nubiles to his golden presence, had the desired effect of exciting horror and disgust; and in their place girls of a tender age were demanded. The Kyanns sent young female children, who were immediately returned as too young, and ever since no further demand has been made. Still this practice remained in force until within these last few years, since when it is merely a matter of taste; and it is a remarkable instance of the capricious nature of the latter, when we see even now, men tattooing the faces of their wives without being compelled, either by human law or mandate of religion. I have seen some girls about sixteen who had not yet arrived at the general age for this disfiguration, whose features were uncommonly fine: they were far superior to the Burmese women in figure and fairness of complexion.

Their dress is a frock coat, with long sleeves of blue cotton cloth, which reach to the knee; the breast is open as low down as the waist, and is lined with strings of cowries, or some varied coloured fringe; a small blue handkerchief binds the hair, and a basket is suspended from the back of their heads by a thong which reaches round the forehead: in this they carry their provisions or the wild cotton they gather amongst the mountains. The men wear a frock of the same colour, but much shorter, reaching to the waist; their loins are girt in a white cloth, ornamented at the borders by stripes of red; their legs are entirely bare; a pouch is suspended from the shoulder by a belt ornamented with cowries and pieces of silver and pebbles; in this their valuables are kept, but it is, more properly speaking, a tobacco pouch; they possessing more of the latter than the former. Both males and females are particularly partial to smoking: they all carry a long reed pipe, generally tipped with a piece of silver or coral. Their weapons of defence are spears, swords, and cross bows, from which they project arrows of reed or bamboo, the points of which are hardened in the fire and dipped in vegetable poison, which seldom fails inflicting instant death.

The Kyanns are nominally tributary to the Burmese, who however derive little benefit from their wild and untaught vassals, except from those who have been allowed to enter the plains and have there settled. I saw many who seemed very happy, and, to do the Burmese credit, were not at all oppressed.

To speak generally of their character, from what I have heard from those who have been in the habits of daily intercourse with them for these last 20 years, I would say that their civilization would be of much importance to us, and could be accomplished without much difficulty. Conciliation is the only means. The Kyanns amongst themselves, pleased with their natural freedom, are rather a social race: they have, from the strongest of reasons, been taught to look on strangers as enemies. The Burmese, the only people they ever knew, they have only known as their oppressors. But now within the territories and under the protection of a Government famed for its liberality, temper, and mildness, and whose policy is grounded upon the principle of moderation, the Kyanns will find protection, and, gradually gaining confidence, may become useful subjects, and worthy of our consideration.

III.—*Particulars of a Visit to the Siccim Hills, with some account of Dárjíling, a place proposed as the site of a Sanatarium or station of Health. By Captain* J. D. Herbert, *D. S. G.*

Favorable accounts having reached Government, of the climate of the Siccim country, and of the advantages which would attend the establishment of a Sanatarium or station of health at Dárjíling, it was suggested to me, that my personal examination of the spot might lead to a more correct appreciation of these advantages; and in particular that my knowledge of the western mountains might suggest some useful comparisons of the features or peculiarities of the new station with the old ones, so as to give a more perfect idea of them, and enable the public to determine how far the former might, under particular circumstances, be eligible as a residence for invalids.

Mr. Grant of Málda, who had first drawn attention to the subject, and who was enthusiastic in praise of the country and of the people, had determined on a second visit, and it was proposed that I should accompany him; a proposal I very gladly accepted, for besides the curiosity to see a people of whom I had heard such very interesting accounts, I had long wished to verify the identity of the geological formations within the tract in question, and our mountains to the northwest. In particular, I wished to put to the test the truth of some views noticed in

my paper on the coal of the Himmalaya, published in the 15th vol of the Asiatic Researches, and which to me appeared not only speculatively interesting, but to have some reference to public utility.

On the 6th February, pursuant to arrangement with my fellow traveller, I left Calcutta by dawk for Málda, where I arrived on the 8th, at 2 P. M., having stopped a few hours at Berhampore for refreshment. On the 9th we quitted Málda in company, and reached Dinájpúr the following morning early. Málda, it is known, is in the vicinity of the extensive ruins of the ancient city of Gaúr—ruins so extensive, that they give the country an undulating and almost hilly appearance. Of the actual remains of building, I saw few in my line of road—but the dimensions of one of the tanks, not the largest, as I afterwards understood, perfectly surprised me, and gave me a lively idea of the former magnificence of a place which is now almost a desert. A well raised causeway runs from Gaúr through Málda to Dinájpúr. On leaving Málda we entered the Parwa jungle, as it is called, the site of an ancient and still more extensive city than Gaúr. From the road scarcely a trace is visible beyond an occasional undulation in the surface, the whole being dense but not lofty jungle. A very magnificent ruin called the Edína Masjid, of the history of which I could gain no account, was visited by us. It is situated on the road side about the middle of the jungle, and is a place of pilgrimage to the superstitious Musulmáns of the surrounding districts. As Parwa was a Hindú city, it is not very obvious how the mosque came there, unless we suppose, what the discovery of some Hindú sculptures in a corner, which had been built over, appears to entitle us to do—viz. that it may have been originally a Hindu temple, and seized and converted into a mosque, by some of the fanatical emperors. This opinion is confirmed by the character of the architecture, particularly of the pillars, which are quite in the ancient Hindú style. The tomb of Sikandar Sháh, or rather the remains of it, is at no great distance.

Whatever its origin, whether Hindú or Musulmán, it is a magnificent ruin, and, in my opinion, the most worthy of attention of any I have seen in India. The style, as I have said, resembles in some degree the older Hindu buildings in the north west of India, or, perhaps still more strongly, some of the structures in Egypt. The roof is a congeries of domes, and this at first I supposed to be more characteristic of the Mahomedan school; but that the dome is a feature of Hindu architecture also is proved by the Bishenpad at Gya. It consists of two stories, the columns of each story being of different orders, both most beautiful. The members of these order exhibit admirable proportions—all the ornaments are in character, and there is a unity of effect felt in contemplating the building, that stamps it the work of a cultivated people. The whole of a side wall, which is still standing, has been covered with the most elaborate tracery, with which is occasionally mixed the usual Arabic sentences from the Koran, executed in relief. This part of the work was probably contributed by the Musulmáns. It is built of a dark gray almost black basalt, derived from the Rájmahl hills—a stone apparently admirably adapted for the most delicate ornamental work. The upper floor is formed of slabs of granite, of great thickness, supported on the pillars. The building is fast falling to decay; only four of the domes with their pillars remaining perfect—but the remains of pillars and heaps of rubbish show its extent to have been considerable. It is said to have had 700 domes, each dome surmounting a square of 20 or 30 feet. I never so much regretted want of leisure to execute some measurements and memorandum sketches of this building—so striking in its peculiarity of character as well as beauty of architecture. It is indeed well worthy of a Daniel or a Grindlay to illustrate its beauties.

At Dinajpúr we halted a day to allow of the tents and servants making progress, and on the 12th, in the afternoon, getting into our palkees, found ourselves next morning about 10 o'clock at Titalya. Titalya has been only recently abandoned as a cantonment. The buildings are still in good order, and they would be useful in the event of an establishment being formed at Dárjíling, as the cantonment would most likely be made a resting place, and new point of departure for visitors proceeding thither. Supplies from the plains too might be lodged here till an opportunity offered of conveying them into the hills. Titalya is situated in a fine open, high and dry country, on the eastern or left bank of the Mahanaddi, which is said to be navigable in the rains to within a very short distance, even for boats of 700 maunds. The place is said to have been unhealthy; yet from what cause, if the fact was so, it it is exceedingly difficult to say. Assuredly no site could promise better, as far as our examination extended. What the character of the vicinity may be, I have no information or means of judging.

We did not stop at Titalya, but pushed on to Nijántra, on the left bank of the Balásan Nuddi, a small river which, flowing by Dinájpúr, at length joins the Mahanaddee. Opposite the village is a low undulating sandstone hill, on which, during the war, the Goorkhas had established a stockade, notwithstanding the vicinity of the cantonment, where was then stationed a battalion under the late Major Latter. Here we found pitched for us the tents which my fellow traveller had sent on, and his servants waiting to receive us. A moonshee, the medium of correspondence on this frontier with the Sicoim Rája, waited on us to know what assistance he could give. He hinted at the difficulties of our proposed journey, of the bad feeling of the Rája, and of the obstacles which would be thrown in the way of our obtaining porters for the carriage of our baggage, as also provisions for the people. The latter, Mr. Grant told him, he had taken care to bring with him; and the other objections he would not listen to, thinking it very unlikely that any indisposition on the part of the Rája would be manifested towards two English gentlemen travelling on a friendly mission, and by desire of that Government to whom he owed not only his country, but the means of subsistence[1]. Ample notice had been given, not only of our intended visit, but of the number of porters we should require. As the number was small, and such as there could be no difficulty in collecting, we would not allow ourselves to anticipate any disappointment. Orders were therefore given for proceeding the following day.

The hill on which the stockade was situated is of some little extent, and of an elevation amounting perhaps to 50 or 60 feet. The surface, which is undulating, is covered with grass and bush jungle, which effectually conceals the rocky strata. In some of the gullies and small water courses, however, I observed accumulations of rounded stones and gravel, which I concluded to be derived from the conglomerate beds of a sandstone similar to that which is found to flank the great mountain district to the north-west. This conjecture was strengthened by observing in a low bank where the surface had been broken, indications of sandstone strata, though the portion disclosed was too small for me to judge positively. The elevation of Nijántra above Calcutta is 336 feet. The surrounding country is almost flat, the hill above described being the only one within many miles. The thermometer descended during the night to 43°, showing the effect of radiation to be very great at this place.

On the 14th we proceeded on the elephant to Goshaínpúr, also on the eastern bank of the Balásan, the distance about eight miles. The country having a very gentle acclivity, has, to sight, the appearance of a flat, but from the barometer the ascent appears to be 50 feet. It is quite open and interspersed with villages and patches of cultivation, though much ground appears reserved as pasturage. At this place, the Rája's *zamíndár* had erected huts for us and our followers, but we found the tent a more comfortable dwelling. In the afternoon a change of weather seemed to threaten, and the clouds collecting in heavy masses, the outline of the mountains began to be faintly discernible. They appeared to have considerable elevation, even allowing for our proximity. The following morning the clouds had again dispersed, and all was haze in that direction. But they had interfered so much with the radiating process, that the thermometer was only down to 57°, being 14° above what it had fallen to at Nijántra. As a consequence, there was no dew, though at that place it had been heavy.

On the 15th we proceeded to Singamárí, four or five miles within the mouth of the Nágrí pass, which is in fact the bed of the Balásan river. The road is in the *cádir* of the Balásan, and is consequently low, and otherwise objectionable. But the higher ground appeared to afford a very eligible line of road, rising latterly more rapidly into a sort of side range, which kept the direction of the course of the river. As the road we travelled repeatedly crosses the river or some of its branches, and frequently lies in its bed, I do not think it could be kept open in the rains. But no difficulty need arise on this score, as the bank-like elevation above noticed, affords an unexceptionable line, gradually rising, till, at the entrance of the pass, it is already many hundred feet above the present road. It would however cross a branch of the Balásan (as does the present line), which goes to meet the Máhanaddee here, the other branch continuing its course, till it joins below Dinájpúr. This would require a chain bridge perhaps in the rains. At the season we crossed it, though wide, it was shallow. The bed is covered with rounded stones of every size, from 8 or 9 inches in diameter downward; though at Goshaínpúr, but 8 miles below it, it is

[1] Sicoim itself is too poor to maintain half a dozen serving men. It is on the tract of plain country, at the foot of the hills, ceded by our Government, that the Rája supports himself.

quite sandy.—Rassadhára is the name of a halting place here, on its banks in the middle of the forest. This forest is, however, by no means thick, the elephant having found no difficulty in getting through it. At Nánumatti, which is the last station in the plains, our conductor had intended us to halt, and had erected huts for our accommodation. But the place was dirty, dusty, dark and dismal, and the huts small and inconvenient. We therefore determined to proceed onward a little, and even take our chance in the river bed, though unprovided with tents, rather than be smothered with dust at the miserable place they had fixed on. We could not help making the same remark which I have often made when employed in the northern mountains—viz. the total insensibility of the natives of the plains to the charms of rural scenery, they invariably choosing the most objectionable spot to place a camp in, and passing by or stopping short of scenes of the greatest natural beauty.

On proceeding a few hundred yards we emerged from the forest and entered the bed of the river, which had now become a mountain stream: its water clear as crystal, and its course obstructed by huge round stones. The elephant made its way very slowly over these, and after proceeding with great difficulty about a mile and a half, we came to a place where the river, collecting itself in a deep pool, is surmounted on one side by a rocky ledge, over which the path lies. Here, therefore, we were obliged to descend and send the elephant back. The small ones belonging to our conductor, however, passed over this rocky defile, with as much boldness and certainty as a goat would have done. This pool, or natural basin, being nearly thirty feet in diameter, and from five to eight feet deep, offered a fine opportunity for bathing, which as the day was warm, would have been a great refreshment. But as the place had no very inviting features for passing the night in, and as Singamári, where it was known there was a comfortable house, was represented to be at no great distance, we pushed on, and in about an hour and a half we reached it. The baggage however did not come up till nightfall, and then only part of it; so that we had at one time the rather disagreeable prospect, after our day's travel, of going dinnerless to bed, upon a hard flooring, formed of bamboo laths.

The rock above the pool was the first we had seen, and I was curious, having found sandstone so far from the entrance of the hills, to examine it. Agreeably to expectation, it proved to belong to the second zone of rocks: that found succeeding the sandstone in the mountains to the north-west: being an argillaceous gneiss, exactly similar to that constituting the upper ascent of the Ghágar on the road to Almórah. In that mountain it however attains an elevation of 5 or 6000 feet, whereas here it was not above 1000. But it is worthy of notice, that the sandstone is also deficient in elevation; at least if we suppose the low hill at Nijántra to be the only indication of it in this quarter. Now that the latter formation had not disappeared from the effect of wasting, is evident from the total absence of debris either sandy or pebbly, the only trace of the latter being on the hill itself. May we then venture to assume, that those rocks have not risen to the level they have attained in other quarters, simply because the elevating force was less powerful or had more resistance to overcome?

Singamári, elevated 1300 feet, is on the right bank of the Balásan, which we had crossed three times; the last time at the place. It is on one of those small flats seen in all mountain rivers at intervals, and is about 50 feet above the river bed. The valley is narrow, being in fact a mere gorge; the breadth of the river and the mountains on each side rise to a great height, being covered with thick forest. No pines were visible; a singular difference from the other quarter, where they are the only tree seen on first entering the hills. There is no village, or at least there were no inhabitants. We therefore took possession of the principal house, built of bamboos and thatched, and which we found a very comfortable one. It was raised about 3 feet from the ground, the flooring being formed of split bamboos. There were two rooms, the dimensions of which were much more convenient than in the houses of the plains, and quite sufficient to allow of an upright posture. And what I never saw in any native's house—a kind of sideboard or table was constructed of split bamboos in one corner—in another was a very fine raised platform intended for the bed. There were abundance of smaller huts for our people.

On the 16th we left Singamári at 9 o'clock, and proceeding in the bed of the river (which we crossed several times) for a distance of about a mile, turned to the left, and ascended by the bed of a steep torrent which here joins the Balásan. The ascent is latterly rather steep to Jamdári Ghát, elevated 1795 feet above Calcutta. From this pass the Sinchal mountain is visible, bearing N. 20 E. From the pass

the path leads through a bamboo forest, occasionally ascending, occasionally descending to a stream, whence there is a small descent to Dimáli Góla; where we arrived in a heavy shower of rain. This is one of the stations where the mountaineers barter their *manjit* for the good things of the plains or for money: we had therefore a pretty full meeting to stare at and welcome us. The *j-madár*, as they call the officer or head man who is here on the part of the Rája, cleared out a house for us, and we soon found ourselves very comfortably settled.

This was my first interview with the Lepchas, and I saw immediately that they were the same people whom I had met with at Nialang, at Jahnabbi, at Shipci on the Satlej, in Hangarang, and at Lári in Ladác. They are in fact the people who have been erroneously called Chinese Tartars, and are in reality of the same race as the Thibetians, being a family of the great division of Eleuth Tartars or Calmucs. Yet the Lepchas distinguish between themselves and the Bhótiahs or Thibetians, and the languages, though resembling each other sufficiently, have yet a difference. I imagine however this distinction to be rather that of the new and old settler, and the difference of the languages to have originated in the same circumstance. There is certainly not the least difference in their appearance, or manner, or character, as far as we could see into it, or habits, or prejudices, and their religious worship is actually the same.

The peculiarity of feature that marks this race is very striking. A broad, flat face; the nose little elevated, but with expanded nostrils; the eyes small and set obliquely in the head, the inner angle being depressed; a rather large mouth, but with thin lips; and a great deficiency of beard; form the elements of a countenance, which though it cannot, according to European notions, be pronounced handsome, is yet often, from the expression of intelligence and good humour that distinguishes it, more prepossessing than the regular features of the Hindustani. Their character answers to their looks: they are cheerful, frank, full of curiosity; bold, yet not presuming in their address; and to all this is added a simplicity of manner, as well as of feeling, that must render them favourites with Europeans. Their curiosity was not to be satisfied; they crowded around us, while we were dressing, and what seemed greatly to interest them was the process of removing the beard, a part of the human face divine, which requires little trimming with them. That little is effected by plucking it out by the roots in most cases, and the few who cultivate it are not improved in their appearance, as it is so very scanty. Our telescopes attracted much attention, as did a pocket compass, and a watch; the latter being held at a distance, and a long stick touching it, brought in contact with the ear of one of them, he seemed greatly delighted, and called out to his companions that it said tick, tick, tick! using the very word that we do to express the sound.

The Lepchas are able bodied men—they are short square thick-set muscular looking figures. One of them will carry as much as two Bengális, and this without grumbling or complaint. Their legs exhibit proportions which might do honour to an Irish coalheaver or chairman. Their complexion is of a lighter tint than that of the Hindustani, or rather would be, could they be persuaded to remove the thick coat of dirt that obscures it. This leads me to notice their only fault; at least the only one we could discover in our short acquaintance with them. I mean their excessive filthiness; and this is such as to surpass belief. Notwithstanding this drawback, many of them appear remarkably fair, and exhibit considerable colour. They all, men and women, allow their hair to grow, some wearing it loose on the neck, others plaiting it into a tail which hangs down behind, and to the end of which cowries are often attached. The dress of the two sexes is precisely the same. These circumstances of the similarity of the hair and dress, added to their smooth faces and want of beard, give the men a very effeminate appearance, and several of them were constantly mistaken by us for women—the voice alone enabling us to distinguish.

The rocks in this day's journey were gneiss, apparently dipping to north-west, and lying at an inclination of 45. In the bed of the river it continued of the argillaceous type, but on Jamdárí Ghát it consisted of the ordinary ingredients, the felspar being reddish.

On the 17th we left Dimáli Góla for Sámdong. The road descends through a bamboo forest to the river's bed, in which it proceeds, crossing it by a bridge formed of a single bamboo, with another to hold by. A little beyond this, at a place called Gulgulia-muni, the river is collected in a deep and extensive pool overhung by a lofty precipice, which even towards noon keeps the spot in shade. Here appears to reign always a cool and refreshing air—too cold indeed; for heated as we were with our walk, the breeze from the pool chilled us. The precipice is of great height and

steepness, and the river, which takes a bend at the place, washes its foot; the surface as even and unruffled as that of a lake. It is evidently of great depth, and is full, the people say, of fish. We could have wished to have halted here instead of at Dimáli-góla, but were obliged to make our wishes bend to circumstances. A little beyond this the Rámbong river joins the Balásan from the left. The road continues in the bed of the latter, crossing again to the right bank by a similar rude bridge to that before described, and then ascends the steep face of the mountain. This was the most fatiguing part of the stage, and occupied us 40 minutes. At Nagri-long-jók, elevated 2718 feet, the road branches off to Nagri stockade, where we had a detachment formerly from Titalya. Our path was now level for some distance, or with easy descent along the face of the mountain. We had a less confined view of the country too, than when groping in the river bed; yet we could see no villages, nor any thing in fact but thick forest, which seemed to overspread the country in every direction. Here and there a small cleared tract was visible, having a hut in the middle; but these efforts to overcome the exhuberance of nature seemed, like man himself, to bear no proportion to the vast features of these mountains. Gradually descending, we again found ourselves in the bed of the Balásan, which we crossed a third time, on a bridge exactly like the two former. After proceeding in the bed a few hundred paces, we crossed back again, and had then about a mile and a quarter of very unpleasant road, through a thick jungle of the small bamboo; the ground very uneven and wet, and covered with decayed leaves. A fifth crossing of the river was then effected, and we found ourselves, on ascending the bank, at Sámdong. This was rather a fatiguing march, having occupied us five hours.

Sámdong, though elevated 2751 feet, is scarcely superior to Dimáli-góla as a halting place. On the side of a steep mountain, and surrounded with thick jungle, there is no seeing any thing beyond a few yards, while the quantity of even ground is extremely confined. The place is rather dreary looking, I confess; and we had an unfavorable day to contemplate it, as it began to rain immediately on our arrival. But we were comfortably housed, and we pleased ourselves with the idea that we should here really start for Dárjíling, as our Lepcha porters were here to come into play, and the Bengális be discharged. Accordingly, being informed that the Rájah's *dewán*, (as they called a dirty Bhótia with a silk dress,) was waiting to pay his respects, Mr. Grant ordered him to be admitted, and we immediately entered on business. A smart little Lepcha, in a scarlet vest or cloak, something like the Spanish *poncho*, acted as interpreter, and afforded us some amusement by the pertinacity with which he prefaced every speech, however short, with the never varying declaration of *Ghulám bintee hurta, khudáwand mulk ép ha, áur ép ka hukmse*, &c. &c.; after which he would conclude perhaps by refusing to give us half a dozen porters. They began by aking us the intention of our journey, to which, instead of replying by any mystification, Mr. Grant at once declared the full aim and object of our mission. We thought it might simplify and cut short the negociation by satisfying them, that nothing was in contemplation from which they could by any possibility extract any cause for alarm. But with those accustomed to tortuous and crooked methods of arriving at their object, such openness perhaps does not advance one much. Unaccustomed to the thing themselves, they cannot understand the object of practising it; and, as is always the case with weak minds, what they cannot understand or fathom, they are sure to suspect and fear. The royal ambassador testified considerable alarm, and exhibited the only visage (to do the people justice) in which any thing sinister or disagreeable was observed. Like all diplomatists, he seemed never tired of telling lies; and assured us in the strongest terms of the respect and deference his master felt for the British Government all the time he was making a difficulty of allowing us to proceed a step farther. He wished for time, being apparently aware that *time*, like knowledge, *is power*. He declared we had hurried too much, though his lazy master had actually had nearly a month's notice of our approach. All his excuses and protests we set aside at once, and told him plainly, that if by morning we were not furnished with porters to proceed to Dárjiling, we would retrace our steps, and leave him and his Rája to explain their neglect and incivility the best way they could. Mr. Grant was very mild but firm, and as he appeared to have inspired them with favorable impressions, what he said had the more weight. After a little more delay they declared we should have as many as could be got together by morning. In a short time, nearly a dozen able bodied fellows came to examine and prepare the loads, and we were not a little pleased to find that we had some prospect of seeing Darjiling. Eight annas a stage was agreed to, as their daily hire, not including return; and taking into consideration the severity

of the marches, as well as the extraordinary loads they carried, it was moderate. A few bottles of brandy were given to put them in good humour, for they are extravagantly fond of spirits. Nor was the ambasador or the interpreter forgotten, and even the worthless Raja had a royal and sufficient share assigned to him, which the people promised to forward.

On the 18th we left Sámdong, after breakfast, commencing with a pretty good ascent up a lateral ridge, where the forest seemed a little more open, and from which we could distinctly trace the several ramifications of the mountain Sinchul plainward. The road we had come had proved by no means good, but it was objectionable, still more from the nature of the country it passed through, and the impediments which occurred in every part of it. Of these the principal were the repeated fords over the Balásan, which could not be expected to be passable in the rainy season; or indeed in any season after a heavy fall of rain. Every one who has lived for any time in a mountainous country, knows the sudden impetuosity which even insignificant rills will acquire from the effects of a pretty heavy shower; and that it requires a bridge for the passage of every stream, if a road is to be kept open all the year round. But even with bridges this road could not be kept open, as great part of it lies in the bed of the stream, and must be under water after every heavy fall of rain. Add to which, that during great part of the year a considerable portion of this road must be decidedly unhealthy. But a very unexceptionable line of road is to be traced from the ridge above Sámdong. One of the ramifications of the mountain above-mentioned, exhibits a uniform ascent from the plains to its parent ridge, without break or valley to interfere; as far at least as we could distinguish: and with very few windings, fewer, in fact, than are found in the present road. So unexceptionable did the suggested line appear to us, that we could not help exclaiming against the apparent perverseness of the people, who will always (or at least had done so here) choose the worst possible direction in which to carry their roads; not adverting to the fact, that in all half settled countries like this, roads must pass by the villages, however circuitous and otherwise objectionable the line be, from the necessity of having shelter and supplies at each stage. We both agreed however that if Dárjíling is ever to become a place of resort, it will require some other means of access than the present; and we saw no reason to doubt, either then or afterwards, the great superiority of the line which had recommended itself to us.

The ascent from Sámdong to Tikri-bong is almost continued, and so steep as to be very fatiguing. The first part is partially cleared, with a solitary hut in one or two places, and an attempt at cultivation; but the latter half is through a thick forest, frequently over a bed of decayed leaves. Soon after we set out it began to rain, and continued more or less heavily till we reached our halting place. This latter was a spot in the forest, where water was procurable. There were no huts, but our Lepcha porters who had preceded us had erected a sort of wigwam of boughs of trees, the roof being covered with the smaller branches, which, however, did not constitute a very water-proof sort of house. But by putting up blankets in the inside we contrived to shelter ourselves from the rain, which continued to fall nearly all night, though far from heavily. A platform had been erected for our beds, on which we slept pretty comfortably, in spite of the rain and cold wind. In fact, we took the precaution of lighting a blazing fire within the hut, on the earthen flour beyond our sleeping platform, and with our heads directed to this excellent companion and the blankets over head, we passed as comfortable a night as if we had been in a palace; and this in a place which, on a first view, appeared the most wretched and unpromising I ever saw. The elevation of Tikri-bong is 5559 feet, and the thermometer had sunk the following morning to 46°.

19th. The morning was not more promising than the evening had been; but as there was no inducement to remain where we were, we determined to push on in spite of the thick mantle of cloud which enveloped the whole of the mountain, and effectually concealed from us every object. The road lay along the summit of the ridge, through the same kind of forest as the preceding day; the bed of decayed leaves rendering the path very disagreeable, and sometimes even dangerous. We had a good deal of ascent, as may be judged by the elevation we attained, 8080 feet, being upwards of 2000 feet above Tikree-bong. But we had much more than this; for the most tedious part of the road was a series of ascents and descents, sometimes very steep, and over a road so bad that I think I have never seen in any part of the hills a worse. Yet I must say that it could, with a very small expenditure of means, have been made a very good one. After reaching the highest point we began to descend through a thick jungle, I will not call it forest, of the small bamboo, in which the

stems were so intertwined that it was with some difficulty we could make our way. The former part of the road was about the worst I had ever seen, but it yielded to this. For miles we could see nothing but these stems interlaced in every direction; while it was often a matter of considerable difficulty, picking our way through them over the mass of decayed leaves or slippery clayey soil, where the ground was at all visible. The day was one of the most dreary that can be imagined, and doubtless, by the sombre colouring it threw over every thing, gave us an exaggerated idea of the difficulties. For the greater part of the distance we could not see even the sky, the forest forming a thick covering over head; while the density of the cloud in which we were enveloped, afforded us little more light than might be called darkness visible by which to see our way. But it must be noticed, that in speaking of the badness and difficulty of this road, the ordinary features of bad mountain roads are not to be understood; but rather such as might belong to any unfrequented track, even in a plain country, through similar jungle and in similar weather. After a long march, the tediousness of which was rendered worse, by the difficulties and discomforts mentioned, we emerged from the forest, and found ourselves on a part of the ridge entirely cleared, marked by a small square erection of a few feet, with a pyramidal top, which they called Paspatnáth. In front no trees were visible, while the prospect opening gave us a very general view of the country, and showed us to be within a considerable basin, the sides of which were formed by lofty mountains. The cleared spot on which we stood was DÁRJÍLING[1].

IV.—*Report of the Committee appointed by the Council of the Royal Society, to consider the subject referred to in Mr. Stewart's Letter, relative to Mr.* Babbage's *Calculating Engine; and to report thereupon.*

Your Committee, in this their Report, have no intention of entering into any consideration of the abstract mathematical principle on which the practicability of such a machine as Mr. Babbage's relies, nor of its public utility when completed. They consider the former as not only sufficiently clear in itself, but as already admitted and acted on by the Council in their former proceedings. The latter they regard as obvious to every one who considers the immense advantage of accurate numerical tables in all matters of calculation, especially in those which relate to astronomy and navigation; and the great variety and extent of those which it is professedly the object and within the compass of Mr. Babbage's engine to calculate and print with perfect accuracy.

The original object of the present machine was to compute any tables which could be calculated by six orders of differences and twelve figures in each, and sixteen figures in the table itself, in such a form that by bestowing a very moderate degree of attention on their publication, it would be impossible for a single figure to be erroneous; and supposing any person employing them to entertain a doubt whether that moderate degree of care had been bestowed, he might in a short time himself verify the tables. The machine was intended to produce the work stamped on plates of copper or other proper material. Besides the cheapness and celerity of calculation to be expected from it, the absolute accuracy of the printed results being one of the prominent pretensions of Mr. Babbage's undertaking, the attention of your Committee has been especially directed, both by careful examination of the work already executed, and of the drawings and by repeated conferences with Mr. Babbage, to this point. And the result of their enquiry is, that such precautions appear to have been taken in every part of the contrivance and work which they have examined; and so fully aware does the inventor appear to be of every circumstance which may by possibility introduce error, that they have no hesitation in saying they believe these precautions effectual, and that whatever the engine does, it will do truly.

In the actual execution of the work they find that Mr. Babbage has made a progress, which, considering the very great difficulties to be overcome in an undertaking so novel, they regard as fully equalling any expectations that could reasonably have been formed; and that although several years have now elapsed since the first commencement, yet, that when the necessity of constructing plans, sections, elevations and working drawings of every part; that of constructing, and in many

[1] We have been obliged to leave off here, and to reserve the continuation of this paper for our next number.

plates *transmitting* the same, the numbers have only to be multiplied, according to Biot, by ,00023, which gives the result in inches. We shall have then

No. 1 = 0.00092 inch.
„ 2 = 0.00254 „
„ 3 = 0.00396 „
„ 4 = 0.00575 „
„ 5 = 0.00508 „

which agreed as nearly as might be with actual measurement.

30. The measurement of thin crystalline plates is not the only useful purpose to which the polarizing instrument may be practically applied: a more important one is the ready means it affords of finding the axis of double refraction or crystallization in any crystal, a main point in mineralogical crystallography, and in constructing what are called double image micrometers of crystal. It is useful, in a minor way, to detect false gems, without scratching them. It affords useful hints as to the best disposition of glass reflectors: but these are trivial matters; the real point of utility gained by the discovery of polarization, is the knowledge of a fundamental law of light, which goes far to explain the rationale of reflection and refraction—two co-existent effects, which always seemed at variance with one another—an attraction and a repulsion simultaneously at work on the surface of bodies:—it also gives very strong support to the theory of the materiality of light, and confirms all the subtle reasoning of the great philosopher who first analyzed the prism, and pronounced the relative weight, number, and velocity of atoms, which, but for his researches, would, perhaps, never have been acknowledged to possess a material form or existence.

II.—*Particulars of a Visit to the Siccim Hills, with some account of Dárjíling, a place proposed as the site of a* Sanatarium *or Station of Health. By Captain* J. D. Herbert, *D. S. G.*

[Continued from page 96.]

Dárjíling is on the southern side of a great hollow or basin, being that of the Ringit river, which falls into the Tísta, a few miles east of the place. To the north the view is open, and exhibits the usual succession of range beyond range, all irregularly ramifying in every direction, and in apparently inextricable confusion. It terminates in the snowy range, which is here equally as magnificent an object as to the north-west, and there is some reason to suspect, includes peaks of even greater height than those measured in the surveys of Garhwál and of Kamaún. Unfortunately, during the two days we halted, the weather was unfavorable; a mass of clouds almost continually obscured them, and it was only by an occasional glimpse of a peak that we were enabled to trace out their great extent, or guess at their superior elevation. To the westward, the view is confined by a lofty range at the distance of about 10 miles; intermediately is a low ridge connected with that of Gángla, which is again a part of the Sinchal mountain; on the top of this ridge is the small village of Changtong, separated from Dárjíling by a deep valley. To the eastward appears the valley of the Tísta, the boundary of Siccim and Bután; and on each side of it is the confused assemblage of mountain ridges as to the north. Above the head of the Tísta may be seen the opening of the Féri pass—that, I imagine, by which Captain Turner visited Táshi Lumbú. To the left of it the high peak Chamalári, noticed also by that traveller, is visible; and west of it the highest summit in this quarter, called Kanching-jinga. This is the peak which is mentioned in a communication published in Brewster's Edinburgh Journal, and conjectured to be a volcano[1]. It is said to have been measured, and found to be 27000 feet high.

To the south, Dárjíling has the Sinchul peak, elevated about 9000 feet, and the Gardan-kattar range, which is a ramification of it. These mountains are completely clothed with forest from the top to the very bottom, and owing to consequent sameness of tint and want of break or variety in the surface, they form

[1] I have not been able to learn any of the particulars of the measurement, further than that it was in some degree only approximate, and by no means rigorously exact. It is visible as a very conspicuous object from Dináj́púr, which cannot be less than 150 miles distant in a direct line. This is, in itself, a presumption of great height.

rather sombre features in this landscape, especially in cloudy weather. Dárjíling is, as before mentioned, situated on the shoulder of this great mountain.

The extent of the cleared part of the ridge, the site originally of a Lepcha town, and afterwards of a Gúrkha cantonment, is in a northerly direction about 400 yards. The southern extremity, marked by the small building called Pusputnuth, is a narrow neck of land, having on one side a steep declivity, covered with thick forest; on the other a more gradual one, with the forest open. From this point the hill rises into a broad and almost flat summit, having on it the remains of a *Gumba* or Lama monastery. The northern and eastern sides sink down precipitously, but to the west and south the declivity is easier. On the western side, there is, at the foot of this summit, a considerable tract of level ground, which passes round from south to north, and at the latter corner throws off a broad and tolerably even topped ridge as a ramification to the westward. On the highest summit, round its western base, and along this ramification, will be found ample room, even for a small town. Water is plentiful and not distant, there being two springs close to the place; and should more be required, some of the innumerable rills, which are found in the higher but connecting range of Sinchal, could easily be conducted in narrow channels along the face of the mountain, as is practised in every part of these hills.

Of the climate it is impossible to speak too favorably. During our stay of two days, 19th and 20th February, the range of the thermometer was 39 to 49°. Both days were cloudy; and doubtless, had it cleared up, the thermometer would have risen higher than 49. But from a single observation of this kind, nothing can be learned of course as to the temperature of the hot months, which would be the period for invalids visiting Dárjíling. We can, however, determine, from knowing the elevation of the place, what would be the difference of temperature between it and Calcutta, as it has been found, by a very extensive induction, that an ascent of about 300 feet occasions a fall in the temperature of the air, amounting to 1° of Fahrenheit's thermometer[2].

The elevation of Dárjíling appears, by a mean of two cotemporaneous observations, to be 7219 feet. Divided by 300, this gives 24° as the difference of temperature between Calcutta and Dárjíling. When the thermometer is at 80° at the former place, it would be 56° at the latter; when 90°, 66°; and in the very rare cases in which it reaches 100° in Calcutta, it would be but 76° at Dárjíling. The latter would then be the highest temperature out of doors: but in a house it could never rise even to 70° in the hottest weather; while during greater part of the hot weather and rains it would not much exceed 60°. Let any dweller in our city of palaces picture to himself the establishment of a cold weather suddenly in the middle of the rains, and he will have some idea of the change in his feelings and health, which a visit to Dárjíling would produce. The lowest temperature ever felt in the house in Calcutta is 62°, and this at Dárjíling would be about the temperature of the hottest season of the year. The following table will put the difference of climate in a clearer point of view.

Comparative Temperatures.	Calcutta.	Dárjíling.
WITHIN DOORS.		
Mean temperature of the year,	78°	54°
Mean temperature of hottest month,	87	63
Mean temperature of coldest month,	65	41
Mean maximum temperature of hottest month,	93	69
Mean minimum temperature of ditto,	81	54
Mean temperature of rainy season, (July, August and September,)	83	59
Maximum temperature, (June,)	95	71
Minimum temperature, (January,)	62	38
OUT OF DOORS.		
Maximum temperature,	101	77
Minimum,	48	24

[2] Mr. H. Atkinson, the author of a very elaborate paper on the theory of Astronomical Refractions, gives as the result of his very extensive induction, $T° = H \div n$, in which T is the difference of temperature due to any difference of elevation H, and n a variable divisor, the value of which may always be found, by adding $\frac{1}{100}$ part of the difference of elevation to the constant 251. This would give as the rise due to 1° in the present case 287 feet, and the difference of temperature 25°. *Mem. Astr. Soc. vol.* ii. *p.* 1.

In the cold season it appears then that the temperature would sink below the freezing point. Snow might then be expected to fall; and this agrees with the experience of Captain Lloyd, who visited the spot in 1827, and found snow in the neighbourhood even in February. We did not observe any snow even on heights of 10,000 feet; but it is to be considered that there is a great difference even at home in different years, and the present year began here with an unusually mild winter[3]. Though we saw no snow lying, except on the very elevated ranges in the neighbourhood of the Himalaya, yet we saw it falling on a neighbouring ridge, not much higher than Dárjíling; and indeed from the temperature observed at the latter place, 39°, it is evident that a very trifling fall in the thermometer would have brought snow.

But it is not so much the mere temperature of a mountain station, (though that is a great point,) that renders it so delightful a retreat to the debilitated European, who for twenty years or more has suffered under the fervors of an Indian sun. There is a lightness and a buoyancy in the air, or rather in our spirits, in mountain regions, that to him who has doled away years in the apathetic indolence, inevitably induced by the climate of the plains, and particularly of Calcutta, feels like taking a new lease of life, or rather like passing into a new and superior state of existence. Instead of that listlessness in which we of the city of palaces pass our lives, apparently insensible even to extraordinary stimuli; the dweller in the mountains feels an energy and vigour, a power of exertion and a freshness of feeling, which is not found in the plains even in countries sufficiently cold. This exhilarating effect of the mountain breeze has been often noticed, but never, that I am aware of, satisfactorily accounted for. Perhaps it is the purity of the air,—perhaps the greater dryness, owing to increased evaporation,—perhaps neither the one nor the other. That it is not the lightness of the air, seems pretty clear from a well known fact, that our spirits every where rise with the barometer, i. e. as the air becomes heavier. But whatever be the cause, the fact is certain, and I appeal to those who, after suffering from the heat of the plains, have escaped to our northern sanctuaries, Semla or Landaúr, whether they did not feel renovated in mind and body by the transition. It is alone in mountainous countries that we experience that delightful sensation which renders mere passive existence a high enjoyment.

That the advantages of a residence at Dárjíling will be equally great as at the northern stations of Semla, Landaúr, or Almórah, can admit, I imagine, of no doubt. The elevation being within less than 300 feet of the former, must give it a temperature at all times within 1° of Semla. The latitude is certainly lower by 3°, but it is very doubtful whether the difference in geographical position would amount to so much as the former. To which is to be added, that Semla, having a southern aspect, with nothing to defend it from the heated winds of the plains, would probably, on that account, appear to have even less than this little advantage of climate over Dárjíling, which, facing the north, is well screened by the Gardan-kattar range, situated to the south, and the direction of which is nearly E. W. But this range, as noticed by Captain Lloyd, will act a still more important part in meliorating the climate of the place. For the rising fogs and exhalations of the plains will be checked in their progress northward by the cold air, which must always rest on the summit of this mountain, while the winds will be turned off; so that if there be any thing deleterious in the air of the country at the foot of the hills, it would be neutralized as far as Dárjíling is concerned; being in fact prevented reaching that place by the screen afforded by this range[4]. The efficacy of a mountain range to modify climate

[3] It appears to be thought by many that snow lies in considerable quantity every year at Semla; but this is not the case. The difference of different years may be judged of by the following two facts. In the year 1815 snow fell at Nahan elevated 3000 feet, and at Kálsi 2500, and lay deep also on the low sandstone range that bounds the Dehra Doon to the south (2000 to 3500.) In 1819 there was no snow fell on elevations of 9000 feet.

[4] This consideration involves a most serious objection against the only other mountain station in the vicinity of Calcutta; I mean that at Nanklaúl, in the Cásia hills. An extensive tract of low marshy ground, with much of the worst kind of jungle, borders that table land to the north and to the west. When the wind proceeds from that quarter it must bring with it malarious exhalations; and that it does so and inevitably occasions the place to be less healthy than it otherwise would be, is the opinion of those who know and have lived in the country. The difference of elevation between Dárjíling and Nanklaúl is however too great (2200 feet=7° Fah.) to allow of any question being made between them, even if there were not the above great advantage on the side of the former.

is acknowledged; and were it doubtful, the case of the great Himálaya chain would show it most powerfully in the fact, that there is no rainy season to the north of that great belt of elevated land. And I feel disposed to believe, that this great range of Sinchul must have something of a proportionate effect on the tract to the north of it, and the rainy season would be much less violent than at Semla and at Landour, open to the full blast of the great congregation of vapours swept from the plains. And even supposing the question of malarious exhalations to be worth nothing, it would still be certain that Dárjíling would have the advantage of those places as a residence in the rainy season, at which time they are exceedingly dreary.

The relative temperatures of these several stations is best learned by comparing their elevations, a very trifling allowance being due to those in the north-western mountains, as before remarked, for their higher latitude[a]; and perhaps to Dárjíling for its northern aspect. Keeping in mind that 300 feet in elevation is equivalent to 1° of temperature; we may by a glance at the following table, obtain a perfect idea of the differences of these places, with reference to temperature. We may see by it that Semla is nearly 1° colder than Dárjíling; Landaúr, or rather Masúri, 2° hotter; and Almórah 6° hotter.

Semla.	Dárjíling.	Masúri[b].	Almórah.
7486	7218	6500	5920

As a locality for a Sanatarium, Dárjíling has then many claims on our notice. Temperate climate, a sufficiency of level ground, a sufficiency of water, in which it has the advantage of Semla and Landaúr, and of building materials, as far, at least, as stone and timber are concerned. In the deficiency of limestone it is no worse than were Semla and Almóra when first established. And that a little careful research will succeed as it did at those places, in detecting the mineral at no great distance, appears to me very probable, from the fact of the grey-wacke formation (with which the limestone is associated) being found in the vicinity. That we did not discover it, is not even a presumption against its existence, for we had not the means to do justice to the enquiry, being obliged to hurry through the country as fast as we could, and prevented going off the particular line of route we had chosen to follow. In the article of rides and walks Dárjíling offers great advantages. Connected with a lofty range, which throws out its ramifications in every direction, a level road of any desirable extent may be cut with little trouble. And though the immediate spot itself be inferior in romantic beauty to Semla or Landaúr, it has many beautiful places in its vicinity. The forest scenery on the Gardan-kattar range is very magnificent, and the descent to Ging, which is on the same ridge with Dárjíling, is a very picturesque ride. No place can boast of a more extensive view of the snowy range, if only on account of the peculiarity of the position, as will be evident by considering the description before given. Accordingly nearly a third of the horizon is occupied with these lofty pinnacles, some of which are considered, and not without reason, amongst the most elevated points of this stupendous chain.

The ground is sufficiently cleared to allow of building being immediately commenced on, little more being requisite than burning down some jungle grass that has grown up rather luxuriantly. But in the construction of a road to the place, some assistance would be required from the people of the country; the present road, as I have already stated, being utterly useless as a means of convenient or even regular communication. The line which appeared, as far as we could see, eligible, is the greater part of it through thick forest, the clearing of which would be the principal part of the work. In effecting this object, the co-operation of the people of the country would be very useful. They are a hardy and athletic race, and would be glad to join us if permitted.

They are at present living within the Gúrka territory, whither they fled to avoid the tyranny and oppression of the Raja of their country. But they are not satisfied with their position. The Gúrkas being rigid Hindús, they find themselves subject to various disagreeable prohibitions, and are made to feel, in fact, that they are what the knavish brahmin calls outcasts. Free from every sort of injurious prejudice and absurd restriction themselves, they cannot but feel the yoke of a bigotted and superstitious race, who seem imbued with all the worst spirit of the Hindú system.

[a] Dárjíling is in 27°, Almórah in 29°. 30′, Landaúr in 30° 20′, and Semla in 30° 40′.

[b] I cannot refer to the elevation of Landaúr; but it is, if any, very little above that of Masúri.

They are, therefore, very anxious to return to their country, which is in this neighbourhood, and have been lately making every effort to obtain the permission and guarantee of our Government to that effect. The Gúrkas, however, are aware of their value, and endeavour to prevent any communication with us.

There are said to be 1200 of them in the Gúrka territory under their chief Eclátoc, whose brother Barajít was murdered by the Sikkim Raja in the most treacherous manner. Barajít's wife and children were also put to death, as they fell into his hands, with the exception of one son, whom the Raja has spared, but keeps in an honorable confinement. By means of this young man he is endeavouring to inveigle his stray subjects back, but much as they dislike the Gúrkas, they will not venture to trust him without our guarantee. It is not that they are afraid of him, but of us; for were they certain of our indifference to their squabbles, they could drive him out of the country to-morrow, as their numbers exceed those of his party. The Raja's tyranny and injustice has the additional stain of the basest ingratitude, for at the time that the Gúrkas took possession of his country, he owed his safety as well as subsistence for many years to this very man, whom he afterwards so treacherously murdered. The absence of the people who belonged to this part of the country, for so many years, has occasioned it to become a perfect wilderness; and even Dárjílling itself, once the site of a flourishing town, will ere long lose all trace of its former state. The establishment of a *Sanatarium* there, connected with the recal of the people, would however soon give a very different aspect to affairs; and I should not despair to see, in a few years, the bazár and *Bania's* shops, which it once boasted. At present, the only traces of its having ever been inhabited, besides the extent of cleared ground, are the remains of a *Gumbu* or Lama monastery on the summit, and of *cási* Barajít's house on the even strip below to the west.

The geology of this country is that of the north-western mountains. In the last three stages gneiss, of ordinary character, was the only rock observed. Owing to the thick coating of vegetation however, the rock is very seldom visible, and never to any extent. The chief difference in the arrangement of these mountains, and those between the Satluj and Káli, appears to lie in the small developement of the sandstone formation in this quarter, and the absence altogether, in the route we had followed, of the clay slate. These circumstances, with the prevalence of gneiss, seemed to me additional reasons for doubting that any thing like the true shale of the coal formation had been found in this quarter, as stated in the Geological Transactions. That the specimens of coal, found by Mr. Scott in the beds of the Sabac and Tista rivers, belonged to the same class as those so common in our sandstone to the north-west, I had always been inclined to believe, and to infer, consequently, that they were entirely unconnected with the true coal formation, notwithstanding the use of the term *shale* in the paper above referred to. The little insight which our journey so far had afforded me, confirmed me in this view; and I was now chiefly anxious to see the places described by Mr. Scott, more for my own information and satisfaction, than as having any doubt of the conclusions I had arrived at. I wished, in fact, to examine this so called shale *in situ*, and to compare the sandstone with which it was associated with that which I had studied in the north-western mountains, and which I supposed equivalent with the *newer red sandstone* of Europe, and consequently to *overlie* that formation in which coal is found.

With a geology absolutely identical, and a climate the same in every respect, whether of temperature or arrangement of seasons, it was a subject of surprise to me to find so great a difference in the forest features of the country. Of the five species of pines found in the north-western mountains, not one is here visible,—a deficiency which is particularly striking on entering the hills, the lower ranges to the north-west being literally covered with the *Pinus longifolia*, or where it is wanting, in the lower sandstone hills, being seen within the first 10 miles in considerable numbers. Of the *Pinus Deodara*, the king of the forest tribes, we could neither see nor learn any thing. There is the same deficiency of oaks, a genus of which there are six species in the north-western mountains, and of which I only saw one individual in our journey. The character of the landscape, which in those mountains depends chiefly on these trees, is, it may be supposed, quite different. Of the three species of *Rhododendron* found there, not one was seen by us in Siccim. Most of the trees I saw were new to me; the most remarkable exceptions were the wild date, the wild plantain, the tree fern, the rattan, and a reed, the name of which I do not know, growing about 20 feet high, seldom so thick as the wrist at the base, forming an excellent material for mats, and growing also in the north-

west, where it is used for the same purpose. The bamboo is found in great perfection in these hills, and at a greater height than I should have supposed it could bear; it grows much thicker than the bamboo of Bengal, though not equal to the enormous bamboo of Martaban. The Lepchas, however, find their bamboo large enough to serve them instead of jars to keep a supply of water in their houses. They cut them into lengths of about five feet, and cut away, or otherwise remove the partitions at the knots. Such a bamboo will hold about three gallons. The shrubs and herbaceous plants seem to have a greater resemblance than the trees to the productions of the other mountains. The several species of *Rubus* are found the same, amongst which I particularly remarked a herbaceous one, with shoots like the strawberry, which bears a raspberry of very tolerable flavour, and which, I am persuaded, would improve by cultivation. The wild strawberry is also found, from which I would infer that this fruit might be brought, by cultivation, to great perfection here; judging at least from the excellent specimens which are every year produced in the plains,—a climate certainly less congenial to it than one where it grows wild. Of flowers I only saw the violet, and one or two unimportant species; but the season was not sufficiently advanced to entitle us to expect to see any. There is the same variety of ferns, mosses, lichens, and fungus, that we have to the north-west; and in this department of botany my fellow traveller made an excellent collection.

Our two days,—to which period we had limited our stay,—soon passed away, and, to our great disappointment, without any improvement in the cloudy state of the atmosphere. I was unable to determine even the latitude of the place, though provided with the means; and the arrangements I had made for settling its longitude by chronometer became nugatory. What was still more mortifying, we could not get a fair view of the snowy range, or even of the high peak Kanching-jinga, so as to take an azimuth and altitude, which with similar observations in the plains, combined with latitudes and the elevations of the two places by barometer, would have given the means of fixing the position and elevation of the peak within sufficiently narrow limits. The only observations made, were those of the barometer and of temperature. The former stood, on the 19th February, at 4 P. M. 23,056, Therm. 49,7; and on the 20th, at 4. P. M. 23,134 att. th. 47 det. th. 46. These observations being calculated, give 7134 and 7294 as the height of Dárjíling; the mean is 7218, which cannot be very erroneous. The temperature, by a register thermometer, was each day minimum 39°, maximum 49°.

On the 21st, finding the weather still unpromising, we determined to descend. With some difficulty we got a sufficient number of porters, for those we had brought from Sandong had there stipulated that they should be free to return from Dárjíling. Some of them, however, were induced to accompany us, and the full number was made up by a few that had come in from the neighbourhood. It had been thought adviseable that we should return by another route, in order that we might be prepared to say which was preferable. The route by the Sabbak pass, near the *debouche* of the Tista river, was said to be the best, and by that we accordingly determined to return.

Our first march was to Takdak, a small hamlet, the residence of a Lama, situated in a north-easterly direction from Dárjíling, and on the declivity of the Gardan-kattar range. The first six miles was a very easy descent, the road excellent, and the scenery far superior to any thing we had yet seen. The road was evidently a made one as far as Ging (about four miles;) and so broad, and of so easy a descent, as to render this part of our march most agreeable. At Ging there is a small square building, surmounted by a pyramidal top, and called Ging-chúten or Paspat-nath, but no other trace of the village which was once here. Two miles beyond Ging, the road which had led down the crest or back of the ridge, turns to the southward to descend to the bottom of the glen which separates the Dárjíling ridge from that of Gardan-kattur. This part of the road is at first tolerable, but gradually gets worse, and finishes with so steep and difficult a descent, that excepting there was little or no danger, I scarcely ever saw a worse. The first part was well cleared, and was indeed altogether such a road as a person would travel for pleasure; but the latter part was through a thick jungle, in which the long and luxuriant grass was particularly the source of much annoyance and difficulty. As we got near the bottom the heat was quite dreadful, we having left Dárjíling about half past 9, and, therefore, had the hottest part of the day to get over the worst part of the road. Great was the satisfaction with which we at length descried the beautiful stream that ran at the bottom of this most fatiguing descent, which had occupied us an hour and three quarters. The mere sight of the water, and the

shady and sequestered spots that bordered it, soon made us forget our recent toil, while the clear and sparkling fluid was in its refreshing coolness doubly welcome to our thirsty and parched lips.

From this stream, which is 5000 feet below Dárjíling, the road ascends to Takdad, about 1000 feet, and is far from good. The distance is not above two miles; when the proximity of the village is indicated by the improvement of the road and the increase of open and level ground. The village spring, with its rude spout of wood, was next passed; and here I had the first opportunity of seeing one of their beautiful breed of cows, far superior to any I had ever seen in the north-western mountains, and indeed only inferior to our English animal. Immediately after, we found ourselves at the village; one of the most comfortable houses of which, was assigned as our residence.

The Lama, we were told, was prevented paying his respects by illness; and we were so fatigued by our long and difficult march, that we were very glad to excuse him. We arrived late in the evening, and were glad, after being on our legs all day nearly, to have a little rest.

The following morning the weather was still as cloudy as ever, but towards 8 o'clock the atmosphere began to clear up, and we thought we should at last see the snowy peaks while yet not at too great a distance. But the hope was delusive: they appeared at intervals, and so imperfectly as only the more to excite our curiosity to see them in their full and unclouded glory. Of four of them I was able to observe the bearings, but only of one the altitude, and even of this imperfectly, as before it could be properly taken, the peak was again covered with cloud. The bearings were as follows:

No. 1	Broad topped mountain,	340° 15′	
		341 00	
No. 2.	Kanching-jinga,	345 15	
No. 3.	Sharp peak, hollow to left,	347 30	alt. 5°.22′
No. 4.	Chamalári,	353 50	
	Feri Pass, the head of the Tista,	1	
	Sulukfok, bare near peak, no snow,	9	
	Dárjíling,	235	
	Ging,	255	

Finding that the weather had no appearance of clearing, we were obliged to leave Takdak. Mr. Grant, however, went previously to visit the sick Lama, who, it appeared, had broken his arm. He had evidently attempted to set it, as it was found bound up with splints; nor did he wish to have it examined: but he expressed a desire for some medicine, which was furnished him. He appeared to know something of medicine, and perhaps of elemental surgery. He was intelligent and superior in his manner to any of the people we had yet met with. All our followers, as well as his own, seemed to treat him with great reverence and respect. Turner mentions the great influence which those of his class possess. They are not, however, a distinct caste; for of any such division or distinction these people have no notion. The Lamas are taken indifferently from every class,—at least in Thibet; and are educated to fit them for the duties they have to perform. Like the priests of the Roman Catholic Church, they make a vow of chastity; and this attempt to shake off the feelings of human nature, is, as in other unenlightened countries, repaid with the credit of great sanctity. Much of their influence with these people is derived from the belief that they have power over the evil spirits of the country; for here, as in other mountainous districts, we find superstition people each wild spot with its peculiar demon. Yet the Lepchas have more reason, and even philosophy, in their superstition, than might at first seem compatible with this offspring of ignorance and mental darkness. The *kelpie* or *bhút* of Siccim inhabits the deep glens and narrow vallies, the tracts of dank and luxuriant vegetation. His anger is shown by visiting his victim with an intermittent fever; so that he is, in fact, not a mere *ens rationis*, but may be considered rather to be the embodied spirit of *malaria*. This spirit, it is supposed, the Lamas have the power of conjuring far away,—possibly into the red sea; and such is the confidence of this people, that they never seem to enquire whether there is a *bhút* (spirit) in such a locality, but whether a Lama resides there. The latter, it is supposed, excludes the former. Of the existence of the *bhút* they are perfectly convinced; nor do they allow his invisibility to be any argument against their belief. The death of several people in a village from fever, is considered to be quite sufficient evidence of there being something there that ought not to be; and their philosophy is satisfied with the explanation which the Lamas give of the matter.

22d. On leaving Takdak, the road leads up the face of the Gardan-kutter range, and is steep, but not difficult. It occupied us three hours, not including halts. On this mountain is a fine field for a botanist, the whole of it being covered with thick forest, in which appears a great variety of productions. The top of the ridge is broad and quite flat: it would furnish an excellent site for an experimental garden; and as it is connected with the mountain, over which the road to Dárjíling would pass, a branch road could easily be made to it. The soil, as in all mountain forests, is a rich vegetable mould. The elevation is 6600 feet, or about 600 feet lower than Dárjíling. If the latter place should be found to be deficient in even ground, the top of this range, which extends several miles in length, and is upwards of 200 yards in width, would afford ample. A road might be easily cut along the top of this ridge to lead round the head of the glen to Dárjíling; and as the forest scenery on it is superb, such a road would afford a fine ride to the invalids at that place. It would extend several miles, and be almost level the whole way.

From the summit we had an easy descent of 20 minutes to an open spot on the declivity of the range, whence we had a view of the plains, but dim and indistinct, owing to the unfavourable state of the atmosphere. The stream of the Tista was distinguished flowing to S. 40° E. Onlámpung, a fort in Támsang, a district of Bhután, or the country of the *Dhorna Rája*, was pointed out to us: it bore N. 92° E. We sat down here on a grassy bank, and idled away a half hour pleasantly enough, gazing on the various features of the scene spread out before us, remarking particularly how very different a country it looked from that through which we found our way to Dárjíling. An hour's further descent brought us to a part of the ridge where we observed some substantial huts, as well as various signs of a vigorous system of clearing being in operation. Here we expected to halt, but owing to some objection, which we could not very well understand, they took us on about half an hour's farther walk, where, just below the crest of the ridge along which our descent had latterly lain, we found a most comfortable and substantial farm-house, the best half of which was given up for our accommodation, while the family retired to the other. The day was cloudy and bleak; and notwithstanding our warm clothing and the annoyance of the smoke, we were glad to light a fire in our room. The people of the house very sociably joined our fireside, and took the opportunity of contemplating us at their leisure.

Here we began to fear our progress would terminate,—at least for some days; the porters who had come on from Sámdong positively refusing to proceed any farther. The delay threatened to involve us in very serious inconvenience, as we had been obliged to leave Sámdong but ill provided either with clothes or food, and the articles left behind had not, as promised, been forwarded. After much discussion, we at length agreed to give them a day to collect porters, and if not forthcoming by that time, that the remainder of the Sámdong party must go on with us. It was now we began to feel how little we were indebted to the *Rája* or his arrangements for the progress we had hitherto made; and it began to be a subject of regret, that we had not furnished ourselves with some more pressing introduction to him than that we had received. We had no idea that we should get away under several day's detention, for we knew not where the new hands were to come from, the country appearing to us quite deserted; and as to those who had accompanied us, though they were well satisfied with the treatment they had received, and though to induce them to exert themselves on the occasion, we told them they must go on, failing the relief, yet it is very doubtful I think if they would have stirred a step further. There was, however, no help for it, and we were obliged to content ourselves with repeated injunctions to have the new men ready for the 24th.

The following day part of our difficulties were removed by the arrival of the baggage left behind at Sámdong, and the gloom, for it was a miserable rainy day, was further dispelled by the arrival of a dawk. Upon the whole, our day passed off better than we had expected it would, and by the bustle of new arrivals towards evening, we guessed we should be able to move the following day. Two pigs were given by Mr. Grant to our host, or rather hostess, for it was a woman who appeared to be the head of the family and mistress of the mansion. I mention the circumstance, for the purpose of noting their method of slaughtering animals. They were shot with an arrow, and so skilful was the archer, and so powerful his bow, that the same arrow sufficed for both. I could scarcely have believed that an arrow would pass through a pig's body with sufficient force to kill a second animal standing close to him. Some other good things were added, particularly a bottle or two of brandy, of which these people are immoderately fond.

On the 24th we found all in readiness for our proceeding,—or at least were told so; and we accordingly started after breakfast. Our route lay along the crest of the ridge with very little descent, till we came to a solitary farm house. Here we found we were on the edge of a steep and most fatiguing and tedious descent; and it was represented that as the baggage was all in the rear, and the day now pretty well advanced, it was doubtful whether the porters would reach the foot of the descent where we were to encamp, by night-fall. On further questioning them, it appeared that the new recruits were only half the number we had demanded, and that they had kept this circumstance to themselves, expecting to be able to return for a second load in sufficient time. Finding, however, that this was not the case, they proposed we should halt here, by which means they would be able to effect this arrangement. We were vexed at this unlooked-for delay, though we could not be angry with the people, not only from the motive of their silence, which was to avoid troubling us, but also from the good will they had manifested in wishing to work double tides. But as complaint and vexation were equally unavailing, we were compelled to halt, at least till the people had returned for the extra loads, when we thought we could by a better arrangement, and by dispensing altogether with the most bulky and useless part of the baggage, manage to proceed the following day with even our diminished number of porters. We therefore gave orders for a halt, and sent back the men as they arrived to bring up the several articles left behind.

The only house at the place which was comfortable, though not large, was tenanted by a very interesting family; and short as our intercourse was with them, they established such favorable impressions as not to be soon forgotten. The *gudeman* was out when we arrived, but his wife welcomed us equally cordially. The principal room was soon cleared out for us, and the two young boys set to work to light the fire. Of these one was lame, from some hurt in his thigh, and though evidently, from his countenance, occasionally in great pain, yet shewed more equanimity and fortitude than I should have expected from so young a child. We did not observe the slightest display of pettishness or fretfulness. The other, who was younger, was a funny little fellow, and often making us laugh at his strange comical ways, we nicknamed him *Scaramouch*. At the same time the rest of the family were busy in making room for us, our host's sister was sent to the spring with one of the large bamboos I have mentioned, to bring water. Another was busy pounding rice, assisted by the oldest of the children, a little girl about eight or nine years of age. This latter, though, like the other two, far from regular featured, had yet a very expressive and prepossessing countenance, and her behaviour fully answered to her looks. We tried to recommend ourselves to the children at dinner by offering them a biscuit, glass of wine, &c. but whatever we gave was immediately carried off to the mother, whose permission was always thought necessary; or perhaps they wished to share these gifts with her. The behaviour of these children, without being so riotous as those of Europeans, was extremely natural and interesting, forming a most striking contrast to any thing we had ever observed of children in the plains. That they were grateful for the notice we took of them, was evident on our departure the next morning, as they stood looking after us with very serious countenances as long as we could be seen. Little *Scaramouch*, in particular, seemed very much to regret our departure; and few as were the links of sympathy between us and these rude and neglected people, yet such is the charm of natural goodness and simplicity of feeling that I really believe the regret was mutual.

These people are all rather square built; some so much so as to be clumsy. This is often the case with the women. Of the two sisters of our host, one was about as broad as she was long. She was really a bouncer, and would have formed a fine contrast to one of our modern wasp-shaped belles, equally removed from symmetry though on the other side. The other sister was not quite so much in the Dutch style, though still far from possessing the form described as "fine by degrees and beautifully less." But she had a very expressive countenance,—one the farthest possible removed from that of a Hindustani beauty[1], yet one which, every time it was seen, would be thought to improve. There was a mingled air of sweetness and gravity, which gave a charm to features that, taken singly, were, perhaps, every one of them, faulty. It was, in fact, a European face, and one of much meaning. This girl came the nearest to what I may call a Lepcha beauty of all that we saw. She was betrothed to one of the young men who accompanied us, who appeared every way worthy of her. He was a fine active good

[1] The Hindustani, in all that regards form and feature, is a Greek; only with a darker skin. I remember an engraving of a Greek girl, which every one who saw it mistook for a Hindustani.

humoured and intelligent young fellow, and good looking withal. They had been betrothed many years, and had no immediate prospect of being married, inasmuch as he had not yet made up the present, which it is usual for the parent, or he who stands *in loco parentis*, to exact from the suitor. In fact, in the enquiries suggested by the interest we took in this woman's history, it was completely established that they *buy* their wives. The price of the article in question, which it is evident was rather above par, was 100 rupees. Mr. Grant, desirous of assisting the lovers, asked how much yet remained to be paid, and was told 40 rupees; but to his offer to advance the money, it was answered, that though not paid, the lover had collected the sum, and that the wedding would now take place immediately. Apparently there was some feeling of delicacy that interfered with the acceptance of the offer; nor will those who have seen the people, deem it chimerical to ascribe such and even greater delicacy of feeling to them.

During the betrothment the lovers have every facility of meeting, which is a politic measure, inasmuch as it must tend to hasten the period of the payment. They do not, apparently, like the term *buy* being applied to this singular arrangement. In fact, they pretend it is merely a present to cover the expenses which the guardian is subject to, both in providing the marriage feast, and in endowing the bride with her proper share of goods and chattels. They appear to have learned, in their intercourse with the plains, that it is a custom confined to themselves; and having been, I suppose, rallied on the subject, they try to hide the real nature of the transaction from themselves, or at least to disguise it. It is worthy of remark, that the same custom, with many others, probably borrowed from Thibet, is to be found in our north-western mountains, though Hinduism is fully established there. Of these the most singular is Polyandry. It would be a curious inquiry to ascertain how women came to have such opposite relations amongst these people to what they have in every other nation: having money paid for them instead of conveying dower to the husband, and the allowance of several husbands to one wife, instead of, as elsewhere, to one husband several wives. Doubtless these national discrepancies had their origin in some peculiarity of situation or history, which it might be worth tracing.

The following morning, having previously reduced the baggage to the lowest possible compass, we left Gyal, and immediately commenced the steep descent of the ridge. The road was very bad, and in some places not even quite safe, so precipitous was it. But for the trees which conceal the danger, it would perhaps, to many, appear impassable. Certainly it could never be made a good road for general travelling. The approach, therefore, to Dárjíling by the Tísta side, was no longer a question. Towards the foot of the descent the heat became very oppressive, and we were delighted at last to find ourselves in the river bed, and a beautiful natural basin of great extent and depth, as smooth as a millpond, and with sandy bottom, offering us the great refreshment of the bath—a refreshment which, in these mountains, is almost always within the reach of the heated and jaded traveller. Our camp was only about a mile beyond this beautiful spot, on the bank of the river, but in the middle of a thick jungle, the elevation being little beyond that of the plains. We had as usual a wigwam to sleep in, but preferred spreading our table for dinner on the fine level and gravelly beach of the river, with no other canopy but that of the sky. At night we trusted to a blazing fire and two Lepcha sentries, to keep off wild animals, if there were any. It is probable there are tigers.

On the 26th we marched, and there being no village, were obliged to bivouac as the preceding day, in the jungle. Our route at first ascended the lofty ridge, which here shuts in the river valley, and then pursued its course along the face of a higher range, passing round the several shorter glens or ravines by which it was intersected. Of rocks we had hitherto only met with gneiss, but here the grey-wacke slate began to prevail. We did not see any that was likely to be useful for roofing; nor did we, as I expected, meet with any limestone. But as our researches were confined to the immediate line of route, it is not the less likely to be found associated with this rock as to the north-west. Our route gradually descended, till we halted in the bed of a stream at a place called, Salam-góla.

While on the road, Mr. Grant received two musical boxes that he had ordered from Calcutta, when leaving Malda, and which he had intended as a present to the *Rdja*. Highly as we thought of the intelligence of these people, and great as we had observed their curiosity to be, the interest and admiration expressed by them on hearing these toys in action, exceeded what we had anticipated. At first they stood and listened in breathless admiration, not one of them venturing to speak. At last one of the most enthusiastic burst out into a loud laugh of wonder and

delight. He threw himself on the ground, and appeared quite in an ecstacy of enjoyment; nor were the others much less affected. We could not but contrast the natural and unsophisticated behaviour of these wild mountaineers, with what would have been that of any number of Hindustanís, whether high or low, under the same circumstances. After the first edge of wonder was worn off, they began to look more closely at the box. One of them, who seemed more intelligent than the rest, undertook to explain the matter, as he understood it, to his less clever companions; and to judge by their countenances, (for we did not understand what passed between them,) the lecturer must have acquitted himself pretty well. But the discovery of the cause of the music did not abate the pleasure they took in listening to it. At meals, when we generally had one of the boxes playing, or when we stopped on the march to rest, as soon as ever the silver tones of these beautiful little toys were heard, there was a group of most attentive listeners assembled round us. Nor would one of them leave us as long as the box continued to play.

The following morning we marched for Sabac-góla, which was to be the term of our mountain travels, the place being situated, as we understood, at the gorge of the Sabac pass or river, where it quits the hills to join the Tísta. The route was, the first half, a rather steep descent to the river bed; the remaining half was easier, being in the bed of the river, and consequently almost level. Sandstone began to be observed in the descent, but in the river bed it became fully established; enormous strata of this rock appearing to compose the huge walls, many thousand feet in height, which composed the banks of this river. The first glance at this rock showed that it was the same I had supposed, and confirmed my opinion as to the little value of the coal that had been found in it. As we advanced, the specimens of coal began to show themselves, evidently mineralized logs of wood, their nature being perfectly evident, as viewed in their native sites, though in the only specimens we could detach it be rather obscure, most of them, though bituminised and of a black colour, have yet a nearer resemblance to stone than coal, being fully as heavy and not less hard. Sometimes these kernels, as they may generally be called, are of a grey colour, and look like indurated mud. This latter substance, when in great quantity, assumes the form of a vein; and in this case its substance is fissured in every direction. This is what appears to be called *slate clay* in the Geological Transactions; though it is certainly not slaty in its structure. I would as little think of calling the blacker varieties *bituminous shale*. But not to dispute about names—it may be sufficient to say, that the substance in question is not the bituminous shale of the true coal formation;—that, on the contrary, the sandstone in question is, if not the *newer red sandstone*, one still more recent; and that there appears to me no prospect of discovering coal in this neighbourhood;—I mean in any thing like profitable quantity.

In the evening we went on the elephant to visit the pass or debouche of the Tista. Just before leaving the hills, it collects itself into a smooth and level sheet of water, more resembling a lake, from its great breadth, than a river. The mountains, thickly wooded on each side down to the river's edge, add to the deception; and on first coming in sight I could not be persuaded that it was not a mountain lake. From this beautiful and calm expanse it precipitates itself at one corner by a rapid, which I found it difficult to believe had ever been ascended by a canoe. Below it, about half a mile, there is a second, after which the river, though still having a strong current, is, I should think, navigable. Its breadth here is about eighty or ninety yards; its depth probably ten or twelve feet. On the extensive sands forming its shore, particularly near the patches or islands of jungle grass, we saw numerous impressions of tiger's feet; and returning home, we heard the deer calling in every direction.

On the 28th we marched to Silgúri, about five or six miles through an open forest, in which the elephant had no difficulty in making progress. The remainder, about ten miles, was through a well cleared, high, and latterly cultivated country, the Mahanundee being to our right and at no great distance after emerging from the forest. The following day we marched to Phánsi-déwa, through a well peopled and well cultivated district. On the 29th we reached Titalía, and took up our residence in one of the bungalows there. By evening the dawk bearers arrived, and we left Titalía for Dinajpúr the following morning early. At Dinajpúr I saw the hill raspberry, in Mr. Ellerton's garden, raised from seeds communicated by Mr. Grant. The plant was exceedingly thriving, and would, I should conclude, bear fruit this year, or at furthest the next. From Dinajpúr we proceeded to Malda, whence I came on by Berhampore and Kishenagur, and arrived in Calcutta on the 8th of March, having been just thirty days absent.