,\* and the pine trees, (*Abies Smithiana*) descend about 500 feet below it.

On the road I obtained *Proparus chryseus* and one or two other good birds.

*October 2nd.* The weather was still magnificent, and the road, though still steep, a great improvement on that of the day before. Indeed after crossing the Zemú, (where we stopped to breakfast, and I shot a *Picus hyperythrus*,) and ascending the opposite bank, the road was quite practicable on horseback. The communications of the people of the Láchen valley with Sikkim are evidently much more restricted than are those of the inhabitants of Láchung, but the former, like the latter, carry on a considerable trade with Tibet, the road by Kongra Lama being easier than that by the Donkia pass.

The forest after passing the Zemú is mostly small; junipers abound and are finer than in the Láchung valley. About 4 o'clock, after a long march, we reached Tallam Samdong, a large village of stone houses, one of the best of which had been prepared for us. We had a number of clean fir boards laid down and made ourselves comfortable.

*3rd.* The morning was spent in a vain search after a flock of wild sheep on the opposite slope of the valley. We ascended about 1500 feet amongst shrubs with rich autumnal tints, but although tracks were numerous, no sheep could be found. On the road down, we shot a number of snow pigeons, *Columba leuconota*, which are more abundant here than at any other place I have seen in Sikkim, and on which Hooker lived to a great extent when the Dewan and the Súbá of Singtám tried to starve him out of the country. There were a few choughs and crows, but no ravens.

After breakfast we obtained some pretty good ponies and rode to Tangú, a very short march, of not more than 6 or 7 miles, by a very tolerable road for Sikkim. At Tangú were many people with their yaks, the elevation, 12,750 feet, being only a thousand feet

\* 8,900 feet above the sea, according to Hooker.

above Yeomatong. The houses were small and all occupied, but two of the usual black blanket tents had been pitched for us, and we used these in the day, sleeping in our own. We purchased a yak from the people and slaughtered it. At night the other yaks, scenting the blood, came at a gallop past our tent, bellowing and grunting, and a singular scene took place in the moonlight. The smell of the blood appeared to excite them, they rolled in it, fought with each other and rushed wildly about the place. I was afraid they would knock our tent down, but they avoided it.

4th. I remained in camp in the early morning, but after breakfast, about 10 o'clock, we started on horseback for the frontier. The day was fine, but there was a little mist, which increased towards the afternoon. We went up the Láchén valley, not by the alternative route *vid* Phálúng, and ascended over the huge moraine which crosses the valley just above Tangú; a little beyond this we were above the limit of trees, and then the road led for miles through the open valley with grassy slopes on each side. About 7 miles from Tangú we came in sight of a flock of burhel after which Elwes went, but without success. Above this the valley became more and more barren, its bottom consisting of moraines alternating with stony flats. I shot a Cashmir dipper, *Cinclus Cashmiriensis*, in the river, and saw the other Himalayan species *C. asiaticus*, and between us we procured *Ruticilla erythrogastra*, *Accentor rubeculoides*, a horned lark, *Otocoris*, of a species not previously known, and *Leucosticte hematopygia*, only known before from Western Tibet.

My pony being very slow, I did not arrive till some time after Elwes. I found the Súbá's tents pitched under the shelter of some rocks close to the frontier, which is a bleak open plain where the valley is broader than usual. Our friend the Kámabajong Súbá was beaming with politeness and good nature. He had brought us as a present three perfectly fresh skins, one of *Gazella (Procapra) picticauda*, the others of *Ovis ammon*, an ewe and a young ram, to obtain which he had sent out a shikari. He had also four live and healthy Tibetan sand-grouse, *Syrrhaptes Tibetanus*, which he begged us not to kill if he gave them to us.\* Like a true

\* With much trouble we succeeded in bringing these alive to Darjiling, where

Buddhist, he mourned greatly over the sin we committed in shooting birds, though he admitted having once been a sportsman himself, and having actually bagged two wild yaks, rather an achievement.

We spent a most agreeable evening with the Súbá, who is a very gentlemanly, well informed man. He examined our guns, and the few books and similar small matters which we had with us. He accepted the map, after writing the names of the places, and of the marches to Darjiling, on it in Tibetan, and he also took a photograph of Elwes, saying that he had received permission to accept these, but he would take nothing else. He was very curious about Europeans, we being the first he had ever seen, and especially wished to know what English ladies were like. At the same time he begged us not to form our judgment of Tibetan beauty by the specimens to be seen on the mountains.

We had a long conversation, through an interpreter of course, about Tibet. The Súbá had travelled much, having been at one time in Ladák. I was particularly anxious to learn whether the Tibetans as a body are unfriendly to Europeans, or whether the sole hindrance to entering the country is the jealousy of the Government. The Súbá assured me that the people had no ill-will towards foreigners, that, if allowed, they would willingly receive Europeans, and he regretted that he was obliged to carry out the orders he had received. Otherwise he would have had great pleasure in receiving us at Kambajong.

All that we learned as to the geography of the country north of the Sikkim frontier confirms Hooker's account, even to the digging of the salt at the lakes whence a great part of Tibet, Sikkim and Nipal, are supplied. The salt country lies a long distance north of Jigatzi, and is described as a dreadful wilderness in which no one can live for any time. We were even told that the people who procure the salt rush in, dig up a small quantity and run back, or they would fall insensible. Fearful wild animals and the horniest and hairiest of demons guard the frozen soil. All of which means simply that the country is bitterly cold and barren,

however, one died, and a second did not survive the road down to the plains. I brought two to Calcutta, apparently in perfect health, in October, but before I could despatch them to England, both died of inflammation of the lungs.

and that the powers of the imagination are still vivid at elevations of 14000 to 18000 feet above the sea.

Whilst we were conversing a post arrived with some orders for the Súbá. He said they related to an officer who had come from Pekin to visit the frontiers. This led to a conversation about communication with China and we learned that it takes a year to reach Pekin from Jigatzi. We suggested that a very much shorter time would suffice for communication through India. It appears that the direct road to China is not used in consequence of orders from the Chinese government, which is, I imagine, a Chinese mode of expressing the fact that the road is in the hands of insurgents, and that the only available route is one to the northward, perhaps that by which M. M. Huc and Gabet penetrated to Lhasa. Our statement that British and French troops had once held Pekin was treated as a joke, and the Súbá suggested that perhaps our Government had proclaimed the event, but that nothing of the kind had ever taken place.

About the trade on the frontier we could learn but little: a small quantity of hardware, and small objects, such as spectacles, small looking glasses and similar articles are brought into the country by pedlars. The import of tea is prohibited; this, which we had learned on the Cholá range, was confirmed at the northern passes. It is greatly to be regretted, because a tea-drinking nation like the Tibetans might be much better and more cheaply supplied from Sikkim than from China.

Of the wild animals, both *Ovis ammon* and *Ovis nahura* are pretty common in the country north of Sikkim. The Goa Antelope, *Gazella picticauda*, is less so. The Súbá expressed his surprise at Hooker having seen Chiru (*Kemas Hodgsoni*) at Cholámú lake, and said he had never heard of any in that neighbourhood. The wild yak is not found in this part of Tibet. The Súbá had an overcoat lined with the fur of an ounce (*Felis uncia*, the snow leopard of the Western Himalayas), but he said the animal was not common.

*October 5th.* The night was bitterly cold, and in the morning the ground was covered with hoar frost, and all the little marshes frozen, whilst a keen north wind was blowing. We visited the chait

at the frontier,\* and found a guard sleeping around it, with walls of loose stones built up to protect them from the wind. An attempt was made by our head man and the Lama to induce us to salaam to the chait, which is considered sacred, and moreover is a representative of the rulers of Sikkim and Tibet, as it contains a board with their seals impressed on it, one on each side. However, on our objecting that it was not our custom, the matter was not pressed.

There was no view across the frontier. Barren rounded hills closed the landscape at a short distance. Barren and uninviting as they were, I would have given much for a few hours upon them. But we had promised not to cross the frontier and I could only ramble about on the Sikkim side. I walked back towards Tangú very leisurely, Elwes going by Phálúng. I shot a number of *Leucosticte* and two birds of an apparently undescribed finch, which I at first took for a snow bunting, but it is, I believe, a new *Montifringilla*. I saw a couple of slate coloured hares, but failed to secure either, whilst Elwes picked up a fine fox's brush. I also, on this occasion, came across the yellow billed alpine chough, which is far rarer than the red billed bird in Sikkim.

Thus, in the upper Láchen valley we met with a lark, 2 finches, an *Accentor*, and a chough which we had not previously obtained, and had we had more time, the list might probably have been increased. Læmmergeyers were abundant, but again I failed in obtaining a specimen. The fauna in this valley is more thoroughly Tibetan in the upper part than is that of the Láchúng.

The morning was fine, but about midday mist was blown up the valley, and a little rain fell. I did not reach camp till late in the afternoon. The Tibetan Súbá had accompanied us, on the plea of having business to transact with the Láchen Phipan in Tangú, but really, I believe, from fear that we should in some way give him the slip and cross the frontier.

6th. We halted at Tangú, and were busily engaged all day in skinning, and preserving the *Ovis ammon* skins. I had intended to go to Phálúng, but the weather was vile, misty and wet. The

\* The name of this place is Djokongtong. Kongra Lama is, I think, the name used by the people of Sikkim proper, not by those of the Láchen valley.

Súbá passed much of the day with us, looking over books, &c. He was greatly disgusted at our bird collecting, but told us that so long as Kechú Lámá remained with us, the presence of so holy a man might protect us. Evidently he wished us to infer that to go on in our wicked ways after the Lámí left would entail our certain destruction. I am inclined to believe that any one trying to enter Tibet will find it much easier to do so if he carefully abstain from shooting and from taking life in any form. The mere eating of meat will not injure him; when we taxed the Súbá with having animals killed for food, he replied that he only eat very little meat, and that, after it had been killed at least three days.

The curious idea about heavy rain being caused by shooting, to which Hooker alludes, is universal in Sikkim, and we were several times told that if we wished for fine weather, we should not shoot.

Our friend greatly coveted one thing, a rather nice pair of binoculars which I had with me, but nothing would induce him to accept them. As we did not like to leave this worthy Tibetan without some return for his kindness, Elwes at length, after I had left, again offered him the binoculars, and finally exchanged them for a handsome set of Chinese or Tibetan table utensils, *viz.*, a long knife, and a set of chopsticks in a shagreen case: the Súbá had begged to be allowed to purchase the glasses, which, of course, we would not allow.

Of four sheep which the Tibetans had given to us, one died and two others were sickly, having been poisoned, our people said by a shrub with a yellow flower, which grew in abundance in the neighbourhood. Hooker attributed similar accidents at the same place to a rhododendron, (*R. cinnabarinum*). Our coolies ate all the sheep, including the one which had died.

*October 7th.* Elwes went down to Tallam Samdong with the camp. As the march was a short one and the day fine, I determined on riding to Phálung first, in order to see the plain described by Hooker. The road led north-north-east up the valley of the Tangú-chú for 5 or 6 miles, rapidly ascending above trees and then more gradually over grassy slopes. I saw a herd of burhel, but, as I had no rifle, I did not go after them. After about 2 hours ride I came upon the undulating expanse of grass at about 16000



feet. The little plateau, 2 miles by 4, according to Hooker, (and I have no doubt his measurements are correct) is not only, as he says, covered with transported blocks, but the whole mass is composed of moraine, not a rock is to be seen in place throughout! The marshy bed of the Cháchú, in the valley which runs along the eastern side of the plateau, quite agrees with Hooker's description of it as an old lake bed, the terminal moraine to which the lake was due still existing. I climbed down to this valley and satisfied myself that the slope of the plateau from top to bottom, 500 feet at least, consists of loose stones and angular gravel, the usual moraine debris.

It is not easy to account for so enormous an accumulation of moraine as that of Phálúng from the little valley of the Cháchú, for if the Phálúng plain and a corresponding moraine of smaller dimensions, which is seen east of the Cháchú, on the flanks of the Chang-o-Khang spurs, are the lateral deposits from the glacier which formerly filled the Cháchú valley, how it is possible to account for the comparatively small size of the terminal moraine which dams up the old lake bed. That such an accumulation as the Phálúng plains can be formed at the termination of a large glacier is seen at the end of the great Kinchinjhaó glacier near Momay Sám-dong, but then this difficulty arises: suppose that glaciers from Kinchinjhaó and Chang-o-Khang deposited this mass of debris, there must have been an increase in the length of the Cháchú glacier in order to cut out again the lake bed in which it now runs. But the glacier, when it deposited the Phálúng moraines, must have filled the whole valley, including the portion now occupied by the moraines themselves, and therefore the glacier when longer was smaller than when shorter, a palpable *reductio ad absurdum*.

I am inclined to suspect that these moraine deposits of Phálúng must have come from the Láchen valley at a time when the high Tibetan table-land to the north was a mass of snow, and a large glacier passed off between Kinchinjhaó and Chomiomo, and down the Láchen valley; the same great glacier which left its terminal moraines near Lámteng, at Tangú, and in a dozen intermediate spots, as it slowly diminished in size, and even more gigantic records of which than any now existing may have been swept down the Tista valley by the heavy Sikkim rainfall and the

torrents to which it gives rise. Such a great glacier, after turning round the steep lofty flank of Kinchinjha, must have been far higher than the low hills which separate Phálung from the present Láchen valley and a branch of the glacier descending into the Cháchú valley may easily have filled it with a mass of debris which the little Cháchú glacier was unable to sweep away.\*

I had hoped to find some of the Himalayan snow cocks *Tetraogalus Tibetanus*, which Captain Chamer shot at Phálung, but there were none at this season. The natives, who know them well, say that the birds keep at a higher elevation in the summer and autumn. I found short-toed larks abundant, and I came across one flock of the small *Montifringilla* killed at Kongra Lama, and *Accentor rubeculoides*. At the Cháchú, to my surprise, not a duck nor wader was to be seen; although the valley looked peculiarly fitted for them, being a series of small marshes with deepish serpentine streams running through it.

The view of Kinchinjha was partly concealed by mist till just as I was leaving, when a snow storm came on, preceded by a little lightning: as the storm cleared away, all the peaks came out grandly. The panorama around Phálung well deserves Hooker's praise. In the afternoon I rode down to Tállam Sámdong.

*October 8th to 14th.* We started the next morning from Tállam Sámdong. The morning was superb, the hog-backed white summit of Chomiomo, closing the view up the Láchen valley, was as distinct as if only a mile distant. Our return march demands but brief description. We reached Lámteng on the 8th, a spot in the bed of the river below Láton, on the 9th, and the monastery at Chúngtám, on the 10th. Thence 4 days' march brought us back to Tamlung. The weather had become fine, with the exception of a few occasional showers, and the leeches were fewer in number than when we marched up the Tísta valley. In fact we had arrived at the best season for entering Sikkim instead of leaving it.

\* Mr. Jamieson has suggested, *Quart. Journ. Geol. Soc.* 1863, Vol. XIX, p. 258, the formation of somewhat similar deposits in lakes dammed up by glaciers. Dr. Hooker, at an earlier period, *Him. Journ.* Vol. II., p. 119, referred the terraces at Momay to the same cause. Both the accumulations at Phálung, however, and those at Momay appeared to me too irregular to have been deposited in water. At Phálung there is certainly no trace of terrace formation.

The heat in the valleys was no longer great, except in the middle of the day.

15th to 20th. On the 15th, we parted from Kechú Lámá who returned to Chúmbi from Tamlúng. By him we sent a letter to the Rájá thanking him for the assistance his people had afforded us. I have omitted to mention that when we were in the Láchúng valley, we on several occasions received presents of goats, sheep or flour from Chúmbi, and once a yak was brought to us from the Rájá.

We made a longish march from Tamlúng to Selingtám, crossing the Ryot valley, and ascending the opposite side. Here we came on traces of the military road made to Tamlúng in 1863, and the less steep portions of which are still in good order. On the 16th we crossed the Tista by a very long cane bridge in a poor state of repair, and, after ascending the slope a little way, camped at Lingmo. On the 17th we marched down the Tista valley to Tarco on the northern flank of Mount Tendong, a village standing amongst orange groves, now loaded with fruit, and on the following day we crossed Tendong by a road which goes over the top of the mountain and descended to Námchi, opposite Darjiling.

The change in the fauna in coming southwards is very marked, the number of forms increases, and there is a far greater prevalence of Malay types on the outer hills as compared with the upper Tista valley. The weather was now generally bright and clear, and the roads in good order. Finally, on the 19th, we walked down to the Rungit, and, mounted on horses a friend had sent down for us, rode back into Darjiling and the nineteenth century.

Although we had been disappointed in our attempts to enter Tibet, we had been able to add something to the known geography of Eastern Sikkim. We had explored one pass, and ascertained the position of a second, never previously visited by Europeans nor laid down in any map. We had met with 3 lakes of considerable size, all equally unmapped, and apparently larger than any previously known to exist in Sikkim, and we had obtained a considerable number of birds not before recorded from this part of the Himalayas.

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