

Notes of an Excursion to the Pindree Glacier, in September 1846.

By Capt. ED. MADDEN, Bengal Artillery.

September 10th.—From Almorah to Sutralee, 13 or 14 miles, which occupied us (my companion, Captain Hampton, 31st Regt. N. I.) from 6 till 11 A. M. our progress at first being much impeded by a heavy fall of rain, the termination as we hoped, of the season, but which in fact proved to be only a shadow of what was in store for us. The road lies over the mountain called Kaleemuth, 6,300 feet high, and so called, the Almorah people say, from a coarse kind of black lead which abounds there: the summit is of mica slate and gneiss, in horizontal strata. 2,300 feet below, to the west, is Hawulbagh, now famous like Almorah and Bheemtal, for its thriving plantations of tea; the visiter however, will be disappointed who expects anything picturesque in this cultivation, any more than in the vineyards of France; the shrubs being generally under four feet high, and anything but elegant in form; the tea is made in spring; the plant flowers here at that season, and notwithstanding the extreme plucking it undergoes, produces a profusion of seed in October and November. It may be satisfactory to Drs. Royle and Falconer to know that even at Almorah the plantations suffered not the trace of injury from the snow storms of Jan. 26, and Feb. 2. 1847, the heaviest known to the oldest inhabitant of Keemaon, when about 2 feet fell at Almorah, and lay for many days. Hawulbagh takes its name, "The garden of mist," from the heavy clouds which rest over it almost every morning during the cold season, at about 4500 feet elevation; the Kosilla runs about 200 feet below the station, which has a greater extent of level ground than any other in the N. W. mountains. The river is invariably known to the mountaineers as the *Kosee*, which H. H. Wilson derives from the Sanscrit Kausika, a sheathe, probably in allusion to its generally deep and narrow glen; the Hindustani name Kosilla, may be from the Sanscrit Kausulya, "good fortune." It has become an axiom in the Geography of the N. W. Himalaya, that the Giree is the only river which does not rise in the snowy range: but the assertion is equally true of the Kosilla, and western Ramgunga of Kumaon (the latter known also as the Ruput in Gurhwal); while the Surjoo and eastern

Ramgunga originate in branches of the snowy range which for many months in each year are completely denuded of snow.

Opposite Hawulbagh, at Kutarmul, there is a very large temple dedicated to Aditya, the sun; it is surrounded by a multitude of smaller ones; but all is now forsaken, the main pile having been so shaken by earthquakes as to be dangerous. Many of the large terminal ornamental "Turk's cap" stones have been turned half round. The view from the summit of Kaleemuth is very fine and extensive; to the east, are the dark ranges of Binsur and Jugesur; to the south and south-west the lofty Ghagur completely excludes Kumaon from any view of the plains; from north-east to north-west extend the snowy range, of which the view given in Dr. Royle's illustrations was taken from this point. As might be expected it fails in conveying any just idea of the grandeur of the scene, and is moreover not very correct, most of the groups and peaks being misnamed. What is called the Kedarnath cluster, is really the bastioned mass of Budreenath; his "Juwahir cluster" is properly named "Trisool;" and the peak called Nundadevi, is in fact one to the east of Pindree, commonly known to Europeans in Kumaon as Nundakot, No. XV. of the map. The true Nundadevi, most conspicuous in nature, was perhaps clouded when the artist took his view, being either suppressed, or very imperfectly delineated by the peak marked XIII. which is really the eastern shoulder of the Trisool.

Looking at the snowy range from this and similar points, it appears a matter of no difficulty to reach it; an impression produced by the almost total suppression in the view, of the great spurs and secondary ranges sent off to the south and south-west from the main range; all these, being seen in the direction of their length, present comparatively small points; and it seems to be for this reason that the mountains as seen from Sheharunpoor, Umballah, &c. have the appearance of three or four long ranges, successively rising; but the moment we get amongst them this apparent regularity is lost, and the mountains appear to branch in every direction.

In common with the vicinity of Almorah in general, Kaleemuth is too well grazed by cattle to afford much room for vegetation. In the spring a shrubby *Dipsacus*, with lilac blossoms, is common; and in autumn the warmer declivities abound with the beautiful *Osbeckia stellata*, the *Kookurmakree* of the natives. The *Scilla indica*, *Anquilla-*

ria indica, *Curculigo orchioides*, and *Fritillaria Thomsoniana*, all reach up to this point, and are abundant.

Hence, the route follows the neck which joins Kaleemuth with Binsur; about two miles on, a Cairn, called "Kutputiya," occurs on the left hand; these heaps of stones are raised where three ways meet, many of the people considering it meritorious to add a stone; a custom well known to this day amongst the Celtic tribes of western Europe.* Soon after passing the Cairn, the road quits the Binsur route, and after passing Jak village, crosses by a rocky ascent the western spur of Binsur, called Bhynsooree Cheena; the northern aspect of this is covered with pretty thick woods of *Rhododendron*, *Andromeda*, &c. through which we descended to a glen, extensively cultivated, where a stream from Binsur joins the Takoola from Gunnanath. The united stream is a rapid burn, which joins the Kosilla above Hawulbagh: our route lay sometimes on one, sometimes on the other bank, and not unfrequently in the stream itself. Rice is abundantly produced along the banks, and the Kodah on the higher grounds. This is a late crop, and suffers much from the bears; it is now infested by a considerable number of locusts, which we found daily hence to the snows.

Sutralee is the name of a district belonging to the astrologers of Almorah; and in the midst of abundance, the traveller finds himself like Sancho Panza, in danger of starving; for these "gods of the earth" are infinitely more liberal with their horoscopes and predictions of good weather and fortune than with their supplies of grass, ghee, and flour. We encamped in a confined but pretty spot, surrounded by woody spurs from Binsur and Gunnanath, neither of which is visible; a rivulet from the former has cut a deep perpendicular gorge in the rock, on the brink of which are some old temples dedicated to Umba Debee, from whom the place is called Umkholee. A

* One is constantly struck in India with the identity of the customs and ideas of its population with those of Europe, ancient and modern. A few years since at the Jeypoor Durbar, the sitting was prolonged to so late an hour that it became necessary to introduce lights, on which all the chiefs got up and saluted each other, as if they had met for the first time in the morning. One of them told me it was a common custom. Thirlwall incidentally mentions the very same as having been usual amongst the ancient Greeks.

few cedars overshadow the temples, which are not remarkable. Water boils at 208°, or with correction of thermometer, at 207½°, giving about 4700 feet as the elevation. The pretty white *Barleria dichotoma*, the *Photinia dubia*; a shrub which I took for *Ligustrum Nepalense*; and *Kadsura propinqua*, "Sindrain," are common on the banks of the Takoola.

The mountain of Gunnanath, near this, is said to be very beautiful; the Ghoorkas had a stockade there; and on the advance of our troops toward Almorah in 1815, they were attacked from this point by a body of men under the command of Hustee Dhul; he was killed by a random shot, his men retreated, and the fate of Kumaon was decided. This chief was uncle to the rajah of Nepal, and had been employed in the unsuccessful attempt on Kot Kangra. The contrast of our speedy capture of that celebrated fortress, is to this moment very unpalatable in Nepal: and the story goes that fakeers and other travellers are warned under penalty of a severe beating, to conceal or deny the fact of Lahore being now a British Garrison!

Along the borders of the fields here, as at Almorah, the *Perilla ocimoides*—"Bhungera," is extensively cultivated for the sake of the oil expressed from the seeds: it is now in flower, and will be ripe in October and November.

September 11th.—To Bagesur, 12 miles; at one and half miles, up a pretty valley, by an easy ascent, but over a rocky road, we reached the crest of a ridge, called the Kurngal ka Cheena, which separates the affluents of the Kosilla from those of the Surjoo. It may be about 5,500 feet high, and like all the hills in the neighbourhood, is well clothed with Pines, (*Pinus longifolia*,) as the north side is with *Rhododendron*, *Cornus*, &c.—The *Quercus annulata*, "Funiyat," (the "Bane" of Simlah,) is a common tree on the ascent, and is large and abundant on the Surjoo above Bagesur, mixed with trees which one scarce expects to find with an oak. From the Kurngal Pass, a steep descent through shady woods, brought us to the beautiful valley of Chonna Biloree, watered by a large brook, the Jynghun, which flows round the north side of Binsur to the Surjoo. Biloree, a pretty hamlet, with a small temple amidst a clump of firs, on a conical knoll, much resembling an Irish *Rath*, lies to the right of the road, and a short distance above, to the left, is Chonna, another village, near which is a group of the Cheoorra

tree—*Bassia butyracea*, which does not appear to extend more to the north-west. It is common at about 4000 feet elevation, near Bheemtal, and on the Surjoo near Ramesur; and I have even found it on the low outer range of hills to the north-west of Kaleedonghee: the seeds furnish the so called butter, or Phoolal, of Almorah. Near Biloree several large specimens of the *Castanea tribuloides*—“Kutonj” or Chestnut, were in full flower; this tree is another instance of the approximation of the vegetation of Kumaon to that of Nepal; it occurs sparingly in the glens of Binsur, and becomes abundant east of the Surjoo, but is unknown I believe in Gurhwal, &c.

At Chonna Biloree the soil and rocks are deeply colored with red oxyde of iron: here the road quits the Jynghun, and turning to the left, soon reaches the base of the “Ladder Hill,” so called from a good, but long and steep flight of steps constructed nearly to the summit, by Toolaram, the Treasurer of Almorah. The total ascent is about 800 feet, 150 or 200 short of which we halted to breakfast, at a spring called the Bhoomka Panee. This pass is known as the Palree or Kurrei Cheena, and may be about 5,500 feet in height; on the left the ridge rises many hundred feet higher in a bold rocky bluff, on which is a temple to the Mychoola Debee. Close above to the east is the rounded “Nynee” summit. With the exception of a little clay-slate, the whole range is of limestone, and stretches far down to the south-east, crossing the Surjoo near the Seera Bridge, and every where presenting to the south-west successive tiers of cliffs. This limestone forms the glen of the Surjoo up to the Sooring, where as at Landour, it is capped by a granular quartz. The view of the Himalaya from the top of the Ladder Hill is considered one of the finest in Kumaon; but was entirely eclipsed to-day by dense clouds, which bestowed some sharp showers on us while at breakfast. An easy descent of three miles hence brought us to the Dhurmsala of Mehulee, near the village Patulee, erected by one Debee Sah, the bráhman in charge, being endowed with a monthly salary of less than three rupees;—this he ekes out by the cultivation of a garden, which he entertained a not ill-founded fear would be plundered by our followers should he accompany me to the Soap-stone quarries about a mile distant; this difficulty overcome, we started, and after a slippery walk from one terrace to another, reached one of the five or six quarries in this vicinity. So far as I could

observe, the rock lies in large detached masses, but the mine had been apparently neglected for several years, and was choked up with rubbish. The steatite is called "Khurree;" and at Almorah is turned into a variety of cups, &c. less durable and useful than if of wood. From the Dhurmsalá to the Surjoo, the descent is very long and steep, through woods of superb pine; the soil is a red clay, which with the fallen pine leaves, we found so slippery as with great difficulty to keep our feet. At the base the Cheer Gungá, a rattling stream, flows to the Surjoo, along the right bank of which lies the rest of the route, about $2\frac{1}{2}$ or 3 miles, to Bagesur. The Surjoo is here a large and rapid river, the water of a whitish tinge, and perfectly impassable except on rafts supported by gourds. Wilson gives us the etymology of the name from *eri*, to go: Gunga, from *gum*, to go, to *gang*; and Pindur, probably from *pud*, *pundute*, of the same import; so strongly must the primeval Hindus have been struck by the extreme impetuosity of these rivers.* The elevation of the valley here is between 2,500 and 3,000 feet; it is narrow, with here and there a partial expansion, carefully cultivated with rice. The scenery is exceedingly diversified and verdant. In such a valley to the north-west, as that of the Sutluj, we should have little but arid rock; here all is grass, wood, and swelling hills of the deepest green and most beautiful outline. As a drawback, the climate is considered very unhealthy at this season, and in the months of May and June the winds are said to be nearly as hot as in the plains. The vegetation is nearly that of the Tarai and Dehra Dhoon. *Robinia macrophylla*, (Goujh,) *Rottlera tinctoria*, (Rolee,) *Phyllanthus emblica*, (Amla,) *Pavetta tomentosa*, (Pudera,) *Murlea begonifolia*, (Toombre,) *Sapindus acuminata*, (Reetha,) *Mucuna atropurpurea*, (Buldaka,) *Zizyphus*, (Bair,) *Sponia*, *Toddalia aculeata*, (Khuseroo,) and a species of *Adelia*, are common as trees, with the *Photinia dubia*, called Gur-mehul or Soond, which is also found north-west of Kumaon; where it occupies a zone reaching from 3,000 up to 7,500 feet. Among lesser plants I observed *Centranthera hispida*, *Ipomoea muricata* and *pes-tigridia*, the *Lygodium* or climbing fern (abundant in all the valleys of Kumaon),

* The word Pindur also denotes a *feeder*; while *Pindul* is a *bridge*, a *causeway*, a *passage* over a river or ravine, &c. and might refer in this sense to some early structure at Kurnprag to facilitate the passage of pilgrims to Budureenath.

Costus speciosus, *Zingiber capitatum*, *Curcuma angustifolia*, and most abundant in the meadows the "beautifully blue" *Exacum tetragonum*, "Teeta-khana."

We found the heat in the valley oppressive, and were enjoying the idea of shelter in one of the deserted houses of Bagesur, now at hand, when to our dismay, we reached the right bank of the Gaomutee Gunga, which here joins the Surjoo from Byjnath, and was so swollen and rapid from late heavy rains as to be perfectly unfordable. While crouching under some thickets to avoid the sun, and most sincerely desiring that the original Pontifices maximi, Sin and Death, who built the first bridge, according to Milton, had exercised their "Art pontifical" at Bagesur, we perceived certain naked savages appear on the opposite bank, armed with a multitude of gourds, (toombas,) which they forthwith commenced fastening in rows about their waists, and then committed themselves to the deep, as buoyant as so many corks. A sufficient number being attached to our charpæes, we were ferried over in security, but not very pleasantly; our very unsailor-like rafts sink so deep that it became necessary to strip. The process of crossing is a simple, but very tedious one, and above two hours elapsed before our scanty baggage was passed over. We afterwards saw the men plunge with perfect indifference into the "angry flood" of the Surjoo itself, and "stemming it aside with hearts of controversy," reach the opposite shore with ease, but with great loss of distance. They even promised to convey us over, an offer which was declined. Falstaff justly abhorred a watery death, even in the placid Thames. The town of Bagesur stands immediately beyond the Gaomutee, on the right bank of the Surjoo, in a very confined spot, being closely backed by a precipitous hill. It consists of two or three irregular lines of houses, one of them now washed by the river, and about 200 yards in length, some of the houses are very respectable, adorned with tastefully carved wood work; but the place is a mere depôt, where in the cold season the Almorah merchants, who chiefly own the houses, resort to traffic with the Bhoteeahs, who meet them for this purpose. This, rather than any particular insalubrity, seems the cause of the town being deserted at other seasons; it has no other resources. True, we Europeans found the temperature disagreeably warm, but the site did not seem malarious, and there was little fever amongst the few inhabitants. The

cases however were more numerous on our return, and it is certain the mountaineers look on a residence here with dread.

At the junction of the two rivers are a couple of stone temples of Mahadeo, where Bruhma also is adored *sub invocatione* Bagesur, Sanscrit Vageeswur, the Lord of Speech, and gives his name to the town. There is an inscribed slab at one of these temples, in a character not seemingly very ancient; the import I understand is given in one of the Journals of the Society. The brahmuns have a legend that the Surjoo could not find its way through the mountains till the present channel, a devious one enough, was opened by a Rishi; ever since which time bathing here is justly considered nearly as efficacious in removing sin as the pilgrimage to Budreenarain itself.* "Bagesur" was perhaps in the first instance indebted for this title to the Tigers which abound in the valley; the brahmuns give both etymologies; these brutes (the tigers), roam up as high as Sooring, but from numerous enquiries I am induced to believe that Bishop Heber was misinformed when he was told that they habitually frequent the snows. They are extremely destructive in the district of Gungolee, along the Surjoo, S. E. of this, where during the present autumn and winter, 25 persons are said to have been destroyed; this with an equal number of victims in the Bhumouree Pass, leading from the plains to Almorah, forms a serious item in the Kumaoon bills of mortality, and goes to prove that the Mosaic penalty of blood for blood is no longer in force; indeed a celebrated writer observes that "the lions, the tigers, and the house of Judah" scarce ever observed this covenant. The mountaineers are firmly persuaded that the worst tigers are men, who transform themselves into this shape by means of the black art, the better to indulge their malice, envy, and love of a flesh diet. The superstition reminds one of the lycanthropy of the old Greeks, and the Louf-garon of the French in modern days.

* It is an extraordinary instance of an attempted fusion of the creeds of Brahma and Muhammed, that the brahmuns of Bagesur in relating this legend, identified Mahadeo with "Baba Adam," and his wife Parvutee with "Mama Hhuwa," or Mother Eve. They were probably indebted for this curious association to the circumstance of "Adim" denoting "first" in Sanscrit, so that "Baba Adam" is "First Father." Had they selected Brahma, who as Viraj, divided himself into male and female for the production of mankind, the parallel would have been still closer.

We were told that up near Sooring a tiger was killed within these few years by a pack of the wild dogs, here called Bhonsla; but even our informant seemed to doubt the truth of the story. Of the boldness of these dogs, however, we had no doubt; they are considered to be Bhugwan's* hounds, and no Shikaree ever thinks of shooting them.

Mr. Lushington, the Commissioner of Kumaon, has a bungalow on the bank of the Surjoo opposite Bagesur; a little above this, the mountains on that side recede in a deep bay, leaving a spacious tract of level ground, on which the fair is held in January, at which period the whole of the Bhoteah pergunnahs are deserted by their inhabitants, who descend with their flocks to the central portion of the province for warmth and pasture. These people in mien, make, and features, bear a striking resemblance to the Chinese. It is a curious feature in the agricultural economy of Kumaon that during the same season, almost the entire population of the mountains between Almorah and the plains, descend to the Tarai, where they have cleared very extensive tracts, which are carefully cultivated with wheat, barley, mustard, &c. irrigated with no mean skill and industry by cuts from the various torrents which there debouche on the plains; while the forests swarm with their cows and buffaloes, which supply them with vast quantities of ghee, the sale of which greatly overbalances the occasional loss of their cattle by wild beasts. The presence of these herds in the forest may be said, to form a sort of safety-valve to the botanist or other explorer of its solitudes, the tigers seldom molesting man when he can obtain beef. The appearance of the young leaves on the Seesoo in April, is the signal for the mountaineers to ascend to their natural homes, where they arrive just in time to cut a second rubbee crop, sown in November; the only instance within my knowledge of the same farmer enjoying the advantage of two harvests in one season. I may

* If the mere English reader should ask "who is Bhugwan," he will not be more in the dark than was one of the Secretaries to a certain Board in 1824. Carriage and supplies were required for the troops in Arrakan, and a native dignity in Bengal was required to say how much would be forthcoming from his district. "As much as it pleases *Bhugwan*" was the reply. "Who is Bhugwan," writes the Secretary. "You will be pleased to inform Bhugwan, that if he withholds the requisite aid, he will incur the censure of Government, and assuredly be put down."

remark here that the Gooya or Gweeya of Mr. Traill's Report, which he calls the Sweet Potato, is in fact the edible Arum or Colocasia.

September 13th.—To Kupkot, 14½ or 15 miles. The river above, Bagesur bisects the open tract of ground before alluded to; and then till within two or three miles of Kupkot, winds its impetuous way through a gigantic ravine rather than a valley, the entire floor being frequently occupied by its bed, now reduced to half the width it has below. This narrow channel is exceedingly deep, and in some places the waters flow more quietly for a space, in black pools, the whole not a little resembling the Findhorn in Morayshire. Over one of these, three or four miles from Bagesur, a single spar is thrown for a bridge, from which the passenger, at a depth of 30 or 40 feet below him, may see the water swarming with large Muhaseer.* The river flows in a channel of live rock, from which the mountains rise precipitously; and in one place the road has to be carried for a hundred yards or more, along the face of the cliff; in general however, the rise is that of the river, only interrupted by the many feeders from the mountains to the left; on which occasions, for some unknown reason, the Puha-rees always make a dip, involving a troublesome ascent on the other side. At three miles, we crossed one large affluent, and at about seven a second, the Kundilgurh nudee, a furious torrent, which a few days since carried away its bridge; this was only replaced yesterday, which compelled a reluctant halt of one day at Bagesur, where Messrs. Hort and Powys, H. M. 61st Regiment, overtook us in the afternoon, from Almorah. We found the glen of the Surjoo here almost without habitation—wholly given up to jungle, luxuriant grass, deer, and tigers, the latter much dreaded. On the opposite bank, a little above the Spar Bridge, the river receives a large tributary, the Balee Gunga, and, two or three miles short of Kupkot, ceasing to rage through the narrow gorge which contracts it below, pursues its course along some open, but strong and uncultivated dells, covered with dwarf Zizyphus,†

* The presence of a large fish, apparently of the Shark kind, is well attested, in the Surjoo, from Bagesur downwards; reported to grow 6 feet long, to be devoid of scales, and to have teeth like those of a dog.

† The famous shrine of Budureenath derives its name from this shrub, the Buduree (now Ber) or Jujube, Vishnoo being there invoked, like an apothecary, as the "Lord of Jujubes." All the synonymes, Budurecsail, Budureebun, "the

to these soon succeeds the beautiful glen of Kupkot, splendidly cultivated with rice, mudoora, &c. in the centre of which we halted at noon, in a grove of tall Silung trees—but had not time to pitch our tents, or put the camp kettle in trim for breakfast, when the exceedingly sultry forenoon was succeeded by a heavy storm of wind and rain, which poured down for two hours, and made us excessively uncomfortable, the ground being already swampy from the rice fields close by.—When the clouds cleared off, we found ourselves in a most romantic little valley, the Bingen of the Surjoo, from one half to two miles long, and about half as wide, from 4,000 to 4,500 feet above the sea, enclosed by a belt of gently swelling and diversified mountains, covered with a beautiful vegetation, the Cheer Pine feathering the summits. The village is on its western edge, close under the sloping mountains, about 150 feet above the river and half a mile from it; several smaller hamlets are scattered over the plain, each with its groves of trees, among which the plantain is conspicuous, producing large and excellent fruit. The more solid supplies are also abundant; and the people, the most civil and obliging in the hills, instructed by the example of Chintamun, the old Putwaree, a more perfect gentleman than whom it would not be easy to find. The climate he represents greatly better than at Bagesur. A bold peak called Chirput, raises its head on the north side of the valley, on this bank of the Surjoo, and to the right of this, up the glen of that river, there is a near view of several snowy peaks the most prominent among them being the so-called Nunda Kot, east of Pindree. The Surjoo, now falling, was rather muddy. On our return though unfordable, its waters were clear as crystal, blue as sapphire, and sparkling in long reaches under a brilliant sun it seemed the most beautiful as it is one of the most sacred of Himalayan rivers.

rock, forest of Ber," point to the same fact: but as no Zizyphus could exist in that climate (they scarce reach Almorah), the spiny tree, Hippophae salicifolia, may be intended: or the name has been altered from *BAWdr*; "Happiness, prosperity, *Mt. Meroo*." I once suggested these difficulties, with my own solutions, to a brahman who had visited the spot. He honestly avowed, that so far from Ber trees growing there, there were, as far as he saw, no trees or bushes of any kind; but with an orthodoxy worthy of a better cause, he insisted that the genuine Ber must be there, since the Poorans said so, to doubt which would be Nastikee (Atheism). The deceivers have merged into the deceived!

The rock between Bagesur and Kupkot is almost exclusively limestone, here as elsewhere, forming the most bold and varied scenery: and bearing a most exuberant forest, festooned with innumerable climbers. A gradual change may be perceived in the nature of the plants, and as we approached Kupkot, the *Origanum* and white thorn, *Cratægus crenulata*, "Geengaroo," indicated a less tropical climate. Lower down the dwarf date tree springs from every cliff. The *tejpat*, *Cinnamomum albiflorum*, called *kirkiria*, abounds in the shady glens. The *Didymocarpus macrophylla*, *Loxotis obliqua*, &c. cover the dripping rocks; a flesh-colored *Argyreia*, and the *Cucumis Hardwickii* "air-aloo," climb over the bushes, with *Tricosanthes palmata*, "Indrayun," and its brilliant-red, but fetid fruit. *Coix lacryma*, "Loochoosha," "Job's Tears," grows by every stream, and in several places I observed the *Æginetia indica*. The pretty lilac *Osbeckia angustifolia* is very abundant amongst the grass, and *Clerodendron serrata*, *ternifolia*, and *grata*, amongst the thickets, as is the "Poe," *Boehmeria tenacissima*. The splendid *Abelmoschus pungens*, grows in abundance on the damp shaded slopes; it is called "Hou" or "Kupusya;" the fibres afford a good cordage. The more common trees are the *Photinia* and *Quercus annulata*, *Kydia calycina*, "Put," *Ebretia serrata*, "Poonya," *Dalbergia Ongeinsis*, "Sanun," *Terminalia bellerica*, "Byhura," *Grislea tomentosa*, "Dhaec," *Flemingia semi-alata*, *Wendlandia cinerea*, *Callicarpa macrophylla*, "Ghiwalee," *Saurauja Nepalensis*, "Gogunda," *Engelhardtia Colebrookiana*, "Moua," *Bauhinia variegata*, "Kweiral," and *Bauhinia retusa*, Roxb., "Kandla," this last being identical with *B. emarginata* of Royle. Lastly comes a most abundant shrub of the *Euphorbiacæ*, a species of *Sapium* apparently, called "Phootkia" by the natives, who occasionally employ the root as a cathartic, but describe its effect as dangerously violent. It grows from 4 to 10 feet high, with tender green foliage, which has, on being crushed, a disagreeably sour odour; like all or most of the plants just mentioned, it accompanied us to our highest point in the valley of the Surjoo. At Kupkot I first (on our return) met the *Silung* tree in flower; the trees quite covered with the small light yellow blossoms of the most exquisite fragrance, which is diffused (with the least wind) several hundred yards, the mountaineers say a *kros*. It grows to be a large umbrageous tree, and appears to be the *Olea grata* of Wallich. In this

province it is commonly found near the temples and on the mountain passes, called Benaiks, where a few stones are piled and rags tied up in honor of the Deotahs. It is most likely the tree called *Olea fragrans* in the Darjeeling Guide: no notice of it occurs in Dr. Royle's illustrations.

Kupkot is the first village in the pergunnah of Danpoor, which includes the remainder of our route; as comprising Nunda Devee, the loftiest mountain on the globe hitherto accurately measured; it would probably now have occupied the niche in the Temple of Fame filled by Santa Fe de Bogota, Popayan, &c. had Humboldt carried into effect his plan of investigating the Natural History and structure of the Himalaya. That his attention was diverted to the Andes must ever form the subject of regret to the Anglo-Indian.

September 14th.—To Sooring or Sring, 11 miles in 5½ hours, including much delay in passing above and through a spot where a great landslip of white talcose calcareous slate, due to the late rains, had annihilated the road, and nearly obstructed any further advance. Except at this spot, the rock on this day's route consisted chiefly of the usual stratified limestone, forming many abrupt brows and lofty walls, and sometimes contracting the Surjoo to a few yards in breadth. The river is now reduced to a mere torrent, and from Sooring appears, at a profound depth, a narrow streak of foam. Its source is on the south face of a huge spur from the eastern precipitous shoulder of "Nunda Kot;" this spur forks to south-west and south-east; the south-west range separating the valley of the Surjoo from that of the Pindur. At this fork there is not a vestige of snow in September and October.

Our path kept to the right bank of the river, with much more ascent and descent than heretofore. In one place a cliff is passed by scaffolding, with the Surjoo perpendicular beneath, altogether somewhat difficult for ponies (which are of little or no use beyond Sooring to a good pedestrian), and rather trying to nerves which have not been case-hardened in Kanawar and the Bhoteah pergunnahs. Four streams large enough to require bridges, occur in to-day's march, besides an infinity of rivulets, often converting the road into a swamp, where the leeches were most numerous and voracious. I picked 16 off my feet at once, and found the bites not a little venomous; it moreover

requires all one's resolution not to scratch them, as in that case they are apt to form bad sores. The only security against these pests consists in soaking the stockings in brine; but where one wades for miles through "fresh-water formations" the salt is soon washed away. The idea prevails in the mountains that these leeches possess the power of springing on their prey: this requires verification, but is not altogether improbable. It is only too certain that by getting into the nostrils of sheep, goats, ponies, &c. they do much mischief by keeping them lean and unhealthy. We also found the small round fly or gnat very troublesome here: they give no fair notice of their approach as does the mosquito, and inflict a very irritating bite, for which death is a poor revenge.

About three miles above Kupkot, there is a good Sanga bridge of two planks, 66 feet long, across the Surjoo, leading to Moongharee, Milum, and the Oonta Dhoora Pass. The river here receives a large affluent on each bank. At one and half miles from Sooring, the path quits it, and mounting 800 or 1000 feet, we found ourselves at our camp with, as at Kupkot, a number of convenient sheds for the servants and coolies, a most welcome piece of hospitality confined, I think, to Kumaoon, but well worthy of introduction elsewhere. Our camp occupies an open spot above Sooring, and below a village called Lohagaon. As water boils at 200°, the elevation is somewhere near 6,700 feet above the sea. A colony of agricultural Bhoteeahs is established in the mountains, which rise steeply above this to the west; unlike the rest of their race, they never quit their villages, and had never even descended to Bagesur they told us. "The world forgetting, by the world forgot," their talk is of bullocks and bears; their only visiter is the tax-gatherer, who ferrets out the most determined hermit; but in this respect the burden of the Kumaoonees is light.

The scenery across the Surjoo is fine. The Lahour ka Dhoora, so named from a village visible to the north-east rather higher than Sooring, is bold, lofty, green, and wooded to the summit; it extends from north to south, and beyond it is the valley of the Ramgunga. From two P. M. we had smart showers for a couple of hours, with a drizzling cloudy afternoon, and more rain at night. It is wonderful how a little experience in Himalayan meteorology opens the understanding with regard to certain doctrines of Hindu Theology: e. g. Vishnu sleeps

on the serpent Sesha during the rainy season ; but the shastras which affirm the fact, omit the reason ; this can be no other than that the earth is concealed from the skies by so dense a canopy of clouds that even the Lotus-eyed himself cannot pierce it ; and hence, unable any longer to observe and preserve his *very* peculiar people of India, he even goes to sleep like Baal of old, letting every man go to the devil his own way. So also it would appear that their representations of Kylas, Bykunth, Uluka, and Soomeroo, glittering with gold and precious stones, are derived from the glorious tints which light up the Hemakoot, or "Peaks of Gold," when "the god of gladness sheds his parting ray" on its snows ; aided perhaps by the reality that gold, rock-crystal, &c. are found there, especially near the sacred Lakes of Mansorowur, the *neighbourhood* of which is now ascertained by Mr. Strachey actually to originate four great rivers, flowing to the cardinal points, viz. the Sanpoo, east ; Sutluj, west ; Indus, north, and Gogra, (Kurnalee) south. Lastly, the shastras affirm that the Ganges, &c. fall from heaven, and, just touching the crests of the Himalaya, flows along the earth : a representation not so utterly ridiculous to those who have seen the sources of these rivers chiefly fed by innumerable cascades, pouring down their sheets of water from the unseen plateaux above the glens. But enough of Hindoo Geography !

I made some inquiries here concerning the Ma-murree, a very deadly fever, which annually devastates whole villages in north-west Kumaon and south-east Gurhwal, but though the reverse is believed at Almorah, could not hear that it had ever penetrated to any place in our line of route. It is chiefly prevalent in the hot season, and is accompanied by buboes under the ears and armpits, and on the groin, exactly as in the plague ; attacking for the most part the population clad in woollens, and unquestionably originating in the extreme filthiness of their persons and villages. The disease is mentioned as a typhus fever in Mr. Traill's report ; and has lately excited a more lively interest from its having last season approached within 14 kros of Almorah, and included the cotton-weavers amongst its victims. Such is the consternation caused by its appearance, that the village is immediately deserted, and the patient left to shift for himself, which, considering the Sangrado simplicity of native prescriptions, such as violets in cholera, &c. may

perchance deduct little from the otherwise small hope of recovery. The rank cultivation of hemp close to the doors of the houses, may very likely be connected with the origin of this pestilence, which should be investigated. As to goitre (gega) the people of Kumaon appear less afflicted by it than those of Bissahur, and amongst the Bhoteahs it appears to be unknown; a fact, if it be one, strongly corroborative of the opinion now received in Switzerland, that it has nothing to do with snow or other water, but is induced by the infected air of close valleys liable to abrupt transitions from heat to cold, a removal from which is often followed by cure. The people of Kumaon employ a remedy, sold in the Almorah bazar, and called *Gelur-ka-puta*; on procuring a bit of this, and steeping it in warm water, it speedily developed into an unmistakable fucus or sea weed; a fact on which Dr. Royle (Illustrations, p. 442,) expresses some doubt, and desires information. All that the druggists of Almorah know is that it comes from the west, and is taken internally. It may be assumed as an illustration of the small intercourse between England and Switzerland (at all events, its interior), in the age of Shakspeare, that the poet makes Gonzalo ask in the *Tempest*—"When we were boys, who would believe that there were mountaineers, dewlapp'd like bulls, whose throats had hanging at them wallets of flesh?" and then proceed to adduce as equally authentic, the "men whose heads do grow beneath their shoulders;" not yet discovered.

The vegetation between Kupkot and the base of the Sooring Hill, though less luxuriant than yesterday's route, exhibited most of the same forms, but as we rose, the *Anemone vitifolia*, *Berberis lycium*, "Kilmora," *Erythrina arborescens*, (coral-bush,) "Roongura," and latterly the *Parochetus communis* and *Quercus incana*, become the substance of things hoped for in the way of a better climate. In Don's *Prodromus* we find this last tree, the "Banj," (Ban of Simlah,) confounded with the *Reeanj*, or *Quercus lanuginosa*, which is very distinct, the latter, common on the Ghagur range, is unnoticed by Dr. Royle, as well as the *Quercus annulata*, common everywhere. Another plant common along the Surjoo to-day was the *Æchmanthesa gossypina*, abundant also on the hills between Bheemtal and Mulooa Tal, and very remarkable for the dense, thick, and pure white coat of tomentum which invests the branches and stem; it is called "Jounde-

la." Bees are said to be particularly fond of the honey afforded by the flowers, and to make it in large quantities when these are most plentiful. On the sunniest quartz rocks above Sooring, the *Vitis macrophylla*? creeps along with its stems 5 or 6 feet long, and great cordate leaves from 18 to 20 inches each way. The people call it "Umlee," "Assonjee," and eat the fruit in November: it is not uncommon near Almorah, and Dr. Boyle mentions it as climbing over trees at Mussoorie; where, however, I never saw it; nor if this be his *macrophylla* as it should be, has it at all a climbing habit.

September 15th.—To Khatee, $12\frac{1}{2}$ miles, over the Dhakree (or Thakooree) Benaik. There is a bitter proverb that if you want to know the value of money, try to borrow some; so to realize the height of these mountains, you must walk up one of them. Such an experience will also go far to reclaim one from the intellectual system of the most honest, able, and amiable of bishops since Synesius, Berkeley, who endeavours to reason us out of our senses, and persuade us that all which we see, hear, feel, touch, and taste has really no external existence—all that we perceive being only ideal—and existing therefore only in the mind. The brain itself, as a sensible thing, exists only in the mind, and not the mind in the brain, as the materialists vainly allege: if full of such sublimated cobwebs, one commences such an ascent as to-day's, he speedily begins to waver; what, have all these rocks, forests, torrents, snows, this "brave o'erhanging firmament"—"immense, beautiful, glorious beyond expression, and beyond thought;" and still more, these wearied legs and craving stomach, no absolute being? If so, it is quite surprising how these two latter ideas are burnished and stimulated by other ideas, such as an easy chair and a pleasant glass of ale. The higher we mount into the atmosphere, the lower we fall in the region of metaphysics; and on the summit of the mountain will generally in practice be found pure materialists, adopting with full conviction the moral enjoined in the apologue of Menenius Agrippa.

We left Sooring at 6:20, and reached Tantee, a chalet, about 200 feet below the Dhakree Benaik Pass, at 10:10. Here we breakfasted. Water boils at about $192\frac{1}{2}^{\circ}$, giving the elevation about 10,700 feet, and the actual ascent 3000, not half what one has to climb on many other routes. The path rises at once from Sooring, and is in parts very steep and rocky, interspersed with occasional undulating meadows. The

streams passed are inconsiderable, but a large one, rising between the pass, and the Chilt ka Dunda flows down the spacious wooded glen on the right hand towards the Surjoo, and in one spot forms a fine waterfall. The limestone rock ceases at Sooring, and is replaced by quartzose rocks, and finally by gneiss. The views across the Surjoo are very grand, and from the pass we enjoyed, not to-day, but on our return, a near and magnificent, though contracted prospect of the snowy range :—extending from the Nunda Kot Peak on the east to Mauntolee ka Dhoora (Trisool) on the west. The eastern peak of the Trisool (No. XIII. of the map) faces the west in a great bluff (which our guides affirmed to be Nunda Devee), from which a long easy ridge, presenting to us an unbroken sheet of snow, slopes down to the east, connecting the Trisool with the Nunda Devee cluster. Strange to say that here, within 20 miles of the two great rocky peaks of this cluster, and elevated 10,800 feet, they are invisible, being concealed by the two beautiful pinnacles of pure snow, which from Almorah, &c. are seen to be merely the abrupt terminations of two immense spurs, the easternmost of which, apparently with a large Loggan stone on its summit, is there known as Nunda-khat, "Devee's bed." From this point of view it rises into so fine and lofty a spire that our ignorant guides insisted it was the Darcoola (Panch-choola). In the hollow between the Trisool and Nunda groups rises the Soondur-Doongee or Redinga river, which flowing nearly south down a narrow and most profound glen, joins the Pindur a little above Wachum, affording probably the best and easiest route to the traveller desirous of penetrating to the core of the Nunda Devee mass. This stream, we were assured, has its source in a glacier like that at Pindree. East of Nunda Devee, in a deep col is "Traill's Pass" supposed by him to be 20,000 feet high, leading NOBODY to Milum; its eastern portal formed by the N. W. shoulder of "Nunda Kot"—which mountain closes the view in a colossal rectangular summit of pure snow, with the glen of the Pindur easily made out. The line of perpetual or at all events of unmelted snow, was very well defined along the whole extent of the range, certainly 2000 feet below the crest of Traill's Pass. It is unfortunate for the hurried tourist that to the east of the Dhakree Benaik the range gradually rises, and three or four miles distant, in the Chilt ka Dunda, a bluff woody summit with a temple to Devee,

attains full a thousand feet additional elevation, completely excluding the Panch-choola, &c. from the prospect. To reach this point which probably commands the loftiest peaks of Nunda Devee, would require a whole day, which we could not spare. The path is very practicable according to Puharee logic—"our *goats* traverse it," a consolation we received more than once. On the whole, I would say, let no one who has no other object, fash himself by coming so far to look at the snowy range. Partial masses are indisputably very grand, but far finer in my opinion is the main line, stretching from Jumnoo tree far down into Nepal, as we see it from Binsur and the loftier points of the Ghagur—always indeed, excepting one snowy range seen from another; e. g. the Ruldung group from the Roopia Pass.

We remained nearly two hours at Tantee and then continued our march leisurely towards Khathee, where we arrived at four P. M. and found Messrs. Ellis and Corbett encamped, employed in bear-shooting, after a very pluviose visit to the glacier above. The Mohroo (Tilunga) and Kurshoo oaks are abundant on the eastern exposure of the Dhakree Benaik, but no pines. The descent on the western side is rapid, first through Kurshoo, which soon becomes blended with abundance of Pindrow (Ragha) fir, forming boundless forests on this fine range. Below these, we passed down, through luxuriant meadows, nearly to the Pindur, opposite to a large village, Wachum. Here a path strikes off to our left to Chiring; and when passable, which it is not now, enables one to vary the return route to Almorah. This long, but in general not very steep descent, led us to a torrent, from which the road again ascends considerably towards Khathee, three miles or so further, the road lying amongst horse-chestnut, Maple, Sumach, mountain Bamboo, Banj, &c. Mohroo oak, Hornbeam, (Carpinus, "Geesh,") Ash, &c. The last hour we walked under a heavy fall of rain, which continued drizzling more or less all night.

Khathee has no permanent village, and at best only a few miserable sheds; the only cultivation half a dozen fields of Chooa, (*Amaranthus anardana*;) supplies must be obtained from Soopee, six kros distant, on the upper Surjoo, a flourishing village, under the Putwaree Mulgoo. This gentleman forwarded none till the afternoon of the 16th, which compelled us to rest here for a day.

Khathee consists of some beautiful, open, and swelling lawns, closely

hemmed in by exceedingly steep and lofty mountains, either covered with grass or enveloped in dark forest. On the N. W., about 300 feet below, the Pindur roars along its narrow gully, up which, whenever the clouds cleared a little, several high snowy and black rocky peaks of the great range appeared close at hand. Water boiled at $195\frac{1}{2}^{\circ}$, making the elevation about 9,000 feet; but as the thermometer gave the same result at Diwalee, 10 miles up the valley, and certainly 500 feet higher, 8,500 feet is perhaps the true height of Khathee. The place is a perfect bear-garden; we had not been an hour in camp, before one appeared on the opposite bank of the river, feeding quietly on the locusts. Messrs. Ellis and Corbett have seen half a dozen daily, and on the afternoon of the 16th bagged one of them about half a mile from camp. The mountaineers hold them in great dread and are unanimous in asserting that they not only devour sheep and goats, but even their own species when found dead. They are very fond of the mountain Ash, or Rowan fruit.

The species found here is the common black bear, called indifferently Bhaloo and Reech, terms which Mr. Ogilvy (in Royle's Illustrations) is inclined to think mark two kinds.

The argus and other pheasants are also common in the woods.

The vegetation on our route this day, and about Khathee, is wholly different from that which we have just parted from in the valley of the Surjoo. About 500 feet above Sooring, the *Hemiphragma heterophylla* began to show itself, scarcely as long as its own name; its godfather was fond of such, and Don observes justly of another of his appellations "Nomen Spermadietionis nimis auris terribile est servandum." My friend Pilgrim was not so far out, botanically at least, when he compared the Nynee Tal mountains to the Himalaya. On Cheena we find the Kurshoo oak, (*Quercus Semicarpifolius*), and on the flat summit of the mountain, this very *Hemiphragma*; lower down the *Pyrus baccata* is common by streams, as it is about Khathee and in the Beans country, everywhere under the same name, Bun-mehul, or wild pear. As we advance to the S. E. in these mountains, the various plants, &c. seem not only to occur at lower elevations, but to approach the plains more and more, till in Assam, some of them descend to the valley. In the mountains of Busehur, this *Hemiphragma* is scarce found under 10,000 feet; here it is common at 8,000. *Primula denticulata* and

Quercus dilatata, both comparatively rare at Simlah, abound on the crest of the Nynee Tal range almost overhanging the plains at the foot of these hills, reaching to Kalaputhur. We find the Bengal Mudár, *Calotropis gigantea*, both the purple and white varieties, in profusion; while, as Dr. Royle observes, the *C. Hamiltonii* only is found to the N. W. It is curious to mark the exact line of demarcation between different species: the Tree ferns reach to Burmdeo, where the Kalee leaves the hills; *Plex excelsa*, unknown in Gurhwal and Sirmoor, is common in Kumaon, where also I lately found many plants of the *Chamærops Martiana* on the Ghagur range, two or three miles S. E. of the Ramgurh bungalow, at about 5,500 feet elevation. The Thakil, a mountain 8,000 feet high, near Petorahgurh, takes its name from this palm. On the Ghagur, Binsur, &c. we also meet as a timber tree, a *Michelia*, perhaps the *Kisopa* of Nepal, and in the Dikkolee and Bhumouree Passes, *Didymocarpus aromatica*, called "Puthur-loung" "Rock-clove," by the natives. But, probably owing to a milder or a damper climate, not only do plants grow lower down, but also much higher up, in Kumaon than to the N. W. Thus the *Rhododendron arboreum* (Boorans), and *Andromeda ovalifolia* (Uyar), which in Busehur we lose at about 8,500 feet, flourishes in the valleys of the Pindur and Goree fully 2,000 feet higher, reaching the lowest limit of *Rhododendron campanulatum*, and flowering till June. On the west side of the Dhakree Benaik we first meet the *Rhododendron barbatum*, about the same size as the latter, or rather larger, and known by the same name "Chimool;" it is common above Diwalee. Here also occur *Pyrus lanata*, "Gulion," *crenata*, "Moul, or Moulee," and *foliolosa*, "Sulia, or Hulia;" the "Moulee" is now ripe, and, though small, is the sweetest wild fruit I know of. At about 7,500 feet, on the eastern side of the mountain, a procumbent species of raspberry, perhaps the *Rubus foliolosus* of Don, made its appearance, and gradually became more abundant, covering every rock, bank, fallen tree, &c. and reaching up to within three or four miles of the Pindur glacier. It has large white flowers and excellent orange fruit, here called "Gungoor;" the Sinjung of Beans. Should this be identical with the "Ground Raspberry" of Darjeeling, it affords another instance of the approach of species to the plains as they extend S. E. along the Pindur above Khathee. Another *Rubus*, the *rugosus* of Don, grows to be a large and very handsome shrub,

affording copious panicles of large and excellent blackberries. *R. concolor* is found above Diwalee. The *Viburnum nervosum* and *cotinifolium*, "Ginnia" and "Gweea," *Millingtonia dillenifolia*, "Gwep," *Cotoneaster affinis*, "Rous or Reooush," with black, not bright red fruit, which Loudon gives it in the Arboretum, a smaller shrub, with fruit of this color, is common, and is called "Koocus," the *C. acuminata*? the *Elæagnus arborea*, "Gheewae;" the *Kadsura grandiflora*, "Sillungheete," *Panax decomposita*, *Sabia campanulata*, *Rhus Teeturee*, *Fraxinus floribunda*, "Ungou," the finest I have met, *Acer villosum* and *cultratum*, the Alder, *Alnus obtusifolia*, "Ooteesh," *Cornus macrophylla*, "Rachia," *Betula cylindrostachya*, "Haour," or "Shaoul;" and several more trees and shrubs, abound on the mountains of Khathee: with the plants *Gaultheria nummularioides*, "Bhaloo-bor," *Anemone discolor*, "Kukreea," *Parnassia nubicola*, *Strobilanthes Wallichii*, *Euphrasia officinalis*, *Geranium Wallichianum*, *Veronica chamcedrys* or *Teucrium*, *Halenia elliptica*, *Pedicularis megalantha*, *Sibbaldia procumbens*, the beautiful club moss, *Lycopodium subulatum*, "Toola-mooka," 6 to 10 feet long, *Roscoea spicata*, *Hedychium spicatum*, *Spiranthes amoena*, &c. &c.

The *Pœonia Emodi* abounds in the woods and glades here and higher up, and has as often two carpels as one; the natives call it "Bhooniya madeen," ("Yet-ghas" of the Bhoteeahs,) to distinguish it from the "Bhooniya nur," *Lilium giganteum*, common in the forests along the Pindur; these being considered the male and female of one species; a very humble approximation to the Linnæan system! Among the bushes opposite to Wachum there is abundance of a twining campanulate plant called "Gol-ghunna,"* with large greenish yellow and purplish blossoms, which, as well as the capsules, are eaten by the inhabitants; it is a species of *Wahlenbergia* or *Codonopsis*.

September 17th.—After rain all night, and fresh snow on the mountains above us, we left Khathee at 10½ A. M. and reached Diwalee, about 10 miles distant, in four and quarter hours. A drizzling rain fell nearly the whole way, rendered doubly disagreeable by the dripping of the thick forest, and especially the luxuriant and most abundant *Nigala* bamboo,

* All these words are spelt according to Dr. Gilchrist's system nearly, which seems best adapted to the English reader; one must protest, however, against its being introduced into names intended for Latin, where *u* for *a*, and *uo* for *au* are horribly barbarous.

(*Arundinaria falcata*.) which, from 20 to 30 feet high, overhangs the path in the most graceful but to-day unwelcome clumps; it reaches up within a few miles of the glacier, and is also common on the western face of the Dhakree Benaik; it is very generally in seed, now ripe and ripening. The mountaineers assert that this only takes place every twelve years (a suspicious period), and that then the plant dies. They are certainly so far borne out in this that all the fruit-bearing specimens *do* seem fading away, and that for several years past I have in vain tried to procure the seed. The Nigala is of infinite use to them for mats, baskets, &c. some of which are very neatly and strongly made. Our route lay first on the left, then for a short distance on the right, and finally returned to the left bank of the Pindur, keeping nearly its *level*, with the exception of a few short but steep ascents and descents; the two bridges good. The scenery is of the sublimest description—the valley somewhat of the character of the upper Roopin, except that it is much more narrow, the mountains rising like *walls* to a vast height on each side, broken into great buttresses, and universally invested with the densest forest. Three or four beautiful cascades poured down their *boiling* water from the woody heights, their volume doubly augmented by the late and present rain, but one can scarce appreciate the beauty of these things when wet and hungry, and all around with faces expressive of despair. The last of these falls, nearly in front of Diwalce, pours down amongst the ledges of slate rock from a *maidan* or table-land, which must reach up close to Nunda Devee, and is a favorite beat of the Shikarees. Thar, (wild goat,) moonal, argus, pheasant, &c. being in great numbers. Diwalce, perhaps named from the wall-like cliffs of the Pindur just above, stands in the angle where that river receives on its left bank the Kushinee or Kuphinee river, a stream as large and turbulent as itself, rising in the south-east recesses of Nunda Kot mountain. Their waters are of a dirty milk colour, and the bed of the combined stream is obstructed by some great boulders, against which the waters dash at the pas de charge. We found a good spot for our tents in the angle between the river; above this are several successive terraces, all well adapted for the same purpose, shaded by yew and sycamore trees, but the forest soon terminates upwards in the great bluff snowy spur which separates the rivers. The left or south bank of the Kuphinee is formed by the “Kotela” mountain, the

summit of which, far above the forest region, commands the Pindur from this to its source, and communicates by a goat-path with the Dhakree Benaik.

We were accompanied here from Khathee by Ram Singh, the accredited guide to the glacier; an athletic mountaineer of Soopee, with the limbs of Hercules and the head of Socrates, but scarcely his honesty: this last quality having been perhaps sullied by a three years' abode at Almorah; we found him however, with some disposition to make the best of them, very useful in our subsequent difficulties, and ultimately parted well pleased with each other.

The trees, &c. on the route to-day include all those near Khathee, except the Banjoak; to these may be added the Elm, *Ulmus erosa*? "Chumburmaya," of great dimensions; *Juglans regia*, "Akor," *Cerasus cornuta*, "Jamuna," *Spircea Lindleyana*, *Leycesteria formosa*, "Kulnuha," *Hippophae salicifolia*, "Dhoor-chook," the "Turwa-chook" of the Bhoteeahs, in abundance all along the banks of the river from Dewalee to Khathee. *Ampelopsis Himalayana*, "Chehpara," the climbing and the arborescent *Hydrangea*, the latter called "Bhoo-chutta" and "Bhoojhetta," the hazel, "Bhoteeah-budam," and "Kapasee," *Corylus lacera*, *Piptanthus Nepalensis*, "Shulgurree," on which the Thar is said to feed in preference: *Ribes glaciale* and *acuminata*, black and red currants, "Kokulia;" *Berberis Wallichii*, and the only fir, *Picea Pindrow*. *Picea Webbiana* is pretty common above Diwalee; both known as "Ragha;" but not a vestige of *Pinus excelsa* (which however, Mr. H. Strachy found common in Beans) nor of *Abies Smithiana*, which from Captain Raper's account, is not to be met on this side of Joseemuth. There is a thick undergrowth with the above, of *Strobilanthes*, Balsams, *Rubus*, *Cucumis Himalensis*, *Cuscuta verrucosa*, *Polygonum runcinatum*, *molle*, and others. *Oxyria elatior*, *Tricholepis nigricans* (Edgeworth), *Senecio nigricans*, *alata*, *canescens*, and *chrysanthemifolia*; *Aster ferrugineus* (Edgeworth), a shrub which also occurs in Kunawur, *Aster alpina*, *Inula Royleana* (*Aster inuloides* of Don), *Jussilago*, very abundant on rubble, &c. Doubtless these form but a moiety of the vegetable riches of this region, which I could only partially examine from under the auspices of an umbrella.

On arrival at Diwalee we seized the opportunity of a partial cessation of the rain to pitch our tents; but it soon recommenced, and continued

to fall from this time for no less than 75 hours without a break! This deluge came from the east, and prevailed over all Kumaon, and no doubt much farther; it made us prisoners in our narrow tent till 5 P. M. on the 20th, when the clouds cleared away before a west wind. During this period, the smallest rivulets became unfordable, and the Pindur and Kuphinee were swollen into the most turbulent, turbid and ungovernable torrents. Up near its source I afterwards observed that the former had risen from 15 to 20 feet, and lower down where the bed is more contracted, and had received countless accessions, it was probably double this; accordingly at 2 P. M. on the 20th we were not surprised by a shout from our people that the Kuphinee bridge was swept away; and in a few hours, our worst fears were confirmed that both bridges over the Pindur had shared the same fate, after standing uninjured for the last 4 or 5 years. This Ram Singh was pleased to call "burra tum-asha," but it was death to some of us, and would have placed us in a most serious dilemma as to provisions, had not a flock of sheep and goats, returning from the summer pastures, been fortunately arrested in the same spot as ourselves, utterly cut off from any escape to the south by two savage rivers, and with no means of advance to the north except over the hopeless pass to Milum, barely practicable in the best weather. It was an unlucky emergency for the flock, as during our imprisonment in this slough of despair, we and our followers ate six, and the bears seven of them. The destruction of the bridges isolated our party in three distinct groups: one in the peninsula, a second on the left bank of the Kuphinee, while the third, driven thence on the night of the 18th by the waters invading their oodiyar or cave, had crossed to the right bank of the Pindur, and taken up their residence in a cave between the two bridges. These, when the bridges went, were intercepted from all aid; those across the Kuphinee were supported by "fids" of mutton and goat flesh, which we flung over; but without salt or flour; this food disagreed much with all our people, and when supplies reached us, it was curious to observe how every one eagerly demanded *salt*. On the 21st, the eight men across the Pindur, contrived to clamber down the right bank, till at a spot about two miles short of Khathee, they found a place where its force was somewhat diminished by the current being divided into three streams: these, four of them determined to cross, and had actually got over two, but

the third and last separated them, and three of the unfortunates were instantly carried off and drowned; the fourth, a very strong swimmer, reached the bank, but was so bruised and chilled, the water being at 42°, that he could not lay hold of the rocks, and was rapidly drifting after his luckless companions, when Messrs. Hort and Powys, ignorant of the fate of the bridges, came to the spot at this critical moment, on their way to Khathee, and dragged him out. Mr. Hort *might* have addressed him in the words of Pythagoras, O Genus attonitum—*gelide* formidine *mortis*, Quid Stygias, quid tenebras, quid nomina vana timetis; Materiem vatis, falsique pericula mundi? but he did much better: he clothed him, and restored the circulation by brandy, and had him carried back to Khathee. For having his life saved by this unlawful medicine, the poor man soon became an outcast, and it required all my persuasion, and not a few menaces, to induce his accusers to make the amende, on our return to Khathee; this was only accomplished by the chief of them publicly drinking water from his hands, which was not done without much hesitation and many a grimace.

September 21st was a glorious day, and was passed in various devices to throw a plank over the Kuphinee, to expediate Ram Singh to Khathee, to which, once over this torrent he said there was a track passable for goats and Danpoorees, but all our inventions and exertions failed for want of a felling axe and some thirty yards of strong rope, without which no one should intrude into these regions; during the course of the next day, however, we received a communication from our friends below, with some supplies; and what was better a detachment of the bold Soopee men appeared on the other bank of the Kuphinee, and with some assistance on our side, soon laid a tree or two over that stream, which by noon on the 23rd were so secured and planked as to be passable to us; and our coolies being so starved and paralyzed as to be utterly useless, we sent them all back to Khathee. By the 24th the upper Pindur bridge was partially restored, but as there appeared no probability of the lower one being completed for some days, I determined to make a push for the glacier.

We had smart rain from 2 till 6 P. M. on the 23rd. The Pindur river, about 60 feet below us, was invisible from our tent during our "close arrest;" not so the Kuphinee, which, though actually as far down, was right before us, and bounding down its inclined bed at such

an angle as to threaten us with apparent destruction. So great was their combined roaring that all conversation was kept up by shouting, and with the party over the water by gesticulations only. At night, one could not help fancying one's self on board a colossal steamer, with the thunder of the machinery and the incessant plash of the paddles deafening one; but there all is guided by skill and design: here the wild war of the elements seemed to terminate in destruction merely. They afforded a fine study for the action and resistless force of large bodies of water in motion down steep planes. Everywhere the lateral torrents had heaped up on each of their banks enormous *bunds* of mud, gravel, and huge rocks. When we passed, the waters of course had greatly subsided, and perhaps in their utmost force could never move such blocks; these must be owing to the landslips and great *debauches* of mud, in which the specific gravity of the stones is reduced almost to nothing. When subsequent rains have washed away the mud, there remain those immense couleés of rocks so prevalent along the mountain slopes as we approach the Himalaya.

September 24th.—With Ram Singh as guide, one of my own followers who wished to see the glacier, two Danpoor coolies, tea apparatus, and a column of ready-made chupatees, I started at 10:20 A. M. for Dooglee, and reached at 1 P. M. distance about five miles. The rise is gradual but continuous, and except near Diwalee, though the road was much cut up by the innumerable torrents and rivulets still rushing across it, I did not experience much difficulty; *there*, one or two formidable landslips had fallen, which compelled us to rise and get round them—not very pleasant work, when all was still tottering. The “still-vexed” Pindur raves close on the left hand during the route, and at about two miles from Diwalee becomes most savage, leaping down its rocky bed and among the birch-covered boulders in a series of the most *Cambrian* rapids and cataracts. It flows from 150 to 200 feet below Dooglee, whence, and indeed from the glacier, its course towards Diwalee, is nearly straight, and due south. At about one mile from the latter place, there is, across the Pindur, a very fine waterfall: and higher up, on the same side, where the crags fall precipitously to the river, three or four more, all equally beautiful, fed by the snows, and trembling over the bleak bare rock above the line of vegetation in copious sheets of spray. On the left bank the cliffs and shivered pin-

nacles are more remote, and rise from a tract of undulating ground strewn with great rocks and covered with forest and brushwood. At two miles from Diwalee passed a hut and grazing ground, called Toon Paehurree, a little to the east of which a superb cascade falls from the heights in three distinct leaps. One advantage of the late rain and snow is that these falls are now in perfection.

Approaching Dooglee the glen becomes very narrow, and the wild crags and bluffs above the forest across the river, now mantled in an unbroken sheet of snow, are but a few hundred yards distant! The accommodation provided here by nature for the wayfarer consists of a most enormous mass of mica-slate, a little above the road to the east: its western face projects gradually so much as to afford a tolerable shelter in the worst weather, as I had soon an opportunity of testing; for the heavy clouds drifting up the valley turned to rain at 3 P. M., which continued for an hour and a half; but though it was bitterly cold, the Oodiyar remained waterproof. Several similar rocks are grouped here and there in the vicinity, on which the spreading Juniper grows freely: the site also being just at the highest verge of the forest, must be about 11,500 feet above the sea. The wild goat is said to be very numerous hereabouts: and I noticed several flocks of the "Snow Pigeon;" higher up, amongst the cliffs at Pinduree, the Chough is common. The vegetation towards Diwalee comprises the trees before specified, with Silver Fir (*Picea Webbiana* and *Pindrow*); Birch (*Betula Bhojpatra*), *Rhododendron arboreum* and *barbatum*, Maples, Jamuna Cherry, with coppice of *Viburnum nervosum* and *cotinifolium*, *Rosa Webbiana* and *Sericea*, "Sephula" of the Bhotiahs, *Berberis brachystachys* (Edgeworth), *Jasminum revolutum*, *Syringa Emodi* ("Gheea,") *Lonicera obovata* and *Webbiana*, several shallows, the red and the white fruited mountain-ash, *Pyrus foliolosa*, "Sullia," "Hullia," (the letters s and h are interchangeable here, as in Latin compared with Greek;) and extensive thickets of *Rhododendron campanulatum*; while the pastures and streams abound with alpine plants, such as *Spiræa Kamtchatkika*, *Cynoglossum uncinatum*, "koora," *aplotaxis aurita*, *Carduus heteromallus* (Don), "Sum-kuniou," *Swertia perfoliata*, "Simuria," *Cyananthus lobata*, *Impatiens moschata* and *Gigantea* (Edgeworth,) *Rhodiola imbricata* (ditto,) *Saxifraga parnassiæfolia*, *Caltha Himalensis*, *Elshottzia polystachya* and *Strobilifera*, *Podophyllum Emodi*, Sal-

via Moorcroftiana? *Delphium vestitum*. At Dooglee, the *Potentilla atosanguinea*, "Bhooi-kaphul" commences, and is common towards the glacier, and near the latter only, occurs *Aconitum heterophyllum*; "Utees;" both plants being-common-on Muhasoo at Simlah, at about 8500 feet. Are these anomalies of the retreat of the alpine plants and the advance of the temperate ones, in these vallies, to be explained by the fact of their thorough exposure to the sun, from their nearly exact north and south direction? Amongst the rocks above Dooglee I found a shrub which the people called, from its bright red berries, "Dhoor-bank," *mountain arum*: the *Triosteum Himalayanum*, I believe; and if so, the most north-west locality in which it has yet been found.

Either from the hardness of my bed and "dampers," or the wild sublimity of the scenery, and perpetual war of the cascades, "deep calling unto deep, at the noise of the waterfalls," finding sleep impossible, I passed a good portion of the night in conversation with Ramsingh and his companions, and amongst other things endeavoured to convince them, but without much even apparent effect, of the propriety of eating beef; not all their deference and adulation could make them admit its innocence! and yet they are well skilled in the most ready flattery. When we first met Ramsingh, we asked him whether he had ever been to Budreenath, and his reply was—"No! why should I? *you are my Budreenath.*" Enquiring now a little into his history and the affairs of his village, it soon became too evident that even in these sequestered glens—where one might expect to discover an Arcadia—the very same bad passions are at work as in the nether world,—envy, hatred, malice, jealousy; in short the complete "Black Battalion" of human frailties and passions. If my informant spoke truth, Mulkoo, the Put-waree of Soopee, by the grossest oppression, had despoiled him of house, lands, and flocks; while, according to Mulkoo, Ramsingh, by engrossing the glacier as his peculiar property, robs *him* of his lawful quota of the rewards which accrue from the visitors. Truly of all "the fables of the ancients" that of the Golden age appears to be the most unnatural and incredible. "Croyez-vous, dit Candide, que les hommes se soient toujours naturellement massacrés, comme ils font aujourd'hui; qu'ils aient toujours été menteurs, fourbes, perfides, ingrats, brigands, foibles, volages, lâches, envieux, gourmands, ivrognes, avarés, ambitieux, sanguinaires, calomniateurs, débauchés, fanatiques, hypocrites, et sots?"

Croyez-vous, dit Martin, que les éperviers aient toujours mangé des pigeons quand ils en ont trouvé? Oni, sans doute, dit Candide. Eh bien, dit Martin, si les éperviers out toujours en le même caractere, pourquoi voulez-vous que les hommes aient changé le leur?" My companions, however malicious, were intelligent enough, and listened eagerly to my details of railways, steam-vessels, electric telegraphs, &c. the last a difficult matter to explain to them; they were also very curious to know what the "Sahib-log" did with the sacks and boxes of stones which they carry down to the plains with them! They must surely contain gold, silver, precious jewels, or very probably the Philosopher's stone, in the reality of which they implicitly believe, may be amongst them! In the uses of plants they are more at home, but as to anything beyond tangible and present utility in the way of food or medicine, every man of them is another Jeremy Bentham. Ramsingh informed me that if the honey of the upper Himalaya be eaten fresh or unboiled, it produces continued intoxication, severe griping, &c. Can this be caused by the abundance of Rhododendrons, and the bees feeding on their flowers? The *Ten Thousand* in Pontus were apparently affected from this cause.

September 25th.—Clear morning and the snows of Pindree in full view ahead, called two pukka kros, about four miles. Leaving Dooglee at 6 A. M. I reached the base of the glacier in two hours; the ascent very gradual, and for the most part over sloping lawns, bounded on the east by high crags, and covered with *Geranium Wallichianum*, *Potentilla atrosanguinea* and other species, *Ligularia arnicoides*, *Morina longifolia*, *Primula glabra*, *Parochetus communis*, *Cyananthus*, *Saxifraga spinulosa*, *Polygonum Brunonis*, and others, *Sibbaldia procumbens*, *Ephedra Gerardiana*, several species of *Gentian* and *Pedicularis*, &c. The only bushes beyond Dooglee are the *Rhododendron campanulatum*, *Lonicera obovata*, Willow, Birch, Rowan, all diminutive, and ceasing wholly about a mile short of the glacier, except the Juniper and the *Cotoneaster microphylla*, both of which flourish on its edges; the latter hardy little shrub seeming equally at home here as on the hottest banks at Almorah. The west bank of the Pindur is precipitous for about two miles above Dooglee, where a Gopha or cave is pointed out, said in days of yore to have been tenanted by the Pandoo, Bheemsing, not, however, till after the manner of St. George and St. Patrick, he had

expelled and slain certain dragons and serpents, the original occupants.* Above this cave, the right bank also becomes undulating, and exhibits the trace of a road which formerly led to the glacier, till the bridge was carried away; the slopes there are covered with low thickets, probably of *Rhododendron lepidotum*, but the unfordable river forbade all examination. In the north-west Himalaya, the passes, contrary to the fact here, are all gained by the north-west banks of the streams; here in general the eastern bank is most accessible. One circumstance remains constant, which is the comparatively level bed of the river below the glacier; from its source to the cave nearly, the Pindur flows along a wide channel, overspread with gravel and stones, the product doubtless of the glacier, which has no terminal moraine; its waters are exceedingly turbid, and though diminished above by the dozens of cascades, which of all sizes, and at all distances, rush down from the snow, are quite impassable. The spot called Pinduree is rather an open, undulating piece of ground, covered with grass, docks, and the ubiquitous Shepherd's Purse, in an amphitheatre of crags, with many snow-beds along their bases. Here I found the remnants of a hut, which supplied fuel, and at 10 A. M. started for the head of the glacier and the source of the Pindur (this last about 10 minutes' walk distant, but visited last,) which took me exactly three hours to accomplish. From the breakfasting ground the ascent is rather steep, over rough, and occasionally pasture land, covered with *Sibbaldia*, *Salix Lindleyana*, a low shrubby *astragalus*, the yellow aromatic *Tanacetum*, the dwarf white *Helichrysum*, an *Iris*? a garlic-like *allium*, and two most abundant and beautiful blue *Gentians*. The glacier lay to the west, and between us and it, rose a lofty moraine, along the hither or east base of which flows a considerable stream, the source of which is much more remote than that of the Pindur, which it joins one or two hundred yards below its exit from the ice. Having ascended perhaps a thousand feet, we struck off to the left, and crossing the moraine, which is here about 150 feet high, descended to the glacier, and with infinite

* During the heavy snow which fell in Kumaon in February 1807, from 40 to 50 *Kakur* are reported to have taken refuge in a cave near Loba, when they were killed by the peasantry. Had the bad weather continued, and these deer been starved, we should probably have one illustration of the manner in which Bone Caverns have been stocked.

difficulty, advanced a few hundred paces towards its head, where it commences in huge broken tiers of the purest snow. The glare from this was intolerable, and the warmth of the sun now began to tell on the snow; the consequences soon made themselves heard and seen in the avalanches which, one in about every three minutes, commenced falling from the lofty crest on our right—the northern shoulder of Peak No. XV. generally known as Minda Kot or Nunda Hosh. The ridge of this was capped by a wall of snow, apparently 40 or 50 feet thick, from which stupendous masses were constantly detached and fell with the noise of thunder, spreading out in their descent like a fan, and tumbling in great blocks to the base of the moraine. Though perfectly safe where we stood to gaze, my Almorah servant was terribly frightened by “Devee’s opera.” Having crossed the glacier we kept for a short distance along its western side, as I hoped to reach the source of the Pindur that way; and return to the *camp* by crossing it at its source: both objects Ramsingh assured me were now impracticable; and as heavy clouds began to collect to the south, any delay became dangerous; and therefore returning to the glacier, we endeavoured to steer down its centre, so as to look down on the river from the southern escarpment; but this was also impossible, from the tremendous fissures (the veritable Davy’s locker) which crossed our path. Nothing remained but to regain the moraine, which we only did by passing along some very awkward isthmuses between these fissures. The moraine is constituted of gravel, mud, and blocks of stone imbedded in ice; the stones much smaller than I should have expected. It conducted us, latterly by a very steep descent, to where the river issues from a cave in the face of the glacier, about 20 feet high, by perhaps 90 wide; the impending roof is riven into four or five successive thick ribs of ice, the lower members of which promise a speedy fall. I found the water extremely cold and muddy, and, as my guide had declared, too deep and impetuous to be crossed. Mr. Hort found the water to boil at $190\frac{1}{4}^{\circ}$, which, allowing half a degree too high for the error of his thermometer, would make the elevation very nearly 12000 feet.

It is most surprising that with such a beautiful and unquestionable example of a glacier within seven marches of Almorah, the existence of this phenomenon in the Himalaya should have been considered doubtful! Having within these five years visited the Mer de Glace and seve-

ral of the glaciers of Switzerland, I can most confidently state that there is not in Europe a more genuine instance, and Mr. H. Strachey, after much more experience, in Gurhwal and Kumaoon, assures me that it is by no means a singular one. Captain A. Broome many years ago penetrated to the cave source of the Bhagiruthee, which he found to be formed of pure ice; so that little doubt can remain of the enormous "snow-bed" at the head of that river being also a true glacier. Captain Weller, who traversed the glacier near Milum (J. A. S. No. 134, for 1843) was struck by the fantastic castles, walls, &c. of its higher portion; this appearance would denote the junction of a lateral glacier; but in no part of his journal does he appear to be aware that at Milum there was such a thing as a glacier; at least he never employs *the word*. Certainly the recent heavy rains had thoroughly washed the Pinduree glacier, and its surface exhibited a sheet of the purest ice, except on and near the terminal escarpment, which being covered with rubble, resembles, at a short distance, a steep bank of mud; and such, I hear, is the appearance in May and June of the Milum glacier. But to make quite sure, I carried a hatchet, and frequently broke off fragments, which *everywhere* were perfect ice, the only difference perceptible, or that I can remember, between this and the Alpine ice, being a coarser granular structure here. It is intersected by the same fissures, has the same *ribband* texture, and from its origin in the snow to its termination above the cave, falls in a series of the most beautiful curves, which appeared to my unscientific, but unbiassed eye, a striking illustration of the truth of Professor Forbes' *Viscous Theory*. That the mass is moving downwards seems confirmed by the form of the snow at its head, viz. a succession of terraces, with steep walls, just such as clay, &c. assumes on its support being removed. The Bhotiahs of Milum affirm that their glacier has receded from the village two or three miles to its present site, and Ramsingh assured me that the same is true, in a less degree, at Pinduree. The glacier may be about two miles long, and from 300 to 400 yards broad, and probably occupies the interval between the levels 12000 and 13000 feet above the sea; owing its existence to the vast quantities of snow precipitated from Nunda Devee and the other lofty mountains above, which, melted by the noon-day sun, is frozen at night. It must be observed too, that in spite of theory and observation elsewhere, the perpetual snow appears here to

descend to the level of 13000 feet: for from the head of the ice to the crest of "Traill's Pass"—the *col* which may be considered as the *root* of the glacier,—there is an uninterrupted surface of snow, and that, from its low angle except for the lowest thousand feet, evidently in situ. In short no one in Kumaon can doubt the existence of *permanent* snow, when he contemplates daily the faces of Trisool, Nunda Devee, and others, exposed to the full blaze of the meridian sun, and yet preserving in many spots, and those by no means the highest, spacious fields of snow without a speck or rock.

None of the culminating pinnacles of the Himalaya are visible from Pindree; though the great Peak, No. 15, 22,491 feet, is *immediately* above on the east—but its northern shoulder, a massive snowy mountain, forms a grand object to the north-east, and this, passing the depression forming Traill's Pass, is continued in glorious domes and peaks to the left, where a beautiful pinnacle terminates the view, apparently the easternmost of the two lower peaks of Nunda-Devee. The adytum of the Goddess herself is utterly concealed. By many she is irreverently confounded with THE BULL of Siva; but H. H. Wilson gives us Nunda and Nundee as epithets of *Durgá*, the *inaccessible* goddess." The largest temple at Almorah is dedicated to her, and though several hundred years old, is there very generally believed by the credulous mountaineers to have been built and endowed by Mr. Traill, the late Commissioner, in gratitude for his recovery from temporary blindness from the snow glare, when crossing the pass now named from him. An equally lying tradition purports that, like Heliodorus, he was struck blind at Almorah for forcing his way into her temple, and only restored on endowing it handsomely. These legends, credited against all evidence on the very spot and in the very age where and when they were invented, reduce the value of tradition, and even of contemporary testimony, unless assured of the witness' judgment, considerably below par! Amongst some great rocks on the east of the moraine, I found numbers of the curious *Saussurea obvallata*, here called the "Kunwul," or Lotus of Nunda Devee; near it grew the *Dolomisea macrocephala*, another sacred plant, bearing the strange name of "Kala-Tugur," or Black Tabernæmontana; and the common Rhubarb, *Rheum Emodi*, here called "Doloo." The rocks in situ about the glacier are mica-alate and gneiss, but on the moraine, the fragments consist

also of crystalline and slaty quartz, the latter often considerably colored with iron between the layers; hornblende rock is also common; and masses of the same granite which forms the great range at least up to Gungootee. Though it exhibits quartz, felspar, and mica, the felspar is in such excess to the other minerals, and large crystals of black schorl are so abundant, that Captain Herbert probably did not recognize it to be granite, and hence his denial that this rock is found in the snowy range.—It certainly differs much in appearance from the more authentic granite which we find north and south of the Great Chain, in Kunawar and Kumaoon.

My investigations were cut short by the very threatening appearance of the weather, and to his great relief, I at last commanded Ramsingh to retreat. At one period, he had evidently lost his way, and become confused on the glacier, and on quitting it, he turned round, joined his hands, and made a low reverence towards Nunda Devee; on the intensive principle invented by Puff in the critic of firing six morning guns instead of one, I own I was strongly tempted to imitate and even surpass my guide by making six vows in the same direction, but there was no time for formalities, and the goddess who is pacified for a million of years by the sacrifice of a man, is not to be bearded with impunity in her own den; so, without further ceremony, we started, and passing Dooglee, in one hour reached Diwalee, in an hour and a half more, under pelting showers the whole distance. Messrs. Hort and Powys had arrived from Khathee an hour before me.

The existence of alternate diurnal currents of air to and from the Himalaya, the first of which I experienced to-day, resembles in its regularity, the land and sea breezes of many tropical coasts, and is a fact which all travellers in these mountains must have remarked, though none that I am aware of, has recorded or attempted to explain it.* All along the exterior ranges we find that during the warm season, at least, about 9 or 10 A. M. a strong gale sets in from the plains, well known at Mussooree as the "Dhoon Breeze," and equally prevalent and grateful at Nynee Tal, &c. from 2 to 3 P. M.; it reaches the snowy range, blowing violently up all the passes from the Sutlej to the Kalee;

* Mr. Batten informs me that the Rev. J. H. Pratt has written an essay on this subject in a literary Journal of Cambridge; which I have not had the advantage of consulting.

and so furious in Hoondes and upper Kunawar as to preclude the use of pitched roofs, and to render it necessary to secure the flat ones by heavy stones. On the other hand, along the base of the mountains at Hurdwar, Dikkolee (on the Kossillah), Bhumouree, and Burmdeo, we find, so far as my own experience goes, that from November till April, from perhaps 2 till 7 or 8 A. M. a perfect hurricane rushes down the great vallies *from* the mountains, and being greatly cooler than the surrounding air, and soon followed by an oppressive calm, is perhaps the cause of much of the insalubrity of the tarai; as the reverse gale probably originates *much* goitre in the mountains. The explanation which suggests itself is as follows: Sir J. Herschel states that at 10,600 feet about the sea, one-third of the atmosphere is below us, and at 18,000 feet, one half. For the sake of round numbers, let us assume the attenuated stratum of air resting] on the Himalaya and Tibet, to be deficient by about half the weight of the whole atmosphere; during the day time, owing to the heat reflected and radiated from this elevated plateau, and the rocks and snows of the Main Chain, (a source of heat wanting of course to the corresponding stratum over the plains,) this is further expanded or rarified, so that it becomes specifically lighter, and ascends. Hence, owing to the great pressure of the whole mass of the atmosphere incumbent on the plains, the air thence is forced to flow upwards, to fill the comparative vacuum, and the current is generated, which commencing at the outer range, reaches the higher one in the afternoon, laden with vapor, which is there condensed by the cold, and astonishes the traveller by those storms of rain and snow which succeed, and are indeed a necessary result of the serene morning. It is for this reason that the guides are always so anxious to set out betimes, so as to cross the passes by noon. It may be objected that as the process of rarefaction commences at the summit of the mountains, and must be gradually communicated to each stratum beneath, where it comes in contact with the heated ground, the current should begin instead of ending at the highest elevations; but it would appear probable that the movements of the air from this cause is trifling; the main agency being the pressure of the atmosphere on the plains, which necessarily commences its operation with the outer ranges. During the night, the atmosphere, like Penelope, undoes what it did by day. From the absence of the sun, the mountain air is cooled and condensed,

and, recovering its former bulk and weight, descends, to restore the equilibrium by forcing the aerial invader back to the plains, the process being no doubt greatly aided, or rather caused, by gravitation as well as by the expansion and consequent diminution and negation of pressure which the plain atmosphere has itself experienced from the intense heat of the earth and sun's rays by day, the former of which is dispersed into the air during the whole night, and till about sunrise, when the gale from the mountains attains its maximum of intensity.

Both "up and down trains" must be much modified and complicated by the direction of the mountain ranges and great vallies; these last determine of course their usual route, and by their narrowness and depth tend greatly to augment the force of the wind. At Bheemtal, 12 miles from the plains, its effect is but too sensible; but at Ramgurb, as much farther in, it is unknown; the Ghagur serving as a most efficient screen in this direction. The entire career is run out in about 100 miles; this distance is so short, and the anomalies from the irregularity of the ridges so great, that the effect of the earth's rotation may be unappreciable; if not, the day breeze coming from the south, where the velocity of rotation is greater, ought to blow from the south-west and the night one from north-east: and this is certainly true at Almorah of the first.*

* The climate of Ludakh, 11,000 feet above the sea, as observed by Moorcroft, fully bears out the above theory. Frost and snow continue from the beginning of September till that of May. "In May, the days become warm, although early in the morning the rivulets not unfrequently present a coat of ice, and this may be observed in some spots even in June, whilst on the loftiest mountains, snow falls occasionally in every month of the year. During the summer months, the sun shines with great power, and, for a short part of the day, his rays are intensely hot. At Lé, on the 4th July, the Thermometer in the sun rose at noon to 134°, and on the march to Piti, it stood ten degrees higher. At night the temperature was 74 degrees. Even in the depth of winter, the heat of the sun is very considerable for an hour or two, and the variation of temperature is consequently extreme. On the 30th of January, the thermometer shewed a temperature of 83° at noon, when it was only 12½° at night. The great heat of the sun in summer compensates for the short duration of the season, and brings the grain to rapid maturity. Barley that was sown in the neighbourhood of Lé on the 10th of May, was cut on the 12th of September; and at Pituk, five miles from Lé and about 800 feet lower, in a sheltered angle of the valley, the same grain is ready for the sickle in two months from the time of sowing. (Travels, I. 268) Much further eastward, Captain Weller

The trade and similar periodical winds are of no mean benefit to the navigator ; the use of their mountain counterparts is unknown, unless it be to scour the deep vallies of their malaria. One abuse of them was too evident ; the locusts were everywhere taking advantage of them to penetrate into the mountains, and were in considerable numbers, living, dying, and dead, at the very head of the Pinduree glacier. How strong must be the instinct of wandering and self-preservation in these scourges, when, in search of sustenance (which they would scarce find in Tibet,) it thus leads them, as the moth in the case of light, to their own destruction amongst the ice and snows of the Himalaya ! But so long as rational men are found to resort to Sierra Leone, &c. on the same errand, and with the same fate, though from an opposite cause, we have not much room to boast of our superior discretion. The natives of Kumaon consider that the flights of locusts, which have in late years, done immense damage to their crops, are produced from the sea. I know them to be produced in Rajpootana ; on our return to Almorah on the 2nd October, we found vast swarms of them settled on the fields and fresh ones coming from the south and south-east ; fortunately the harvest was too advanced to admit of much injury.

September 26th.—Walked to Khathee in 3½ hours, with soft showers at intervals ; and heavy rain from 4 to 6 P. M. ; at one of the bridges we met the Putwaree Mulkoo, or Mulkih Singh, a regular short, thick-set, mountain savage, not unlike one of his own bears.

September 27th.—To the Tantee chalet (now deserted) on the Dhakree Benaik, which we walked in 3½ hours. From half-past 12 till 6

was told that in May and June "it is hot below Dhapa (Daba,) that sealing wax melts if carried on the person during the day," a significant hyperbole. Moorcroft suffered severely from fever in the same district, probably from these rapid extremes.

During the rainy season of the Indian Himalaya, the prevalence of clouds and moisture, by equalizing the temperature, must in a considerable degree, neutralize these currents : but to solve the problem satisfactorily, careful and extended observations are requisite, with the comments of an experienced meteorologist ; several necessary elements, evaporation, electricity, &c. probably playing no mean rôle in the phenomena.

In the Arctic regions, Dr. Richardson found the radiation of heat from the snow in spring to exceed greatly that from the soil in summer : and in the Himalaya, the "Dhooa Breeze" is most regular and powerful from April till June.

P. M. we endured a heavy storm of rain, hail, and thunder, from the west, followed by a clear and very cold night; our tent, which withstood the 75 hours rain at Diwalee, leaked in half a dozen places at once to-day, such was the deluge that fell. Our people fortunately had the huts to shelter them, for, notwithstanding every precaution, several fell sick every day with fever, so that our march resembles the retreat from Walcheren.

September 28th.—After enjoying the view from the Pass, we descended to Sooring in $2\frac{1}{2}$ hours; slight rain in the evening.

September 29th.—To Kupkot, in $4\frac{1}{2}$ hours, breakfasting at a hamlet about half way, called Dooloom. Some very large species of orchideae, probably *Dendrobium*, *Phaius*, *Cœlogyne*, &c. grow on the rocks and trees in this stage. The road at the landslip not yet replaced; but after the paths above, it was trifling; one's feet seem gradually to acquire a sixth sense from practice over dangerous ground; a portion of the mind descending and taking up its temporary abode in the toes; as the bat is said to have a sensibility in its wings which enables it to avoid walls, &c. in the dark. To-day was fine till 4 P. M. when a strong cold wind blew down the valley accompanied with light showers for about an hour. The rice-crop is now being cut here.

September 30th.—Walked to Bagesur in $5\frac{1}{2}$ hours, breakfasting half-way at the Mundilgurh Torrent, where we met Messrs. Norman and Weston on their way to Pinduree. The Puharees are quite aware of the value of a *mid-way* meal. A friend once asked one of them how far such and such a place was off; and the reply was—"Two kros if you have dined, three if you have not."

The Surjoo has fallen six feet since we left Bagesur; the temperature of the town is considerably lower, but the people look sickly and sallow from fever. No rain to-day, for the first time since we started, 21 days since.

October 1st.—To Sutralee in $4\frac{1}{2}$ hours, of which $2\frac{1}{2}$ were expended in reaching the summit of the Ladder Hill, exclusive of a full hour's delay in crossing the "infamous" Gaomutee, now just fordable, mounted on a ferryman's back, who was obliged to have a second man to steady him. That such an obstacle on the main line of commerce between Kumaon and Tibet should remain without a bridge, is accounted for by the circumstance that little communication takes place in the rainy

season; and that during the rest, the stream is only ankle-deep; but when the iron-mines and foundries of the province are once in operation under the management of the new company, let us hope the traveller will be expedited on his way to Pinduree or Milum by one of the Suspension Bridges, the glory of Kumaon above all the rest of the Himalaya taken together.*

We breakfasted at the Dhurmsala, under a very elegant arbor of Jessamine, but clouds again disappointed us of the desired view of the snowy range. Noticed the *Vitex negundo* in various places to-day; indeed it is common in Kumaon, as in all the outer hills, and is here called Shiwalee. An intelligent bráhman of Almorah assures me that THIS is the Sephalica of Indian poetry, and brought me the Amurkosh to prove his point, where it certainly was explained by "Soovuha"—"Nirgædee" and Neelika; with *niwar* as the Hindee. For Nigoondee, H. H. Wilson gives us "*Vitex negundo*," and "*another* plant, Neel-sephalica," but does not say what this is. "Neelika" though denoting "blue," he follows Sir W. Jones in explaining by *Nyctanthes arbor tristis*, though no blue *Nyctanthes* was ever heard of. Sir W. Jones was assured by his Bengali pundits that this tree was their Sephalica, though he quotes the Amurkosh as stating "WHEN the sephalica has white flowers," &c. which the *Nyctanthes* always has. It grows wild abundantly in Kumaon, but Roxburgh could never find it so circumstanced in Bengal; the original name is therefore more likely to be preserved in the mountains, where so far as the bráhmans are concerned, *Parjat* is the only one extant, and this also Sir William Jones was aware of in respect to other parts of India. He also gives *Nibaree* as the vulgar (Bengal) term for the *Nyctanthes*; but in Dr. Voigt's catalogue, this is annexed to *Cicca disticha*. The Puharee "Shiwalee" is an easy and regular corruption of Sephalica, and Sir William describes it in terms which might well attract the praises of the poets—"a most elegant appearance, with rich racemes or panicles (of odoriferous, beautifully blue flowers, Voigt,) lightly dispersed on the summit of its branches." "Soovuha" 'bearing well,' may allude to these, or to the aroma of the bruised leaves; but the experimentum crucis of try-

* These bridges are constructed of iron manufactured in Calcutta, and probably smelted in England. The abutments of one over the river Khyrna near Nynce Tal are absolutely built on an iron-mine!

ing whether the "bees sleep in the flowers"—for that is the signification of *Sephalica*, remains yet to be made.

October 2nd.—To Almorah in 5½ hours: total hours from the glacier 32; road distance 83 miles, (in a direct line 52,) giving an average rate of walking, 2 miles and 5 furlongs.

In the preceding notes, the popular name of each tree and plant, where any certain one exists, is commonly added, with the view of enabling those who visit the same or similar localities, to acquaint themselves, if so disposed, with the more prominent characteristics of this department. "The naturalist," says Sir William Jones, "who should wish to procure an Arabian or Indian Plant, and without asking for it by its learned or vulgar name, should hunt for it in the woods by its *botanical character*, would resemble a geographer who, desiring to find his way in a foreign city or province, should never enquire by name, for a street or town, but wait with his tables and instruments, for a proper occasion to determine its longitude and latitude."

Account of the process employed for obtaining Gold from the Sand of the River Beyass; with a short account of the Gold Mines of Siberia; by Capt. J. ABBOTT, Boundary Commissioner, &c.

It has long been known that the sand of the river Beyass yields Gold Dust to the sifter. A description of the process and of the value of the produce may possibly be interesting; and if it should lead to search for the original veins of this precious metal, the result may be valuable as well as curious.

From the mountain district of Teera to Meerthul, where the Chukki joins the Beyass, and the course of both is nearly southward, gold dust is found in the sands of the latter pretty equally distributed. The boulders and pebbles in the river channel from Ray to Meerthul (the greater portion of this interval) are generally siliceous, quartz, porphyry, sandstone, gneiss, with occasional granite—and oftener pebbles of jasper. These appear to be debris of the Brisna cliffs and hills bordering the river, with exception perhaps of the gneiss, which I suspect is carried down from the older formations. My impression is