

Himalayan Journals V2.

J. D. Hooker

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IN BENGAL, THE SIKKIM AND NEPAL HIMALAYAS,
THE KHASIA MOUNTAINS, etc.

JOSEPH DALTON HOOKER, M.D., R.N., F.R.S.

Volume II

First published 1854

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CHAPTER XVIII.

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After my return from the Terai, I was occupied during the month of April in preparations for an expedition to the loftier parts of Sikkim. The arrangements were the same as for my former journey, except with regard to food, which it was necessary should be sent out to me at intervals; for we had had ample proof that the resources of the country were not equal to provisioning a party of from forty to fifty men, even had the Dewan been favourable to my travelling, which was clearly not the case.

Dr. Campbell communicated to the Rajah my intention of starting early in May for the upper Teesta valley, and, in the Governor-General's name, requested that he would facilitate my visiting the frontier of Sikkim, north-east of Kinchinjunga. The desired permission was, after a little delay, received; which appeared to rouse the Dewan to institute a series of obstructions to my progress, which caused so many delays that my exploration of the country was not concluded till October, and I was prevented returning to Dorjiling before the following Christmas.

Since our visit to the Rajah in December, no Vakeel (agent) had been sent by the Durbar to Dorjiling, and consequently we could only communicate indirectly with his Highness, while we found it impossible to ascertain the truth of various reports promulgated by the Dewan, and meant to deter me from entering the country. In April, the Lasso Kajee was sent as Vakeel, but, having on a previous occasion been dismissed for insolence and incapacity, and again rejected when proposed by the Dewan at Bhomsong, he was refused an audience; and he encamped at the bottom of the Great Rungeet valley, where he lost some of his party through fever. He retired into Sikkim, exasperated, pretending that he had orders to delay my starting, in consequence of the death of the heir apparent; and that he was prepared to use strong measures should I cross the frontier.

No notice was taken of these threats: the Rajah was again informed of my intended departure, unless his own orders to the contrary were received through a proper accredited agent, and I left Dorjiling on

the 3rd of May, accompanied by Dr. Campbell, who insisted on seeing me fairly over the frontier at the Great Rungeet river.

Arrangements were made for supplies of rice following me by instalments; our daily consumption being 80 lbs., a man's load. After crossing into Sikkim, I mustered my party at the Great Rungeet river. I had forty-two in all, of whom the majority were young Lepchas, or Sikkim-born people of Tibetan races: all were active and cheerful looking fellows; only one was goitred, and he had been a salt-trader. I was accompanied by a guard of five Sepoys, and had a Lepcha and Tibetan interpreter. I took but one personal servant, a Portuguese half-caste (John Hoffman by name), who cooked for me: he was a native of Calcutta, and though hardy, patient, and long-suffering, and far better-tempered, was, in other respects, very inferior to Clamanze, who had been my servant the previous year, and who, having been bred to the sea, was as handy as he was clever; but who, like all other natives of the plains, grew intolerably weary of the hills, and left me.

The first part of my route lay over Tendong, a very fine mountain, which rises 8,613 feet, and is a conspicuous feature from Dorjiling, where it is known as Mount Ararat. The Lepchas have a curious legend of a man and woman having saved themselves on its summit, during a flood that once deluged Sikkim. The coincidence of this story with the English name of Ararat suggests the probability of the legend being fabulous; but I am positively assured that it is not so, but that it was current amongst the Lepchas before its English name was heard of, and that the latter was suggested from the peculiar form of its summit resembling that given in children's books as the resting-place of the ark.

The ascent from the Great Rungeet (alt. 818 feet) is through dry woods of Sal and Pines (*P. longifolia*). I camped the first night at the village of Mikk (alt. 3,900 feet), and on the following day ascended to Namtc (alt. 5,600 feet).

On the route I was met by the Lama of Silokfoke Goompa. Though a resident on the Lasso Kaje's estates, he politely brought me a present, at the same time apologising for not waiting till I had encamped, owing to his excessive fat, which prevented his climbing. I accepted his excuses, though well aware that his real reason was that he wished to pay his respects, and show his good feeling, in private. Besides his ordinary canonicals, he carried a tall crozier-headed staff, and had a curious horn slung round his neck, full of amulets; it was short, of a transparent red colour, and beautifully carved, and was that of the small cow of Lhasa, which resembles the English species, and is not a yak (it is called "Tundra").

Namtchi was once a place of considerable importance; and still possesses a mendong, with six rows of inscribed slabs; a temple, and a Lama attached thereto: the latter waited on me soon after I had encamped, but he brought no present, and I was not long kept in suspense as to his motives. These people are poor dissemblers; if they intend to obstruct, they do it clumsily and hesitatingly: in this instance the Lama first made up to my people, and, being coolly received, kept gradually edging up to my tent-door, where, after an awkward salute, he delivered himself with a very bad grace of his mission, which was from the Lasso Kaje to stop my progress. I told

him I knew nothing of the Lasso Kajee or his orders, and should proceed on the following morning: he then urged the bad state of the roads, and advised me to wait two days till he should receive orders from the Rajah; upon which I dismissed him.

Soon afterwards, as I sat at my tent-door, looking along the narrow bushy ridge that winds up the mountain, I saw twenty or thirty men rapidly descending the rocky path: they were Lepchas, with blue and white striped garments, bows and quivers, and with their long knives gleaming in the sun: they seemed to be following a figure in red Lama costume, with a scarlet silk handkerchief wound round his head, its ends streaming behind him. Though expecting this apparition to prove the renowned Kajee and his myrmidons, coming to put a sudden termination to my progress, I could not help admiring the exceeding picturesqueness of the scenery and party. My fears were soon dissipated by my men joyfully shouting, "The Tchebu Lama! the Tchebu Lama!" and I soon recognised the rosy face and twinkling eyes of my friend of Bhomsong, the only man of intelligence about the Rajah's court, and the one whose services as Vakeel were particularly wanted at Dorjiling.

He told me that the Lasso Kajee had orders (from whom, he would not say) to stop my progress, but that I should proceed nevertheless, and that there was no objection to my doing so; and he despatched a messenger to the Rajah, announcing my progress, and requesting him to send me a guide, and to grant me every facility, asserting that he had all along fully intended doing so.

On the following morning the Lama proceeded to Dorjiling, and I continued the ascent of Tendong, sending my men round the shoulder to Temi in the Teesta valley, where I proposed to pass the night. The road rapidly ascends by a narrow winding path, covered with a loose forest of oaks, rhododendrons, and various shrubs, not found at equal elevations on the wetter Dorjiling ranges: amongst them the beautiful laburnum-like *Piptanthus Nepalensis*, with golden blossoms, was conspicuous. Enormous blocks of white and red stratified quartz, and slate, some 20 and even 40 yards long, rest on the narrow ridge at 7000 feet elevation. The last ascent is up a steep rounded cone with a broad flat top, covered with dwarf bamboo, a few oaks, laurels, magnolias, and white-flowered rhododendron trees (*R. argenteum*), which obstructed the view. I hung the barometers near one of the many chaits on the summit, where there is also a rude temple, in which worship is performed once a year. The elevation is 8,671 feet by my observations.* [8,663 by Col. Waugh's trigonometrical observations.] The geological formation of Tendong in some measure accounts for its peculiar form. On the conical summit are hard quartzose porphyries, which have apparently forced up the gneiss and slates, which dip in all directions from the top, and are full of injected veins of quartz. Below 7000 feet, mica-schist prevails, always inclined at a very high angle; and I found jasper near Namtchi, with other indications of Plutonic action.

The descent on the north side was steep, through a rank vegetation, very different from that of the south face. The oaks are very grand, and I measured one (whose trunk was decayed, and split into three, however), which I found to be 49 feet in girth at 5 feet from the ground. Near Temi (alt. 4,770 feet) I gathered the fruit of *Kadsura*, a climbing plant allied to Magnolia, bearing round heads of large fleshy red drupes, which are pleasantly acid and much eaten;

the seeds are very aromatic.

From Temi the road descends to the Teesta, the course of which it afterwards follows. The valley was fearfully hot, and infested with mosquitos and peepsas. Many fine plants grew in it:* [Especially upon the broad terraces of gravel, some of which are upwards of a mile long, and 200 feet above the stream: they are covered with boulders of rock, and are generally opposite feeders of the river.]

I especially noticed *Aristolochia saccata*, which climbs the loftiest trees, bearing its curious pitcher-shaped flowers near the ground only; its leaves are said to be good food for cattle. *Houttuynia*, a curious herb allied to pepper, grew on the banks, which, from the profusion of its white flowers, resembled strawberry-beds; the leaves are eaten by the Lepchas. But the most magnificent plant of these jungles is *Hodgsonia*, (a genus I have dedicated to my friend, Mr. Hodgson), a gigantic climber allied to the gourd, bearing immense yellowish-white pendulous blossoms, whose petals have a fringe of buff-coloured curling threads, several inches long. The fruit is of a rich brown, like a small melon in form, and contains six large nuts, whose kernels (called "Kator-pot" by the Lepchas) are eaten. The stem, when cut, discharges water profusely from whichever end is held downwards. The "Took" (*Hydnocarpus*) is a beautiful evergreen tree, with tufts of yellow blossoms on the trunk: its fruit is as large as an orange, and is used to poison fish, while from the seeds an oil is expressed. Tropical oaks and Terminalias are the giants of these low forests, the latter especially, having buttressed trunks, appear truly gigantic; one, of a kind called "Sung-lok," measured 47 feet in girth, at 5 feet, and 21 at 15 feet from the ground, and was fully 200 feet high. I could only procure the leaves by firing a ball into the crown. Some of their trunks lay smouldering on the ground, emitting a curious smell from the mineral matter in their ashes, of whose constituents an account will be found in the Appendix.

Birds are very rare, as is all animal life but insects, and a small fresh-water crab, *Thelphusa*, ("Ti-hi" of the Lepchas). Shells, from the absence of lime, are extremely scarce, and I scarcely picked up a single specimen: the most common are species of *Cyclostoma*.

The rains commenced on the 10th of May, greatly increasing the discomforts of travelling, but moderating the heat by drenching thunder-storms, which so soaked the men's loads, that I was obliged to halt a day in the Teesta valley to have waterproof covers made of platted bamboo-work, enclosing Phrynium leaves. I was delighted to find that my little tent was impervious to water, though its thickness was but of one layer of blanket: it was a single ridge with two poles, 7 feet high, 8 feet long, and 8 feet broad at the base, forming nearly an equilateral triangle in front.

Bhomsong was looking more beautiful than ever in its rich summer clothing of tropical foliage. I halted during an hour of heavy rain on the spot where I had spent the previous Christmas, and could not help feeling doubly lonely in a place where every rock and tree reminded me of that pleasant time. The isolation of my position, the hostility of the Dewan, and consequent uncertainty of the success of a journey that absorbed all my thoughts, the prevalence of fevers in the valleys I was traversing, and the many difficulties that beset my path, all crowded on the imagination when fevered by exertion and depressed by gloomy weather, and my spirits involuntarily sank as I

counted the many miles and months intervening between me and my home.

The little flat on which I had formerly encamped was now covered with a bright green crop of young rice. The house then occupied by the Dewan was now empty and unroofed; but the suspension bridge had been repaired, and its light framework of canes, spanning the boiling flood of the Teesta, formed a graceful object in this most beautiful landscape. The temperature of the river was 58 degrees, only 7 degrees above that of mid-winter, owing to the now melting snows. I had rather expected to meet either with a guide, or with some further obstruction here, but as none appeared, I proceeded onwards as soon as the weather moderated.

Illustration--PANDANUS. SIKKIM SCREW-PINE.

Higher up, the scenery resembles that of Tchintam on the Tambur: the banks are so steep as to allow of no road, and the path ascends from the river, at 1000 feet, to Lathieng village, at 4,800 feet, up a wild, rocky torrent that descends from Mainom to the Teesta. The cliffs here are covered with wild plantains and screw-pines (*Pandanus*), 50 feet high, that clasp the rocks with cable-like roots, and bear one or two crowns of drooping leaves, 5 feet long: two palms, *Rattan* (*Calamus*) and *Areca gracilis*, penetrate thus far up the Teesta valley, but are scarcely found further.

From the village the view was superb, embracing the tropical gulley below, with the flat of Bhomsong deep down in the gorge, its bright rice-fields gleaming like emeralds amid the dark vegetation that surrounded it; the Teesta winding to the southward, the pine-clad rocky top of Mainom, 10,613 feet high, to the south-west, the cone of Mount Ararat far to the south, to the north black mountains tipped with snow, and to the east the magnificent snowy range of Chola, girdling the valley of the Ryott with a diadem of frosted silver. The coolies, each carrying upwards of 80 lb. load, had walked twelve hours that day, and besides descending 2000 feet, they had ascended nearly 4000 feet, and gone over innumerable ups and downs besides.

Beyond Lathieng, a steep and dangerous path runs along the east flank of Mainom, sometimes on narrow ledges of dry rock, covered with long grass, sometimes dipping into wooded gullies, full of *Edgeworthia Gardneri* and small trees of *Andromeda* and *rhododendron*, covered with orchids* [Especially some species of *Sunipia* and *Cirrhopetalum*, which have not yet been introduced into England.] of great beauty.

Descending to Gorh (4,100 feet), I was met by the Lama of that district, a tall, disagreeable-looking fellow, who informed me that the road ahead was impassable. The day being spent, I was obliged to camp at any rate; after which he visited me in full canonicals, bringing me a handsome present, but assuring me that he had no authority to let me advance. I treated him with civility, and regretted my objects being so imperative, and my orders so clear, that I was obliged to proceed on the following morning: on which he abruptly decamped, as I suspected, in order to damage the paths and bridges. He came again at daylight, and expostulated further; but finding it of no use, he volunteered to accompany me, officiously offering me the choice of two roads. I asked for the coolest, knowing full well that it was useless to try and out-wit him in such matters. At the first stream the bridge was destroyed, but seeing the planks peeping through the bushes in which they had been concealed, I

desired the Lama to repair it, which he did without hesitation. So it was at every point: the path was cumbered with limbs of trees, crossing-stones were removed from the streams, and all natural difficulties were increased. I kept constantly telling the Lama that as he had volunteered to show me the road, I felt sure he intended to remove all obstacles, and accordingly I put him to all the trouble I possibly could, which he took with a very indifferent grace. When I arrived at the swinging bridge across the Teesta, I found that the canes were loosened, and that slips of bamboo, so small as nearly to escape observation, were ingeniously placed low down over the single bamboo that formed the footing, intended to trip up the unwary passenger, and overturn him into the river, which was deep, and with a violent current. Whilst the Lama was cutting these, one of my party found a charcoal writing on a tree, announcing the speedy arrival from the Rajah of my old guide, Meepo; and he shortly afterwards appeared, with instructions to proceed with me, though not to the Tibetan frontier. The lateness of the season, the violence of the rains, and the fears, on the Rajah's part, that I might suffer from fever or accident, were all urged to induce me to return, or at least only to follow the west branch of the Teesta to Kinchinjunga. These reasons failing, I was threatened with Chinese interference on the frontier. All these objections I overruled, by refusing to recognise any instructions that were not officially communicated to the Superintendent of Dorjiling.

The Gorh Lama here took leave of me: he was a friend of the Dewan, and was rather surprised to find that the Rajah had sent me a guide, and now attempted to pass himself off as my friend, pompously charging Meepo with the care of me, and bidding me a very polite farewell. I could not help telling him civilly, but plainly, what I thought of him; and so we parted.

Meepo was very glad to join my party again: he is a thorough Lepcha in heart, a great friend of his Rajah and of Tchebu Lama, and one who both fears and hates the Dewan. He assured me of the Rajah's good wishes and intentions, but spoke with great doubt as to the probability of a successful issue to my journey: he was himself ignorant of the road, but had brought a guide, whose appearance, however, was against him, and who turned out to be sent as a spy on us both.

Instead of crossing the Teesta here, we kept on for two days up its west bank, to a cane bridge at Lingo, where the bed of the river is still only 2000 feet above the sea, though 45 miles distant from the plains, and flowing in a valley bounded by mountains 12,000 to 16,000 feet high. The heat was oppressive, from the closeness of the atmosphere, the great power of the sun, now high at noon-day, and the reflection from the rocks. Leeches began to swarm as the damp increased, and stinging flies of various kinds. My clothes were drenched with perspiration during five hours of every day, and the crystallising salt irritated the skin. On sitting down to rest, I was overcome with languor and sleep, and, but for the copious supply of fresh water everywhere, travelling would have been intolerable. The Coolies were all but naked, and were constantly plunging into the pools of the rivers; for, though filthy in their persons, they revel in cold water in summer. They are powerful swimmers, and will stem a very strong current, striking out with each arm alternately. It is an animated sight when twenty or thirty of these swarthy children of nature are disporting their muscular figures in the water, diving

after large fish, and sometimes catching them by tickling them under the stones.

Of plants I found few not common at similar elevations below Dorjiling, except another kind of Tree-fern,* [*Alsophila spinulosa*,_ the "Pugjik" of the Lepchas, who eat the soft watery pith: it is abundant in East Bengal and the Peninsula of India. The other Sikkim Tree-fern, *A. gigantea*,_ is far more common from the level of the plains to 6,500 elevation, and is found as far south as Java.] whose pith is eaten in times of scarcity. The India-rubber fig penetrates thus far amongst the mountains, but is of small size. A Gentian, *Arenaria*,_ and some sub-alpine plants are met with, though the elevation is only 2000 feet, and the whole climate thoroughly tropical: they were annuals usually found at 7000 to 10,000 feet elevation, and were growing here on mossy rocks, cooled by the spray of the river, whose temperature was only 56.3 degrees. My servant having severely sprained his wrist by a fall, the Lepchas wanted to apply a moxa, which they do by lighting a piece of puff-ball, or Nepal paper that burns like tinder, laying it on the skin, and blowing it till a large open sore is produced: they shook their heads at my treatment, which consisted in transferring some of the leeches from our persons to the inflamed part.

After crossing the Teesta by the cane bridge of Lingo, our route lay over a steep and lofty spur, round which the river makes a great sweep. On the ascent of this ridge we passed large villages on flats cultivated with buckwheat. The saddle is 5,500 feet high, and thence a rapid descent leads to the village of Singtam, which faces the north, and is 300 feet lower, and 3000 feet above the river, which is here no longer called the Teesta, but is known as the Lachen-Lachoong, from its double origin in the rivers of these names, which unite at Choongtam, twenty miles higher up. Of these, the source of the Lachen is in the Cholamoo lakes in Tibet; while the Lachoong rises on the south flank of Donkia mountain, both many marches north of my present position. At Singtam the Lachen-Lachoong runs westward, till joined by the Rihi from the north, and the Rinoong from the west, after receiving which it assumes the name of Teesta: of these affluents, the Rinoong is the largest, and drains the south-east face of Kinchinjunga and Pundim, and the north of Nursing: all which mountains are seen to the north-north-west of Singtam. The Rinoong valley is cultivated for several miles up, and has amongst others the village and Lamasery of Bah. Beyond this the view of black, rugged precipices with snowy mountains towering above them, is one of the finest in Sikkim. There is a pass in that direction, from Bah over the Tckonglah to the Thlonok valley, and thence to the province of Jigatzi in Tibet, but it is almost impracticable.

Illustration--VIEW OF KINCHINJUNGA FROM SINGTAM, LOOKING NORTH-WESTWARD.

A race of wild men, called "Harrum-mo," are said to inhabit the head of the valley, living in the woods of a district called Mund-po, beyond Bah; they shun habitations, speak an unintelligible tongue, have more hair on the face than Lepchas, and do not plait that of their heads, but wear it in a knot; they use the bow and arrow, and eat snakes and vermin, which the Lepchas will not touch. Such is the account I have heard, and which is certainly believed in Sikkim: similar stories are very current in half civilized countries; and if

this has any truth, it possibly refers to the Chepangs,* [Hodgson, in "Bengal Asiatic Society's Journal" for 1848.] a very remarkable race, of doubtful affinity and origin, inhabiting the Nepal forests.

At Singtam I was waited on by the Soubah of the district, a tall portly Bhotteea, who was destined to prove a most active enemy to my pursuits. He governs the country between Gorh and the Tibet frontier, for the Maha-Raanee (wife of the Rajah), whose dowry it is; and she being the Dewan's relative, I had little assistance to expect from her agent. His conduct was very polite, and he brought me a handsome offering for myself; but after delaying me a day on the pretext of collecting food for my people, of which I was in want, I was obliged to move on with no addition to my store, and trust to obtaining some at the next village, or from Dorjiling. Owing, however, to the increasing distance, and the destruction of the roads by the rains, my supplies from that place were becoming irregular: I therefore thought it prudent to reduce my party, by sending back my guard of Sepoys, who could be of no further use.

From this point the upper portion of the course of the Teesta (Lachen-Lachoong) is materially different from what it is lower down; becoming a boisterous torrent, as suddenly as the Tambur does above Mywa Guola. Its bed is narrower, large masses of rock impede its course, nor is there any place where it is practicable for rafts at any season; the only means of passing it being by cane bridges that are thrown across, high above the stream.

The slope on either side of the valley is very steep; that on the north, in particular, appearing too precipitous for any road, and being only frequented by honey seekers, who scale the rocks by cane ladders, and thus reach the pendulous bees'-nests, which are so large as in some instances to be conspicuous features at the distance of a mile. This pursuit appeared extremely perilous, the long thread-like canes in many places affording the only footing, over many yards of cliff: the procuring of this honey, however, is the only means by which many of the idle poor raise the rent which they must pay to the Rajah.

The most prominent effect of the steepness of the valleys is the prevalence of land-slips, which sometimes descend for 3000 feet, carrying devastation along their course: they are caused either by the melting of the snow-beds on the mountains, or by the action of the rains on the stratified rocks, and are much increased in effect and violence by the heavy timber-trees which, swaying forwards, loosen the earth at their roots, and give impetus to the mass. This phenomenon is as frequent and destructive as in Switzerland, where, however, more lives are lost; from the country being more populous, and from the people recklessly building in places particularly exposed to such accidents. A most destructive one had, however, occurred here the previous year, by which a village was destroyed, together with twelve of its inhabitants, and all the cattle. The fragments of rock precipitated are sometimes of enormous size, but being a soft mica-schist, are soon removed by weathering. It is in the rainy season that landslips are most frequent, and shortly after rain they are pretty sure to be heard far or near. I crossed the debris of the great one alluded to, on the first march beyond Singtam: the whole face of the mountain appeared more or less torn up for fully a mile, presenting a confused mass of white micaceous clay, full of angular masses of rock. The path was very

difficult and dangerous, being carried along the steep slope, at an angle, in some places, of 35 degrees; and it was constantly shifting, from the continued downward sliding, and from the action of streams, some of which are large, and cut deep channels. In one I had the misfortune to lose my only sheep, which was carried away by the torrent. These streams were crossed by means of sticks and rickety bamboos, and the steep sides (sometimes twenty or thirty feet high), were ascended by notched poles.

The weather continued very hot for the elevation (4000 to 5000 feet), the rain brought no coolness, and for the greater part of the three marches between Singtam and Chakoong, we were either wading through deep mud, or climbing over rocks. Leeches swarmed in incredible profusion in the streams and damp grass, and among the bushes: they got into my hair, hung on my eyelids, and crawled up my legs and down my back. I repeatedly took upwards of a hundred from my legs, where the small ones used to collect in clusters on the instep: the sores which they produced were not healed for five months afterwards, and I retain the scars to the present day. Snuff and tobacco leaves are the best antidote, but when marching in the rain, it is impossible to apply this simple remedy to any advantage. The best plan I found to be rolling the leaves over the feet, inside the stockings, and powdering the legs with snuf.

Another pest is a small midge, or sand-fly, which causes intolerable itching, and subsequent irritation, and is in this respect the most insufferable torment in Sikkim; the minutest rent in one's clothes is detected by the acute senses of this insatiable bloodsucker, which is itself so small as to be barely visible without a microscope. We daily arrived at our camping-ground, streaming with blood, and mottled with the bites of peepsas, gnats, midges, and mosquitos, besides being infested with ticks.

As the rains advanced, insects seemed to be called into existence in countless swarms; large and small moths, cockchafers, glow-worms, and cockroaches, made my tent a Noah's ark by night, when the candle was burning; together with winged ants, May-flies, flying earwigs, and many beetles, while a very large species of Tipula (daddy-long-legs) swept its long legs across my face as I wrote my journal, or plotted off my map. After retiring to rest and putting out the light, they gradually departed, except a few which could not find the way out, and remained to disturb my slumbers.

Chakoong is a remarkable spot in the bottom of the valley, at an angle of the Lachen-Lachoong, which here receives an affluent from Gnarem, a mountain 17,557 feet high, on the Chola range to the east.* [This is called Black Rock in Col. Waugh's map. I doubt Gnarem being a generally known name: the people hardly recognise the mountain as sufficiently conspicuous to bear a name.] There is no village, but some grass huts used by travellers, which are built close to the river on a very broad flat, fringed with alder, hornbeam, and birch: the elevation is 4,400 feet, and many European genera not found about Dorjiling, and belonging to the temperate Himalaya, grow intermixed with tropical plants that are found no further north. The birch, willow, alder, and walnut grow side by side with wild plantain, Erythrina, Wallichia palm, and gigantic bamboos: the Cedrela Toona, figs, Melastoma, Scitamineae, balsams, Pothos, peppers, and gigantic climbing vines, grow mixed with brambles, speedwell, Paris, forget-me-not, and nettles that sting like poisoned arrows.

The wild English strawberry is common, but bears a tasteless fruit: its inferiority is however counterbalanced by the abundance of a grateful yellow raspberry. Parasitical Orchids (*Dendrobium nobile*, *D. densiflorum*, etc.), cover the trunks of oaks, while *Thalictrum* and *Geranium* grow under their shade. *Monotropa* and *Balanophora*, both parasites on the roots of trees (the one a native of north Europe and the other of a tropical climate), push their leafless stems and heads of flowers through the soil together: and lastly, tree-ferns grow associated with the *Pteris aquilina* (brake) and *Lycopodium clavatum* of our British moors; and amongst mosses, the superb Himalayan *Lyellia crista*,* [This is one of the most remarkable mosses in the Himalaya mountains, and derives additional interest from having been named after the late Charles Lyell, Esq., of Kinnordy, the father of the most eminent geologist of the present day.] with the English *Funaria hygrometrica*.

The dense jungles of Chakoong completely cover the beautiful flat terraces of stratified sand and gravel, which rise in three shelves to 150 feet above the river, and whose edges appear as sharply cut as if the latter had but lately retired from them. They are continuous with a line of quartz cliffs, covered with scarlet rhododendrons, and in the holes of which a conglomerate of pebbles is found, 150 feet above the river. Everywhere immense boulders are scattered about, some of which are sixty yards long: their surfaces are water-worn into hollows, proving the river to have cut through nearly 300 feet of deposit, which once flooded its valley. Lower down the valley, and fully 2000 feet above the river, I had passed numerous angular blocks resting on gentle slopes where no landslips could possibly have deposited them; and which I therefore refer to ancient glacial action: one of these, near the village of Niong, was nearly square, eighty feet long, and ten high.

It is a remarkable fact, that this hot, damp gorge is never malarious; this is attributable to the coolness of the river, and to the water on the flats not stagnating; for at Choongtam, a march further north, and 1500 feet higher, fevers and ague prevail in summer on similar flats, but which have been cleared of jungle, and are therefore exposed to the sun.

I had had constant headache for several mornings on waking, which I did not fail to attribute to coming fever, or to the unhealthiness of the climate; till I accidentally found it to arise from the wormwood, upon a thick couch of the cut branches of which I was accustomed to sleep, and which in dry weather produced no such effects.* [This wormwood (*Artemisia Indaca*) is one of the most common Sikkim plants at 2000 to 6000 feet elevation, and grows twelve feet high: it is a favourite food of goats.]

From Chakoong to Choongtam the route lay northwards, following the course of the river, or crossing steep spurs of vertical strata of mica-schist, that dip into the valley, and leave no space between their perpendicular sides and the furious torrent. Immense landslips seamed the steep mountain flanks; and we crossed with precipitation one that extended fully 4000 feet (and perhaps much more) up a mountain 12,000 feet high, on the east bank: it moves every year, and the mud and rocks shot down by it were strewn with the green leaves and twigs of shrubs, some of the flowers on which were yet fresh and bright, while others were crushed: these were mixed with gigantic trunks of pines, with ragged bark and scored timbers. The talus which

had lately been poured into the valley formed a gently sloping bank, twenty feet high, over which the Lachen- Lachoong rolled, from a pool above, caused by the damming up of its waters. On either side of the pool were cultivated terraces of stratified sand and pebbles, fifty feet high, whose alder-fringed banks, joined by an elegant cane bridge, were reflected in the placid water; forming a little spot of singular quiet and beauty, that contrasted with the savage grandeur of the surrounding mountains, and the headstrong course of the foaming torrent below, amid whose deafening roar it was impossible to speak and be heard.

Illustration--CANE-BRIDGE AND TUKCHAM MOUNTAIN.

The mountain of Choongtam is about 10,000 feet high; it divides the Lachen from the Lachoong river, and terminates a lofty range that runs for twenty-two miles south from the lofty mountain of Kinchinjhow. Its south exposed face is bare of trees, except clumps of pines towards the top, and is very steep, grassy, and rocky, without water. It is hence quite unlike the forest-clad mountains further south, and indicates a drier and more sunny climate. The scenery much resembles that of Switzerland, and of the north-west Himalaya, especially in the great contrast between the southern and northern exposures, the latter being always clothed with a dense vegetation. At the foot of this very steep mountain is a broad triangular flat, 5,270 feet above the sea, and 300 feet above the river, to which it descends by three level cultivated shelves. The village, consisting of a temple and twenty houses, is placed on the slope of the hill. I camped on the flat in May, before it became very swampy, close to some great blocks of gneiss, of which many lie on its surface: it was covered with tufts of sedge (like *Carex stellulata*), and fringed with scarlet rhododendron, walnut, *Andromeda*, *Elaeagnus* (now bearing pleasant acid fruit), and small trees of a *Photinia*, a plant allied to hawthorn, of the leaves of which the natives make tea (as they do of *Gualtheria*, *Andromeda*, *Vaccinium*, and other allied plants). Rice, cultivated* [Choongtam is in position and products analogous to Lelyp, on the Tambur (vol. i, Chapter IX). Rice cultivation advances thus high up each valley, and at either place Bhoteeas replace the natives of the lower valleys.] in pools surrounded by low banks, was just peeping above ground; and scanty crops of millet, maize, and buckwheat flourished on the slopes around.

The inhabitants of Choongtam are of Tibetan origin; few of them had seen an Englishman before, and they flocked out, displaying the most eager curiosity: the Lama and Phipun (or superior officer) of the Lachoong valley came to pay their respects with a troop of followers, and there was lolling out of tongues, and scratching of ears, at every sentence spoken, and every object of admiration. This extraordinary Tibetan salute at first puzzled me excessively, nor was it until reading MM. Huc and Gabet's travels on my return to England, that I knew of its being the *ton* at Lhassa, and in all civilised parts of Tibet.

As the valley was under the Singtam Soubah's authority, I experienced a good deal of opposition; and the Lama urged the wrath of the gods against my proceeding. This argument, I said, had been disposed of the previous year, and I was fortunate in recognising one of my Changachelling friends, who set forth my kindly offices to the Lamas of that convent, and the friendship borne me by its monks, and by

those of Pemiongchi. Many other modes of dissuading me were attempted, but with Meepo's assistance I succeeded in gaining my point. The difficulty and delays in remittance of food, caused by the landslips having destroyed the road, had reduced our provisions to a very low ebb; and it became not only impossible to proceed, but necessary to replenish my stores on the spot. At first provisions enough were brought to myself, for the Rajah had issued orders for my being cared for, and having some practice among the villagers in treating rheumatism and goitres, I had the power of supplying my own larder; but I found it impossible to buy food for my people. At last, the real state of the case came out; that the Rajah having gone to Choombi, his usual summer-quarters in Tibet, the Dewan had issued orders that no food should be sold or given to my people, and that no roads were to be repaired during my stay in the country; thus cutting off my supplies from Dorjiling, and, in short, attempting to starve me out. At this juncture, Meepo received a letter from the Durbar purporting to be from the Rajah, commanding my immediate return, on the grounds that I had been long enough in the country for my objects: it was not addressed to me, and I refused to receive it as an official communication; following up my refusal by telling Meepo that if he thought his orders required it, he had better leave me and return to the Rajah, as I should not stir without directions from Dr. Campbell, except forwards. He remained, however, and said he had written to the Rajah, urging him to issue stringent orders for my party being provisioned.

We were reduced to a very short allowance before the long-expected supplies came, by which time our necessities had almost conquered my resolution not to take by force of the abundance I might see around, however well I might afterwards pay. It is but fair to state that the improvident villagers throughout Sikkim are extremely poor in vegetable food at this season, when the winter store is consumed, and the crops are still green. They are consequently obliged to purchase rice from the lower valleys, which, owing to the difficulties of transport, is very dear; and to obtain it they barter wool, blankets, musk, and Tibetan produce of all kinds. Still they had cattle, which they would willingly have sold to me, but for the Dewan's orders.

There is a great difference between the vegetation of Dorjiling and that of similar elevations near Choongtam situated far within the Himalaya: this is owing to the steepness and dryness of the latter locality, where there is an absence of dense forest, which is replaced by a number of social grasses clothing the mountain sides, many new and beautiful kinds of rhododendrons, and a variety of European genera,* [_Deutzia, Saxifraga calicata, Thalictrum, Euphorbia, _yellow violet, _Labiatae, Androsace, Leguminosae, Coriaria, Delphinium, _currant, _Umbelliferae, _primrose, _Anemone, Convallaria, Roscoea, Mitella, Herminium, Drosera.] which (as I have elsewhere noticed) are either wholly absent from the damper ranges of Dorjiling, or found there several thousand feet higher up. On the hill above Choongtam village, I gathered, at 5000 to 6000 feet, _Rhododendron arboreum_ and _Dalhousiae, _ which do not generally grow at Dorjiling below 7,500 feet.* [I collected here ten kinds of rhododendron, which, however, are not the social plants that they become at greater elevations. Still, in the delicacy and beauty of their flowers, four of them, perhaps, excel any others; they are, _R. Aucklandii, _ whose flowers are five inches and a half in diameter; _R. Maddeni, R. Dalhousiae, _ and _R. Edgeworthii, _ all white-flowered bushes, of which the two first rise to the height of small trees.]

The yew appears at 7000 feet, whilst, on the outer ranges (as on Tonglo), it is only found at 9,500 to 10,000 feet; and whereas on Tonglo it forms an immense tall tree, with long sparse branches and slender drooping twigs, growing amongst gigantic magnolias and oaks, at Choongtam it is small and rigid, and much resembling in appearance our churchyard yew.* [The yew spreads east from Kashmir to the Assam Himalaya and the Khasia mountains; and the Japan, Philippine Island, Mexican, and other North American yews, belong to the same widely-diffused species. In the Khasia (its most southern limit) it is found as low as 5000 feet above the sea-level.] At 8000 feet the *Abies Brunoniana* is found; a tree quite unknown further south; but neither the larch nor the *Abies Smithiana* (Khutrow) accompanied it, they being confined to still more northern regions.

I have seldom had occasion to allude to snakes, which are rare and shy in most parts of the Himalaya; I, however, found an extremely venomous one at Choongtam; a small black viper, a variety of the cobra di capello,* [Dr. Gray, to whom I am indebted for the following information, assures me that this reptile is not specifically distinct from the common Cobra of India; though all the mountain specimens of it which he has examined retain the same small size and dark colour. Of the other Sikkim reptiles which I procured seven are *Colubridae* and innocuous; five *Crotalidae* are venomous, three of which are new species belonging to the genera *Parias* and *Trimesurus*. Lizards are not abundant, but I found at Choongtam a highly curious one, *Plestiodon Sikkimensis*, Gray; a kind of Skink, whose only allies are two North American congeners; and a species of *Agama* (a chameleon-like lizard) which in many important points more resembled an allied American genus than an Asiatic one. The common immense earth-worm of Sikkim, *Ichthyophis glutinosus*, is a native of the Khasia mountains, Singapore, Ceylon and Java. It is a most remarkable fact, that whereas seven out of the twelve Sikkim snakes are poisonous, the sixteen species I procured in the Khasia mountains are innocuous.] which it replaces in the drier grassy parts of the interior of Sikkim, the large cobra not inhabiting in the mountain regions. Altogether I only collected about twelve species in Sikkim, seven of which are venomous, and all are dreaded by the Lepchas. An enormous hornet (*Vespa magnifica*, Sm.), nearly two inches long, was here brought to me alive in a cleft-stick, lolling out its great thorn-like sting, from which drops of a milky poison distilled: its sting is said to produce fatal fevers in men and cattle, which may very well be the case, judging from that of a smaller kind, which left great pain in my hand for two days, while a feeling of numbness remained in the arm for several weeks. It is called Vok by the Lepchas, a common name for any bee: its larvae are said to be greedily eaten, as are those of various allied insects.

Choongtam boasts a profusion of beautiful insects, amongst which the British swallow-tail butterfly (*Papilio Machaon*) disports itself in company with magnificent black, gold, and scarlet-winged butterflies, of the Trojan group, so typical of the Indian tropics. At night my tent was filled with small water-beetles (*Berosi*) that quickly put out the candle; and with lovely moths came huge cockchafers (*Encerris Griffithii*), and enormous and foetid flying-bugs (of the genus *Derecterix*), which bear great horns on the thorax. The irritation of mosquito and midge bites, and the disgusting insects that clung with spiny legs to the blankets of my tent and bed, were often as effectual in banishing sleep, as were my anxious thoughts regarding the future.

The temple at Choongtam is a poor wooden building, but contains some interesting drawings of Lhasa, with its extensive Lamaseries and temples; they convey the idea of a town, gleaming, like Moscow, with gilded and copper roofs; but on a nearer aspect it is found to consist of a mass of stone houses, and large religious edifices many stories high, the walls of which are regularly pierced with small square ornamented windows.* [MM. Huc and Gabet's account of Lhasa is, I do not doubt, excellent as to particulars; but the trees which they describe as magnificent, and girdling the city, have uniformly been represented to me as poor stunted willows, apricots, poplars, and walnuts, confined to the gardens of the rich. No doubt the impression left by these objects on the minds of travellers from tree-less Tartary, and of Sikkimites reared amidst stupendous forests, must be widely different. The information concerning Lhasa collected by Timkowski, "Travels of the Russian Mission to China" (in 1821) is greatly exaggerated, though containing much that is true and curious. The dyke to protect the city from inundations I never heard of; but there is a current story in Sikkim that Lhasa is built in a lake-bed, which was dried up by a miracle of the Lamas, and that in heavy rain the earth trembles, and the waters bubble through the soil: a Dorjiling rain-fall, I have been assured, would wash away the whole city. Ermann (Travels in Siberia, i., p. 186), mentions a town (Klinchi, near Perm), thus built over subterraneous springs, and in constant danger of being washed away. MM. Huc and Gabet allude to the same tradition under another form. They say that the natives of the banks of the Koko-nor affirm that the waters of that lake once occupied a subterranean position beneath Lhasa, and that the waters sapped the foundations of the temples as soon as they were built, till withdrawn by supernatural agency.]

There is nothing remarkable in the geology of Choongtam: the base of the hill consists of the clay and mica slates overlain by gneiss, generally dipping to the eastward; in the latter are granite veins, containing fine tourmalines. Actinolites are found in some highly metamorphic gneisses, brought by landslips from the neighbouring heights. The weather in May was cloudy and showery, but the rain which fell was far less in amount than that at Dorjiling: during the day the sun's power was great; but though it rose between five and six a.m., it never appeared above the lofty peaked mountains that girdle the valley till eight a.m. Dark pines crest the heights around, and landslips score their flanks with white seams below; while streaks of snow remain throughout the month at 9000 feet above; and everywhere silvery torrents leap down to the Lachen and Lachoong.

Illustration--JUNIPERUS RECURVA (height 30 feet).

CHAPTER XIX.

Routes from Choongtam to Tibet frontier -- Choice of that by the Lachen river -- Arrival of Supplies -- Departure -- Features of the valley -- Eatable *Polygonum* -- Tumlong -- Cross Taktoong river -- Pines, larches, and other trees -- Chateng pool -- Water-plants and insects -- Tukcham mountain -- Lamteng village -- Inhabitants -- Alpine monkey -- Botany of temperate Himalaya -- European and American fauna -- Japanese and Malayan genera -- Superstitious objections to shooting -- Customs of people -- Rain -- Run short of provisions -- Altered position of Tibet frontier -- Zemu Samdong --

Imposition -- Vegetation -- Uses of pines -- Ascent to Thlonok river -- Balanophora wood for making cups -- Snow-beds -- Eatable mushrooms and *Smilacina* -- Asarabacca -- View of Kinchinjunga -- Arum-roots, preparation of for food -- Liklo mountain -- Behaviour of my party -- Bridge constructed over Zemu -- Cross river -- Alarm of my party -- Camp on Zemu river.

From this place there were two routes to Tibet, each of about six days' journey. One lay to the north-west up the Lachen valley to the Kongra Lama pass, the other to the east up the Lachoong to the Donkia pass. The latter river has its source in small lakes in Sikkim, south of the Donkia mountain, a shoulder of which the pass crosses, commanding a magnificent view into Tibet. The Lachen, on the other hand (the principal source of the Teesta), rises beyond Sikkim in the Cholamoo lakes. The frontier at Kongra Lama was described to me as being a political, and not a natural boundary, marked out by cairns, standing on a plain, and crossing the Lachen river. To both Donkia and Kongra Lama I had every right to go, and was determined, if possible, to reach them, in spite of Meepo's ignorance, our guide's endeavours to frighten my party and mislead myself, and the country people's dread of incurring the Dewan's displeasure.

The Lachen valley being pronounced impracticable in the height of the rains, a month later, it behoved me to attempt it first, and it possessed the attraction of leading to a frontier described as far to the northward of the snowy Himalaya, on a lofty plateau, whose plants and animals were different from anything I had previously seen.

After a week the coolies arrived with supplies: they had been delayed by the state of the paths, and had consequently consumed a great part of my stock, reducing it to eight days' allowance. I therefore divided my party, leaving the greater number at Choongtam, with a small tent, and instructions to forward all food to me as it arrived. I started with about fifteen attendants, on the 25th of May, for Lamteng, three marches up the Lachen.

Descending the step-formed terraces, I crossed the Lachen by a good cane bridge. The river is a headstrong torrent, and turbid from the vast amount of earthy matter which it bears along; and this character of extreme impetuosity, unbroken by any still bend, or even swirling pool, it maintains uninterruptedly at this season from 4000 to 10,000 feet. It is crossed three times, always by cane bridges, and I cannot conceive any valley of its nature to be more impracticable at such a season. On both sides the mountains rose, densely forest-clad, at an average angle of 35 degrees to 40 degrees, to 10,000 and 15,000 feet. Its extreme narrowness, and the grandeur of its scenery, were alike recalled to my mind, on visiting the Sachs valley in the Valais of Switzerland; from which, however, it differs in its luxuriant forest, and in the slopes being more uniform and less broken up into those imposing precipices so frequent in Switzerland, but which are wanting in the temperate regions of the Sikkim Himalaya.

At times we scrambled over rocks 1000 feet above the river, or descended into gorges, through whose tributary torrents we waded, or crossed swampy terraced flats of unstratified shingle above the stream; whilst it was sometimes necessary to round rocky promontories in the river, stemming the foaming torrent that pressed heavily against the chest as, one by one, we were dragged along by powerful Lepchas. Our halting-places were on flats close to the river, covered

with large trees, and carpeted with a most luxuriant herbage, amongst which a wild buckwheat (*Polygonum**) [*Polygonum cymosum*, Wall. This is a common Himalayan plant, and is also found in the Khasia mountains.] was abundant, which formed an excellent spinach: it is called "Pullop-bi"; a name I shall hereafter have occasion to mention with gratitude.

A few miles above Choongtam, we passed a few cottages on a very extensive terrace at Tumlong; but between this and Lamteng, the country is uninhabited, nor is it frequented during the rains. We consequently found that the roads had suffered, the little bridges and aids to climb precipices and cross landslips had been carried away, and at one place we were all but turned back. This was at the Taktoong river, a tributary on the east bank, which rushes down at an angle of 15 degrees, in a sheet of silvery foam, eighteen yards broad. It does not, where I crossed it, flow in a deep gulley, having apparently raised its bed by an accumulation of enormous boulders; and a plank bridge was thrown across it, against whose slippery and narrow foot-boards the water dashed, loosening the supports on either bank, and rushing between their foundation stones.

My unwilling guide had gone ahead with some of the coolies: I had suspected him all along (perhaps unjustly) of avoiding the most practicable routes; but when I found him waiting for me at this bridge, to which he sarcastically pointed with his bow, I felt that had he known of it, to have made difficulties before would have been a work of supererogation. He seemed to think I should certainly turn back, and assured me there was no other crossing (a statement I afterwards found to be untrue); so, comforting myself with the hope that if the danger were imminent, Meepo would forcibly stop me, I took off my shoes, and walked steadily over: the tremor of the planks was like that felt when standing on the paddle-box of a steamer, and I was jerked up and down, as my weight pressed them into the boiling flood, which shrouded me with spray. I looked neither to the right nor to the left, lest the motion of the swift waters should turn my head, but kept my eye on the white jets d'eau springing up between the woodwork, and felt thankful when fairly on the opposite bank: my loaded coolies followed, crossing one by one without fear or hesitation. The bridge was swept into the Lachen very shortly afterwards.

Towards Lamteng, the path left the river, and passed through a wood of *Abies Smithiana*.* [Also called *A. Khutrow* and *Morinda*. I had not before seen this tree in the Himalaya: it is a spruce fir, much resembling the Norway spruce in general appearance, but with longer pendulous branches. The wood is white, and considered indifferent, though readily cleft into planks; it is called "Seh."] Larch appears at 9000 feet, with *Abies Brunoniana*. An austere crab-apple, walnut, and the willow of Babylon (the two latter perhaps cultivated), yellow jessamine and ash, all scarce trees in Sikkim, are more or less abundant in the valley, from 7000 to 8000 feet; as is an ivy, very like the English, but with fewer and smaller yellow or reddish berries; and many other plants,* [Wood-sorrel, a white-stemmed bramble, birch, some maples, nut gigantic lily (*Lilium giganteum*), *Euphorbia*, *Pedicularis*, *Spiraea*, *Philadelphus*, *Deutzia*, *Indigofera*, and various other South Europe and North American genera.] not found at equal elevations on the outer ranges of the Himalaya.

Chateng, a spur from the lofty peak of Tukcham,* ["Tuk" signifies

head in Lepcha, and "cheam" or "chaum," I believe, has reference to the snow. The height of Tukcham has been re-calculated by Capt. R. Strachey, with angles taken by myself, at Dorjiling and Jillapahar, and is approximate only.] 19,472 feet high, rises 1000 feet above the west bank of the river; and where crossed, commands one of the finest alpine views in Sikkim. It was grassy, strewed with huge boulders of gneiss, and adorned with clumps of park-like pines: on the summit was a small pool, beautifully fringed with bushy trees of white rose, a white-blossomed apple, a *Pyrus* like *Aria*, another like mountain-ash, scarlet rhododendrons (*arboreum* and *barbatum*), holly, maples, and *Goughia*,* [This fine plant was named (Wight, "Ic. Plant.") in honour of Capt. Gough, son of the late commander-in-chief, and an officer to whom the botany of the peninsula of India is greatly indebted. It is a large and handsome evergreen, very similar in foliage to a fine rhododendron, and would prove an invaluable ornament on our lawns, if its hardier varieties were introduced into this country.] a curious evergreen laurel-like tree: there were also Daphnes, purple magnolia, and a pink sweet-blossomed *Sphaerostema*. Many English water-plants* [*Sparganium*, *Typha*, *Potamogeton*, *Callitriche*, *Utricularia*, sedges and rushes.] grew in the water, but I found no shells; tadpoles, however, swarmed, which later in the season become large frogs. The "painted-lady" butterfly (*Cynthia Cardui*), and a pretty "blue" were flitting over the flowers, together with some great tropical kinds, that wander so far up these valleys, accompanying *Marlea*, the only subtropical tree that ascends to 8,500 feet in the interior of Sikkim.

The river runs close under the eastern side of the valley, which slopes so steeply as to appear for many miles almost a continuous landslip, 2000 feet high.

Lamteng village, where I arrived on the 27th of May, is quite concealed by a moraine to the south, which, with a parallel ridge on the north, forms a beautiful bay in the mountains, 8,900 feet above the sea, and 1000 above the Lachen. The village stands on a grassy and bushy flat, around which the pine-clad mountains rise steeply to the snowy peaks and black cliffs which tower above. It contains about forty houses, forming the winter-quarters of the inhabitants of the valley, who, in summer, move with their flocks and herds to the alpine pastures of the Tibet frontier. The dwellings are like those described at Wallanchoon, but the elevation being lower, and the situation more sheltered, they are more scattered; whilst on account of the dampness of the climate, they are raised higher from the ground, and the shingles with which they are tiled (made of *Abies Webbiana*) decay in two or three years. Many are painted lilac, with the gables in diamonds of red, black, and white: the roofs are either of wood, or of the bark of *Abies Brunoniana*, held down by large stones: within they are airy and comfortable. They are surrounded by a little cultivation of buck-wheat, radishes, turnips, and mustard. The inhabitants, though paying rent to the Sikkim Rajah, consider themselves as Tibetans, and are so in language, dress, features, and origin: they seldom descend to Choongtam, but yearly travel to the Tibetan towns of Jigatzi, Kambajong, Giantchi, and even to Lhasa, having always commercial and pastoral transactions with the Tibetans, whose flocks are pastured on the Sikkim mountains during summer, and who trade with the plains of India through the medium of these villagers.

Illustration--LAMTENG VILLAGE.

The snow having disappeared from elevations below 11,000 feet, the yaks, sheep, and ponies had just been driven 2000 feet up the valley, and the inhabitants were preparing to follow, with their tents and goats, to summer quarters at Tallum and Tungu. Many had goitres and rheumatism, for the cure of which they flocked to my tent; dry-rubbing for the latter, and tincture of iodine for the former, gained me some credit as a doctor: I could, however, procure no food beyond trifling presents of eggs, meal, and more rarely, fowls.

On arriving, I saw a troop of large monkeys* [*Macacus Pelops?*] Hodgson. This is a very different species from the tropical kind seen in Nepal, and mentioned at vol. i, Chapter XII.] gambolling in a wood of *Abies Brunoniana*: this surprised me, as I was not prepared to find so tropical an animal associated with a vegetation typical of a boreal climate. The only other quadrupeds seen here were some small earless rats, and musk-deer; the young female of which latter sometimes afforded me a dish of excellent venison; being, though dark-coloured and lean, tender, sweet, and short-fibred. Birds were scarce, with the exception of alpine pigeons (*Columba leuconota*), red-legged crows (*Corvus graculus*, L.), and the horned pheasant (*Meleagris Satyra*, L.). In this month insects are scarce, *Elater* and a black earwig being the most frequent: two species of *Serica* also flew into my tent, and at night moths, closely resembling European ones, came from the fir-woods. The vegetation in the neighbourhood of Lamteng is European and North American; that is to say, it unites the boreal and temperate floras of the east and west hemispheres; presenting also a few features peculiar to Asia. This is a subject of very great importance in physical geography; as a country combining the botanical characters of several others, affords materials for tracing the direction in which genera and species have migrated, the causes that favour their migrations, and the laws that determine the types or forms of one region, which represent those of another. A glance at the map will show that Sikkim is, geographically, peculiarly well situated for investigations of this kind, being centrally placed, whether as regards south-eastern Asia or the Himalayan chain. Again, the Lachen valley at this spot is nearly equi-distant from the tropical forests of the Terai and the sterile mountains of Tibet, for which reason representatives both of the dry central Asiatic and Siberian, and of the humid Malayan floras meet there.

The mean temperature of Lamteng (about 50 degrees) is that of the isothermal which passes through Britain in lat. 52 degrees, and east Europe in lat. 48 degrees, cutting the parallel of 45 degrees in Siberia (due north of Lamteng itself), descending to lat. 42 degrees on the east coast of Asia, ascending to lat. 48 degrees on the west of America, and descending to that of New York in the United States. This mean temperature is considerably increased by descending to the bed of the Lachen at 8000 feet, and diminished by ascending Tukcham to 14,000 feet, which gives a range of 6000 feet of elevation, and 20 degrees of mean temperature. But as the climate and vegetation become arctic at 12,000 feet, it will be as well to confine my observations to the flora of 7000 to 10,000 feet; of the mean temperature, namely, between 53 degrees and 43 degrees, the isothermal lines corresponding to which embrace, on the surface of the globe, at the level of the sea, a space varying in different meridians from three to twelve degrees of latitude.* [On the west coast of Europe, where the

distance between these isothermal lines is greatest, this belt extends almost from Stockholm and the Shetlands to Paris.] At first sight it appears incredible that such a limited area, buried in the depths of the Himalaya, should present nearly all the types of the flora of the north temperate zone; not only, however, is this the case, but space is also found at Lamteng for the intercalation of types of a Malayan flora, otherwise wholly foreign to the north temperate region.

A few examples will show this. Amongst trees the Conifers are conspicuous at Lamteng, and all are of genera typical both of Europe and North America: namely, silver fir, spruce, larch, and juniper, besides the yew: there are also species of birch, alder, ash, apple, oak, willow, cherry, bird-cherry, mountain-ash, thorn, walnut, hazel, maple, poplar, ivy, holly, *Andromeda*, *Rhamnus*. Of bushes; rose, berberry, bramble, rhododendron, elder, cornel, willow, honeysuckle, currant, *Spiraea*, *Viburnum*, *Cotoneaster*, *Hippophae*. Herbaceous plants* [As an example, the ground about my tent was covered with grasses and sedges, amongst which grew primroses, thistles, speedwell, wild leeks, *Arum*, *Convallaria*, *Callitriche*, *Oxalis*, *Ranunculus*, *Potentilla*, *Orchis*, *Chaerophyllum*, *Galium*, *Paris*, and *Anagallis*; besides cultivated weeds of shepherd's-purse, dock, mustard, Mithridate cress, radish, turnip, *Thlaspi arvense*, and *Poa annua*.] are far too numerous to be enumerated, as a list would include most of the common genera of European and North American plants.

Of North American genera, not found in Europe, were *Buddleia*, *Podophyllum*, *Magnolia*, *Sassafras*? *Tetranthera*, *Hydrangea*, *Diclytra*, *Aralia*, *Panax*, *Symplocos*, *Trillium*, and *Clintonia*. The absence of heaths is also equally a feature in the flora of North America.

Of European genera, not found in North America, the Lachen valley has *Coriaria*, *Hypocoum*, and various *Cruciferae*. The Japanese and Chinese floras are represented in Sikkim by *Camellia*, *Deutzia*, *Stachyurus*, *Aucuba*, *Helwingia*, *Stauntonia*, *Hydrangea*, *Skimmia*, *Eurya*, *Anthogonium*, and *Enkianthus*. The Malayan by *Magnolias*, *Talauma*, many *vacciniums* and *rhododendrons*, *Kadsura*, *Goughia*, *Marlea*, both coriaceous and deciduous-leaved *Caelogyne*, *Oberonia*, *Cyrtosia*, *Calanthe*, and other orchids; *Ceropegia*, *Parochetus*, *Balanophora*, and many *Scitamineae*; and amongst trees, by *Engelhardtia*, *Goughia*, and various *laurels*.

Shortly after my arrival at Lamteng, the villagers sent to request that I would not shoot, as they said it brought on excessive rain,* [In Griffith's narrative of "Pemberton's Mission to Bhotan" ("Posthumous Papers, Journal," p. 283), it is mentioned that the Gylongs (Lamas) attributed a violent storm to the members of the mission shooting birds.] and consequent damage to the crops. My necessities did not admit of my complying with their wish unless I could procure food by other means; and I at first paid no attention to their request. The people, however, became urgent, and the Choongtam Lama giving his high authority to the superstition, it appeared impolitic to resist their earnest supplication; though I was well aware that the story was trumped up by the Lama for the purpose of forcing me to return. I yielded on the promise of provisions being supplied from the village, which was done to a limited extent; and I was enabled to hold out till more arrived from Dorjiling, now, owing to the state of the roads, at the distance of twenty days' march. The people were always civil and kind: there was no concealing the

fact that the orders were stringent, prohibiting my party being supplied with food, but many of the villagers sought opportunities by night of replenishing my stores. Superstitious and timorous, they regard a doctor with great veneration; and when to that is added his power of writing, drawing, and painting, their admiration knows no bounds: they flocked round my tent all day, scratching their ears, lolling out their tongues, making a clucking noise, smiling, and timidly peeping over my shoulder, but flying in alarm when my little dog resented their familiarity by snapping at their legs. The men spend the whole day in loitering about, smoking and spinning wool: the women in active duties; a few were engaged in drying the leaves of a shrub (*Symplocos*) for the Tibet market, which are used as a yellow dye; whilst, occasionally, a man might be seen cutting a spoon or a yak-saddle out of rhododendron wood.

During my stay at Lamteng, the weather was all but uniformly cloudy and misty, with drizzling rain, and a southerly, or up-valley wind, during the day, which changed to an easterly one at night: occasionally distant thunder was heard. My rain-gauges showed very little rain compared with what fell at Dorjiling during the same period; the clouds were thin, both sun and moon shining through them, without, however, the former warming the soil: hence my tent was constantly wet, nor did I once sleep in a dry bed till the 1st of June, which ushered in the month with a brilliant sunny day. At night it generally rained in torrents, and the roar of landslips and avalanches was then all but uninterrupted for hour after hour: sometimes it was a rumble, at others a harsh grating sound, and often accompanied with the crashing of immense timber-trees, or the murmur of the distant snowy avalanches. The amount of denudation by atmospheric causes is here quite incalculable; and I feel satisfied that the violence of the river at this particular part of its course (where it traverses those parts of the valleys which are most snowy and rainy), is proximately due to impediments thus accumulated in its bed.

It was sometimes clear at sunrise, and I made many ascents of Tukcham, hoping for a view of the mountains towards the passes; but I was only successful on one occasion, when I saw the table top of Kinchinjhow, the most remarkable, and one of the most distant peaks of dazzling snow which is seen from Dorjiling, and which, I was told, is far beyond Sikkim, in Tibet.* [Such, however, is not the case; Kinchinjhow is on the frontier of Sikkim, though a considerable distance behind the most snowy of the Sikkim mountains.] I kept up a constant intercourse with Choongtam, sending my plants thither to be dried, and gradually reducing my party as our necessities urged me so doing; lastly, I sent back the shooters, who had procured very little, and whose occupation was now gone.

On the 2nd of June, I received the bad news that a large party of coolies had been sent from Dorjiling with rice, but that being unable or afraid to pass the landslips, they had returned: we had now no food except a kid, a few handfuls of flour, and some potatoes, which had been sent up from Choongtam. All my endeavours to gain information respecting the distance and position of the frontier were unavailing; probably, indeed, the Lama and Phipun (or chief man of the village), were the only persons who knew; the villagers calling all the lofty pastures a few marches beyond Lamteng "Bhote" or "Cheen" (Tibet). Dr. Campbell had procured for me information by which I might recognise the frontier were I once on it; but no

description could enable me to find my way in a country so rugged and forest-clad, through tortuous and perpetually forking valleys, along often obliterated paths, and under cloud and rain. To these difficulties must be added the deception of the rulers, and the fact (of which I was not then aware), that the Tibet frontier was formerly at Choongtam; but from the Lepchas constantly harassing the Tibetans, the latter, after the establishment of the Chinese rule over their country, retreated first to Zemu Samdong, a few hours walk above Lamteng, then to Tallum Samdong, 2000 feet higher; and, lastly, to Kongra Lama, 16,000 feet up the west flank of Kinchinjhow.

On the third of June I took a small party, with my tent, and such provisions as I had, to explore up the river. On hearing of my intention, the Phipun volunteered to take me to the frontier, which he said was only two hours distant, at Zemu Samdong, where the Lachen receives the Zemu river from the westward: this I knew must be false, but I accepted his services, and we started, accompanied by a large body of villagers, who eagerly gathered plants for me along the road.

The scenery is very pretty; the path crosses extensive and dangerous landslips, or runs through fine woods of spruce and *Abies Brunoniana*, and afterwards along the river-banks, which are fringed with willow (called "Lama"), and *Hippophae*. The great red rose (*Rosa macrophylla*), one of the most beautiful Himalayan plants, whose single flowers are as large as the palm of the hand, was blossoming, while golden *Potentillas* and purple primroses flowered by the stream, and *Pyrola* in the fir-woods.

Just above the fork of the valley, a wooden bridge (Samdong) crosses the Zemu, which was pointed out to me as the frontier, and I was entreated to respect two sticks and a piece of worsted stretched across it; this I thought too ridiculous, so as my followers halted on one side, I went on the bridge, threw the sticks into the stream, crossed, and asked the Phipun to follow; the people laughed, and came over: he then told me that he had authority to permit of my botanising there, but that I was in Cheen, and that he would show me the guard-house to prove the truth of his statement. He accordingly led me up a steep bank to an extensive broad flat, several hundred feet above the river, and forming a triangular base to the great spur which, rising steeply behind, divides the valley. This flat was marshy and covered with grass; and buried in the jungle were several ruined stone houses, with thick walls pierced with loopholes: these had no doubt been occupied by Tibetans at the time when this was the frontier.

The elevation which I had attained (that of the river being 8,970 feet) being excellent for botanising, I camped; and the villagers, contented with the supposed success of their strategy, returned to Lamteng.

My guide from the Durbar had staid behind at Lainteng, and though Meepo and all my men well knew that this was not the frontier, they were ignorant as to its true position, nor could we even ascertain which of the rivers was the Lachen.* [The eastern afterwards proved to be the Lachen.] The only routes I possessed indicated two paths northwards from Lamteng, neither crossing a river: and I therefore thought it best to remain at Zemu Samdong till provisions should arrive. I accordingly halted for three days, collecting many new and beautiful plants, and exploring the roads, of which five (paths or

yak-tracks) diverged from this point, one on either bank of each river, and one leading up the fork.

On one occasion I ascended the steep hill at the fork; it was dry and rocky, and crowned with stunted pines. Stacks of different sorts of pine-wood were stored on the flat at its base, for export to Tibet, all thatched with the bark of *Abies Brunoniana*. Of these the larch (*Larix Griffithii*, "Sah"), splits well, and is the most durable of any; but the planks are small, soft, and white.* [I never saw this wood to be red, close-grained, and hard, like that of the old Swiss larch; nor does it ever reach so great a size.] The silver fir (*Abies Webbia*, "Dunshing") also splits well; it is white, soft, and highly prized for durability. The wood of *Abies Brunoniana* ("Semadoong") is like the others in appearance, but is not durable; its bark is however very useful. The spruce (*Abies Smithiana*, "Seh") has also white wood, which is employed for posts and beams.* [These woods are all soft and loose in grain, compared with their European allies.] These are the only pines whose woods are considered very useful; and it is a curious circumstance that none produce any quantity of resin, turpentine, or pitch; which may perhaps be accounted for by the humidity of the climate.

Pinus longifolia (called by the Lepchas "Gniet-koong," and by the Bhoteeas "Teadong") only grows in low valleys, where better timber is abundant. The weeping blue juniper (*Juniperus recurva*, "Deschoo"), and the arboreous black one (called "Tchokpo")* [This I have, vol. i. Chapter XI, referred to the *J. excelsa* of the north-west Himalaya, a plant which under various names is found in many parts of Europe and many parts of Europe and North America; but since then Dr. Thomson and I have had occasion to compare my Sikkim conifers with the north-west Himalayan ones and we have found that this Sikkim species is probably new, and that *J. excelsa* is not found east of Nepal.] yield beautiful wood, like that of the pencil cedar,* [Also a juniper, from Bermuda (*J. Bermudiana*)] but are comparatively scarce, as is the yew (*Taxus baccata*, "Tingschi"), whose timber is red. The "Tchenden," or funereal cypress, again, is valued only for the odour of its wood: *Pinus excelsa*, "Tongschi," though common in Bhotan, is, as I have elsewhere remarked, not found in east Nepal or Sikkim; the wood is admirable, being durable, close-grained, and so resinous as to be used for flambeaux and candles.

On the flat were flowering a beautiful magnolia with globular sweet-scented flowers like snow-balls, several balsams, with species of *Convallaria*, *Cotoneaster*, *Gentian*, *Spiraea*, *Euphorbia*, *Pedicularis*, and honeysuckle. On the hill-side were creeping brambles, lovely yellow, purple, pink, and white primroses, white-flowered *Thalictrum* and *Anemone*, berberry, *Podophyllum*, white rose, fritillary, *Lloydia*, etc. On the flanks of Tukcham, in the bed of a torrent, I gathered many very alpine plants, at the comparatively low elevation of 10,000 feet, as dwarf willows, *Pinguicula*, (a genus not previously found in the Himalaya), *Oxyria*, *Adrosace*, *Tofieldia*, *Arenaria*, saxifrages, and two dwarf heath-like *Andromedas*.* [Besides these, a month later, the following flowered in profusion: scarlet *Buddleia*? gigantic lily, yellow jasmine, *Aster*, *Potentilla*, several kinds of orchids, willow-herb (*Epilobium*), purple *Roscoea*, *Neillia*, *Morina*, many grasses and *Umbelliferae*. These formed a rank and dense herbaceous, mostly annual vegetation, six feet high, bound together with *Cuscuta*, climbing *Leguminosae*, and *Ceropegia*. The great summer

heat and moisture here favour the ascent of various tropical genera, of which I found in August several *Orchideae* (*Calanthe*, *Microstylis*, and *Coelogyne*), also *Begonia*, *Bryonia*, *Cynanchum*, *Aristolochia*, *Eurya*, *Procris*, *Acanthaceae*, and *Cyrtandraseae*.] The rocks were all of gneiss, with granite veins, tourmaline, and occasionally pieces of pure plumbago.

Our guide had remained at Lamteng, on the plea of a sore on his leg from leech-bites: his real object, however, was to stop a party on their way to Tibet with madder and canes, who, had they continued their journey, would inevitably have pointed out the road to me. The villagers themselves now wanted to proceed to the pasturing-grounds on the frontier; so the Phipun sent me word that I might proceed as far as I liked up the east bank of the Zemu. I had explored the path, and finding it practicable, and likely to intersect a less frequented route to the frontier (that crossing the Tekonglah pass from Bah, see chapter XVIII), I determined to follow it. A supply of food arrived from Dorjiling on the 5th of June, reduced, however, to one bag of rice, but with encouraging letters, and the assurance that more would follow at once. My men, of whom I had eight, behaved admirably, although our diet had for five days chiefly consisted of *Polygonum* ("Pullop-bi"), wild leeks ("Lagook"), nettles and *Procris* (an allied, and more succulent herb), eked out by eight pounds of Tibet meal ("Tsamba"), which I had bought for ten shillings by stealth from the villagers. What concerned me most was the destruction of my plants by constant damp, and the want of sun to dry the papers; which reduced my collections to a tithe of what they would otherwise have been.

From Zemu Samdong the valley runs north-west, for two marches, to the junction of the Zemu with the Thlonok, which rises on the north-east flank of Kinchinjunga: at this place I halted for several days, while building a bridge over the Thlonok. The path runs first through a small forest of birch, alder, and maple, on the latter of which I found *Balanophora** [A curious leafless parasite, mentioned at vol. i, chapter v.] growing abundantly: this species produces the great knots on the maple roots, from which the Tibetans form the cups mentioned by MM. Huc and Gabet. I was so fortunate as to find a small store of these knots, cleaned, and cut ready for the turner, and hidden behind a stone by some poor Tibetan, who had never retained to the spot: they had evidently been there a very long time.

In the ravines there were enormous accumulations of ice, the result of avalanches; one of them crossed the river, forming a bridge thirty feet thick, at an elevation of only 9,800 feet above the sea. This ice-bridge was 100 yards broad, and flanked by heaps of boulders, the effects of combined land and snowslips. These stony places were covered with a rich herbage of rhubarb, primroses, *Euphorbia*, *Sedum*, *Polygonum*, *Convallaria*, and a purple *Dentaria* ("Kenroop-bi") a cruciferous plant much eaten as a pot-herb. In the pinewoods a large mushroom ("Onglau,"* [*Cortinarius Emodensis* of the Rev. M. J. Berkeley, who has named and described it from my specimens and drawings. It is also called "Yungla tchamo" by the Tibetans, the latter word signifying a toadstool. Mr. Berkeley informs me that the whole vast genus *Cortinarius* scarcely possesses a single other edible species; he adds that *C. violaceus* and *violaceo-cinereus* are eaten in Austria and Italy, but not always with safety.] Tibet.) was abundant, which also forms a favourite article of food. Another pot-herb (to which I was afterwards more

indebted than any) was a beautiful *Smilacina*, which grows from two to five feet high, and has plaited leaves and crowded panicles of white bell-shaped flowers, like those of its ally the lily of the valley, which it also resembles in its mucilaginous properties. It is called "Chokli-bi,"* [It is also found on the top of Sinchul, near Dorjiling.] and its young flower-heads, sheathed in tender green leaves, form an excellent vegetable. Nor must I forget to include amongst the eatable plants of this hungry country, young shoots of the mountain-bamboo, which are good either raw or boiled, and may be obtained up to 12,000 feet in this valley. A species of *Asarum* (*Asarabacca*) grows in the pine-woods; a genus not previously known to be Himalayan. The root, like its English medicinal congener, has a strong and peculiar smell. At 10,000 feet *Abies Webbiana* commences, with a close undergrowth of a small twiggy holly. This, and the dense thicket of rhododendron* [Of which I had already gathered thirteen kinds in this valley.] on the banks of the river and edges of the wood, rendered the march very fatiguing, and swarms of midges kept up a tormenting irritation.

The Zemu continued an impetuous muddy torrent, whose hoarse voice, mingled with the deep grumbling noise* [The dull rumbling noise thus produced is one of the most singular phenomena in these mountains, and cannot fail to strike the observer. At night, especially, the sound seems increased, the reason of which is not apparent, for in these regions, so wanting in animal life, the night is no stiller than the day, and the melting of snow being less, the volume of waters must be somewhat, though not conspicuously, diminished. The interference of sound by heated currents of different density is the most obvious cause of the diminished reverberation during the day, to which Humboldt adds the increased tension of vapour, and possibly an echo from its particles.] of the boulders rolling along its bed, was my lullaby for many nights. Its temperature at Zemu Samdong was 45 degrees to 46 degrees in June. At its junction with the Thlonok, it comes down a steep gulley from the north, foreshortened into a cataract 1000 feet high, and appearing the smaller stream of the two; whilst the Thlonok winds down from the snowy face of Kinchinjunga, which is seen up the valley, bearing W.S.W., about twenty miles distant. All around are lofty and rocky mountains, sparingly wooded with pines and larch, chiefly on their south flanks, which receive the warm, moist, up-valley winds; the faces exposed to the north being colder and more barren: exactly the reverse of what is the case at Choongtam, where the rocky and sunny south-exposed flanks are the driest.

My tent was pitched on a broad terrace, opposite the junction of the Zemu and Thlonok, and 10,850 feet above the sea. It was sheltered by some enormous transported blocks of gneiss, fifteen feet high, and surrounded by a luxuriant vegetation of most beautiful rhododendrons in full flower, willow, white rose, white flowered cherry, thorn, maple and birch. Some great tuberous-rooted *Arums** [Two species of *Arisaema*, called "Tong" by the Tibetans, and "Sinkree" by the Lepchas.] were very abundant; and the ground was covered with small pits, in which were large wooden pestles: these are used in the preparation of food from the arums, to which the miserable inhabitants of the valley have recourse in spring, when their yaks are calving. The roots are bruised with the pestles, and thrown into these holes with water. Acetous fermentation commences in seven or eight days, which is a sign that the acrid poisonous principle is dissipated: the pulpy, sour, and fibrous mass is then boiled and

eaten; its nutriment being the starch, which exists in small quantities, and which they have not the skill to separate by grating and washing. This preparation only keeps a few days, and produces bowel complaints, and loss of the skin and hair, especially when insufficiently fermented. Besides this, the "chokli-bi," and many other esculents, abounded here; and we had great need of them before leaving this wild uninhabited region.

I repeatedly ascended the north flank of Tukcham along a watercourse, by the side of which were immense slips of rocks and snow-beds; the mountain-side being excessively steep. Some of the masses of gneiss thus brought down were dangerously poised on slopes of soft shingle, and daily moved a little downwards. All the rocks were gneiss and granite, with radiating crystals of tourmaline as thick as the thumb. Below 12,000 to 13,000 feet the mountain-sides were covered with a dense scrub of rhododendron bushes, except where broken by rocks, landslips, and torrents: above this the winter's snow lay deep, and black rocks and small glaciers, over which avalanches were constantly falling with a sullen roar, forbade all attempts to proceed.

My object in ascending was chiefly to obtain views and compass-bearings, in which I was generally disappointed: once only I had a magnificent prospect of Kinchinjunga, sweeping down in one unbroken mass of glacier and ice, fully 14,000 feet high, to the head of the Thlonok river, whose upper valley appeared a broad bay of ice; doubtless forming one of the largest glaciers in the Himalaya, and increased by lateral feeders that flow into it from either flank of the valley. The south side of this (the Thlonok) valley is formed by a range from Kinchinjunga, running east to Tukcham, where it terminates: from it rises the beautiful mountain Liklo,* [D2 of the peaks laid down in Colonel Waugh's "Trigonometrical Survey from Dorjiling," I believe to be the "Liklo" of Dr. Campbell's itineraries from Dorjiling to Lhassa, compiled from the information of the traders (See "Bengal Asiatic Society's Journal" for 1848); the routes in which proved of the utmost value to me.] 22,582 feet high, which, from Dorjiling, appears as a sharp peak, but is here seen to be a jagged crest running north and south. On the north flank of the valley the mountains are more sloping and black, with patches of snow above 15,000 feet, but little anywhere else, except on another beautiful peak (alt. 19,240 feet) marked D3 on the map. This flank is also continuous from Kinchin; it divides Sikkim from Tibet, and runs north-east to the great mountain Chomiomo (which was not visible), the streams from its north flank flowing into the Arun river (in Tibet). A beautiful blue arch of sky spanned all this range, indicating the dry Tibetan climate beyond.

I made two futile attempts to ascend the Thlonok river to the great glaciers at the foot of Kinchinjunga, following the south bank, and hoping to find a crossing-place, and so to proceed north to Tibet. The fall of the river is not great at this part of its course, nor up to 12,000 feet, which was the greatest height I could attain, and about eight miles beyond my tents; above that point, at the base of Liklo, the bed of the valley widens, and the rhododendron shrubbery was quite impervious, while the sides of the mountain were inaccessible. We crossed extensive snow-beds, by cutting holes in their steep faces, and rounded rocks in the bed of the torrent, dragging one another through the violent current, whose temperature was below 40 degrees.

On these occasions, the energy of Meepo, Nimbo (the chief of the

coolies) and the Lepcha boys, was quite remarkable, and they were as keenly anxious to reach the holy country of Tibet as I could possibly be. It was sometimes dark before we got back to our tents, tired, with torn clothes and cut feet and hands, returning to a miserable dinner of boiled herbs; but never did any of them complain, or express a wish to leave me. In the evenings and mornings they were always busy, changing my plants, and drying the papers over a sulky fire at my tent-door; and at night they slept, each wrapt in his own blanket, huddled together under a rock, with another blanket thrown over them all. Provisions reached us so seldom, and so reduced in quantity, that I could never allow more than one pound of rice to each man in a day, and frequently during this trying month they had not even that; and I eked out our meagre supply with a few ounces of preserved meats, occasionally "splicing the main brace" with weak rum and water.

At the highest point of the valley which I reached, water boiled at 191.3, indicating an elevation of 11,903 feet. The temperature at 1 p.m. was nearly 70 degrees, and of the wet bulb 55 degrees, indicating a dryness of 0.462, and dew point 47.0. Such phenomena of heat and dryness are rare and transient in the wet valleys of Sikkim, and show the influence here of the Tibetan climate.* [I gathered here, amongst an abundance of alpine species, all of European and arctic type, a curious trefoil, the *Parochetus communis*, which ranges through 9000 feet of elevation on the Himalaya, and is also found in Java and Ceylon.]

After boiling my thermometer on these occasions, I generally made a little tea for the party; a refreshment to which they looked forward with child-like eagerness. The fairness with which these good-hearted people used to divide the scanty allowance, and afterwards the leaves, which are greatly relished, was an engaging trait in their simple character: I have still vividly before me their sleek swarthy faces and twinkling Tartar eyes, as they lay stretched on the ground in the sun, or crouched in the sleet and snow beneath some sheltering rock; each with his little polished wooden cup of tea, watching my notes and instruments with curious wonder, asking, "How high are we?" "How cold is it?" and comparing the results with those of other stations, with much interest and intelligence.

On the 11th June, my active people completed a most ingenious bridge of branches of trees, bound by withes of willow; by which I crossed to the north bank, where I camped on an immense flat terrace at the junction of the rivers, and about fifty feet above their bed.

The first step or ascent from the river is about five feet high, and formed of water-worn boulders, pebbles, and sand, scarcely stratified: the second, fully 1000 yards broad, is ten feet high, and swampy. The uppermost is fifteen feet above the second, and is covered with gigantic boulders, and vast rotting trunks of fallen pines, buried in an impenetrable jungle of dwarf small-leaved holly and rhododendrons. The surface was composed of a rich vegetable mould, which, where clear of forest, supported a rank herbage, six to eight feet high.* [This consisted of grasses, sedges, *Bupleurum*, *rhubarb*, *Ranunculus*, *Convallaria*, *Smilacina*, nettles, thistles, *Arum*, balsams, and the superb yellow *Meconopsis Nepale*

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