

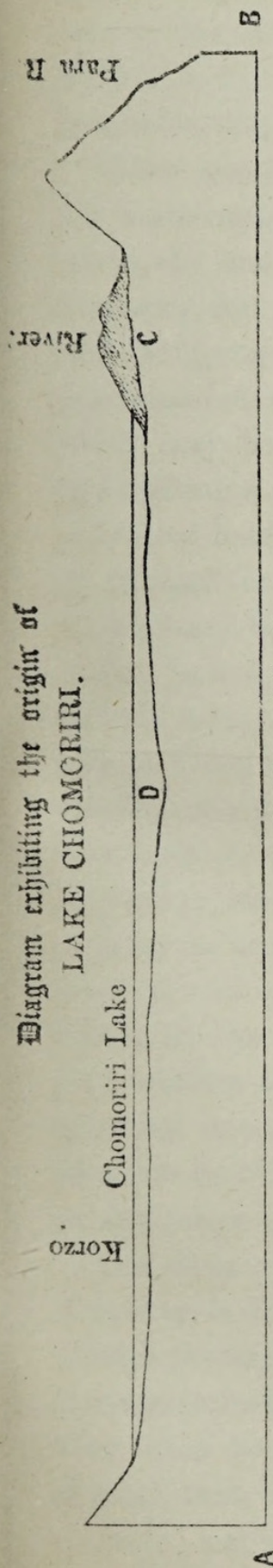
*Notes of a trip from Simla to the Spiti Valley and Chomoriri (Tshomoriri) Lake during the months of July, August and September, 1861.—By W. THEOBALD, Esq., Jnr.,*

The object for which the present trip was undertaken, was to acquire some definite information regarding the interesting fossiliferous deposits, both of Palæozoic and Mesozoic age, known to exist in the Spiti valley and the higher Himalayas, to ascertain as far as a cursory examination would permit, their extent, and relations to the older groups in contact with them, and to collect such a series of fossils from them, as should facilitate the determination of their age in the geological scale, and thereby afford a key for the approximate determination of the age of those older groups, in which fossils are either rare or altogether wanting. These objects have, I trust, been to some extent accomplished, though I shall not now touch on geological questions, which, with the result of the examination of the fossil collections, will appear elsewhere at some future period. In the meanwhile I have put together a few notes of a general character, in hopes that they may prove of some interest or service to any one about to travel over the same ground.

I may, in the present place, perhaps be expected to allude to two papers by Capt. Thomas Hutton, entitled “Journal of a Trip through Kunawar, Hungrung and Spiti, in Vols. VIII, and IX, of the Asiatic Society’s Journal for 1839 and 1840,” and a “Geological Report on the valley of the Spiti and of the route from Kotghur, in Vol. X, of 1841.”

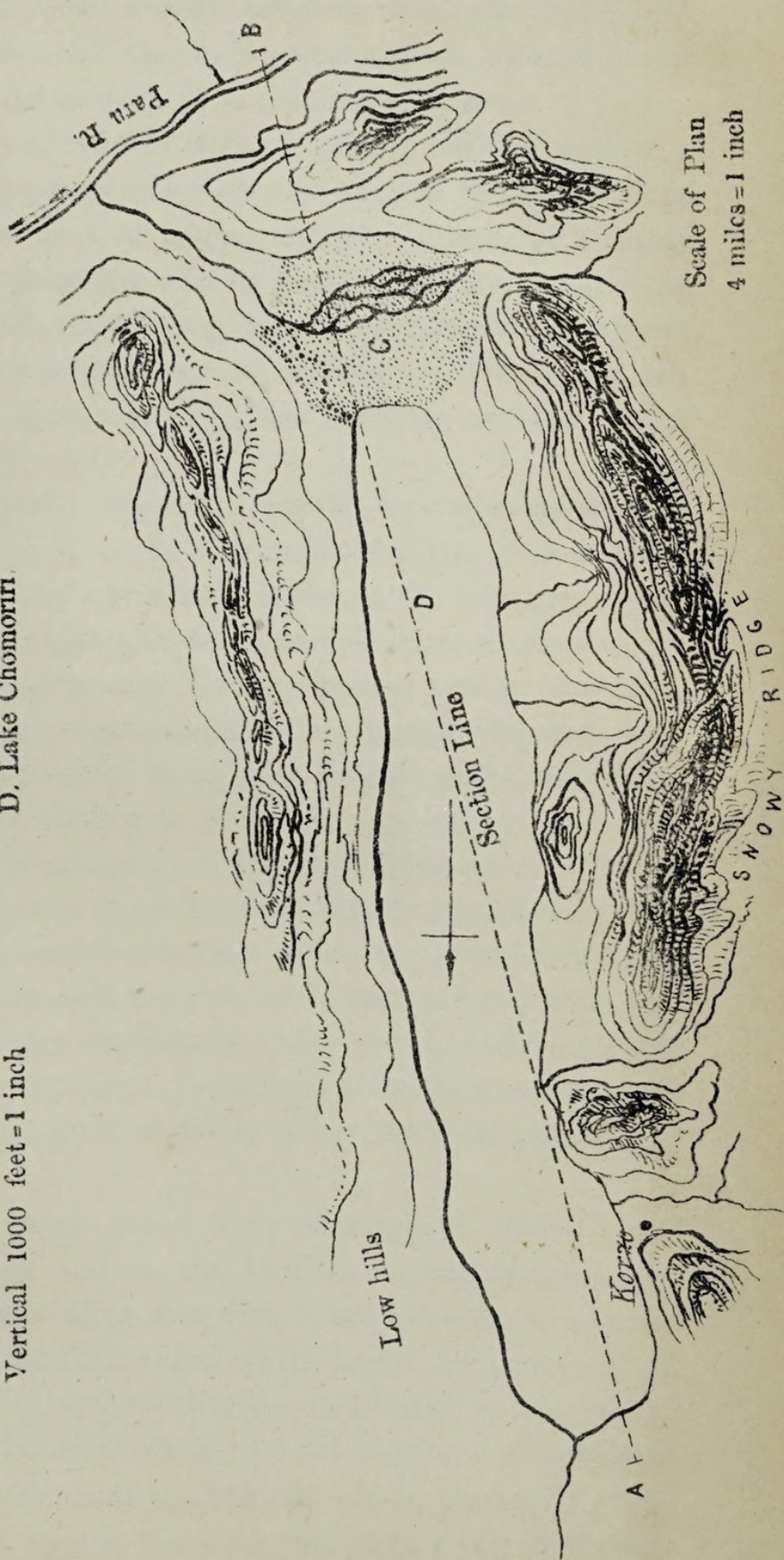
Of the first of these, I have little to remark; but, as regards the second, I must deny the applicability of the term *geological* to such speculations as it presents. Capt. Hutton has, in fact, fallen into the not uncommon error of confounding cosmogony with geology, although they have no more in common than the alchemy of the Middle Ages possesses with the science of modern chemistry. To attempt the serious refutation of some of the views of Capt. Hutton, on subjects connected with geology, would be almost as hopeless, not to say absurd, as for a surgeon to discuss the treatment of Aneurism with a man who denied the circulation of the blood; and I must, therefore, excuse myself from entering at any length on the merits of the views of cosmogony and creation set forth in the above paper: but they are, I fully believe, as ingenious as

# Diagram exhibiting the origin of LAKE CHOMORIRI.



- A. B. Line of Section.
- C. Shingle accumulated by an affluent to the Chomoriri Valley.
- D. Lake Chomoriri.

Scale of Section.  
Horizontal 4 miles = 1 inch  
Vertical 1000 feet = 1 inch



Scale of Plan  
4 miles = 1 inch



such speculations usually are, and, by originality and bold disregard of the most obvious conclusions of geology, deserve honorable mention among the choicest of those similar schemes, which the late Hugh Miller has rescued from oblivion, and embalmed in his witty and laughable chapter on the geology of the Anti-geologists.

When starting myself on this trip, I greatly felt the want of a few hints regarding the equipment requisite; such as the best form of tents, the amount and sort of stores, and the number of servants necessary, &c. I shall, therefore, offer a few preliminary remarks on such subjects, many of which must appear very trivial to any one unacquainted with the vicissitudes of Himalayan travelling, but which may be better appreciated by the traveller on the eve of undertaking a similar journey.

It need hardly be stated, that coolies are the most convenient kind of carriage for the Himalayas; though in many parts, ponies, mules, or yaks may be substituted; as a rule, however, all baggage should be so adjusted, as to be capable of being carried by a single man, as though along made roads heavier loads, requiring two or more men, may be found convenient, such loads are very unsuitable, and occasionally utterly impracticable, along the difficult paths, which will inevitably be met with during a prolonged journey in the hills. Regarding coolies, there is scarcely any serious difficulty in procuring as many as may be required in moderation, though the plan which I adopted, and it is one possessing certain advantages, was to engage in Simla, for the entire trip, half the number of coolies I required; this plan involves a little extra expense in many ways, and is strictly speaking unnecessary, but from experience I should recommend its adoption by others, and should certainly follow the same plan myself on any future occasion.

The daily rate of wages for a cooly throughout Bissahir and Kunawar is four annas, and in the British district of Spiti two, though the shorter stages often met with in Spiti causes the price of carriage in reality to assimilate nearer than might be supposed. I have often heard the higher rate of wages in Bissahir complained of as exorbitant, and our Political blamed for not causing a reduction to be made; but very unreasonably so, I think. It is frequently urged that, as the majority of men in the hills who carry a traveller's baggage from day to day, are employed in and gain their livelihood by

agricultural pursuits, half of the present rate would be an adequate and acceptable remuneration to the men, whilst at the same time a great pecuniary relief to the traveller. Parties who argue thus, would probably esteem it a more thorough sort of relief, to at once resort to the old "begaree" system of gratuitous or forced labour, once recognised and prevalent in the hills when European travellers were rarer than at present; and as no one class of the population could gain a living by this inoppressive system (to the pockets of the traveller), the entire population, who in turns would have to surrender their services, would be led to entertain an appropriate sense of respect for their vagabond lords and of the manifold benefits conferred by their presence. The time has, however, arrived for native customs of this description to give place, and for us to regulate our conduct towards natives of this country by rules consonant with European rather than Asiatic ideas. Endeavouring, therefore, to estimate the amount of what may be considered a fair day's pay for a fair day's work, I confess that four annas does not appear to me an extravagant charge; that is, for an average march of fourteen miles, often along extremely bad and difficult roads, over which the cooly has generally to return empty-handed.

A far juster ground of complaint than the rate of cooly hire or wages, is the capricious rate at which flour is sold to the traveller, and as a matter of justice, I was forced to make up the difference to my servants, when the price rose above nine seers for the rupee, as otherwise their wages would have barely sufficed, in some places, to provide them with flour alone, since in some villages of Kunawar I got no more than five seers for the rupee. This I believe to have been an imposition, though it must be remembered, that wheaten flour is not the staple of the district in these places, but is imported for the use of travellers. At Korzo, at the western extremity of lake Chomoriri, I got four and a half seers, and was told that it was no more than twelve seers per rupee at Lè or Ladak. One circumstance which proves that this was not an altogether fictitious price, put on for the purpose of profit, was that, though paying this high price, I was unable to get as much as I required, and was forced to take rice and sheep to feed my people, as well as flour.

By order of the Maharajah, I believe all officers attached to the Grand Trigonometrical Survey, in his territory, are supplied at the rate

of forty seers of flour for the rupee, but this is I consider a manifest oppression, though many English gentlemen are not ashamed to avail themselves of a despotic order to live cheaply. When I visited Kashmir in 1853, I sometimes had to contest with the native officials about supplies, coolies, &c., but they generally concluded their own demands by observing that *I* was their Hakim, and that the Maharajah would slit their noses if I had any cause of complaint. In like manner the headman of Korzo frankly declared, that if I chose to take provisions by force I could do so, at my own rates, but that he could not sell to me freely at a lower rate than one rupee for four and a half seers. Other travellers I know got their flour here at one-third of this rate, but I consider it neither just, dignified or politic, for English gentlemen to travel through native states dictating their own rates, and brow-beating the authorities in virtue of their being Englishmen. On referring moreover to Cunningham's Ladak, I see he states sixteen seers as the price of flour at Lè in 1847, so that twelve seers is not probably a greater advance in price than would naturally take place in such a famine year as 1861, and not to be compared with the rise in price in Hindustan. The staple supplies of flour, ghee, salt and mutton are nearly every where procurable, but all other articles of consumption, as sugar, tea, spices, rice, onions, &c., must be taken from Simla in sufficient quantities for the trip, being rarely procurable elsewhere. The following articles will also be found very useful, either in case of actual short commons, or by way of change from the everlasting mutton and chupatties, viz., preserved soup and vegetables, spiced beef and sausages in 1 lb. tins, sardines, plain biscuits, a small cheese, and some pigs' cheeks or pieces of bacon of about 6 lbs. each, which last keeps well and will always be found useful.

Wine or spirits, though not requisite at low elevations, are greatly needed in the higher ranges and plains of Ladak, and it is a real hardship to run short of them in tents, when the thermometer is at or near 30°. For a three months' trip, however, not more than seventeen to eighteen coolies are requisite. I took but thirteen, one of them taking a servant's tent, which is not requisite in Kulu or Bis-sahir, but is absolutely necessary in the colder parts of northern Kanawar and Ladak.

A comfortable sleeping pâl which can be carried by one man, (another taking the poles,) will be found most convenient, with a

proper supply of iron pegs, in case of the ground being stony or frozen:—the ordinary blanket tent used by some, lined with wax cloth, being in my opinion inconveniently small, especially if two or more constitute a party. At the same time in no case should the tent be too big for one man to carry.

As regards servants, it is by no means easy to dispense entirely with Hindustanis, though the majority of them are badly suited for hill travelling. Musalmans are far preferable to Hindus, as from the nature of their food they are more capable of enduring the rigour of the climate at a high altitude. One or two men should, however, be added to the party who are familiar with the language of the parts to be traversed, and I found nothing so inconvenient as the want of a man who could hold converse with the people of Spiti and Ladak, which none of my men could do properly.

Another very necessary thing is to be provided with an ample supply of good *English* walking boots, and thick woollen stockings. I found the coarse native stockings, which can be got in Simla, three pairs for a rupee, answer very well, though the European article is of course preferable. I have seen much inconvenience caused from want of proper boots, which wear out with unexpected rapidity in the hills, especially during wet weather, and if the same boots are continued in wear when wet. I have seen it recommended in some work, in case of a new boot proving tight, to break an egg into it *before* putting it on, but a preferable plan I have found to be filling the boot with warm water after it is put on. The surest plan, however, to secure comfort in walking and avoid troublesome blisters on the feet, is to have boots made large enough to admit of two pair of thick woollen stockings being worn with them. The relief this plan affords is wonderful.

Powder and shot are articles which of course must be taken as well as lead, and small quantities of either form very acceptable presents to village headmen and others for any trifling services. The summer time is, however, not the best for sport, as below the forest line the jungle is too thick to enable one to see any distance, and in the higher hills the game is distributed over a large area, which in winter is inaccessible to them and circumscribed by snow.

Throughout Bissahir and Spiti, the people seemed to have little taste for shooting, though numbers of Burrel and Ibex are slaughtered

every year in winter time, as proved by the number of horns which ornament the piles of stones near many of the villages. In Spiti the Burrel horns are common, but I only noticed horns of the Ibex in the Peen valley.

One reason perhaps of my meeting with no game, was from my not going after it, and rarely halting in the same place two consecutive days. Yet traversing unfrequented mountains as I did, without by chance meeting anything, proves the great scarcity of animals, and similar complaints I have heard made by others. The best shooting in fact about Simla may be had along the road. Pheasants being plentiful and Chakor also all the way to Saraon, the farthest Bungalow as yet completed; five sorts in all being procurable, viz., 1st, the Monal, *Lophophorus Impeyanus*, Latham; 2nd, the Argus, *Cerionis melanocephala*, Gray; 3rd, the Koklas, *Puchrasia Macrolopha*, Lesson; 4th, Kalij, *Euplocomus albocristatus*, Vigors; and 5th, the Cheer, *Phasianus Wallichii*, Hardwicke, the last only being a true pheasant, and perhaps the least attractive of the lot. No painting can do justice to the gorgeous beauty of the Monal, the cock of which is resplendent with burnished azure with a golden iridescence, such as the bird of Juno can only rival in the Old World, or those winged gems, the true humming birds, surpass in the New. A handsomer bird, however, in my opinion is the cock Argus with, when living, its superbly coloured gular sack and head lappets and the beautiful contrast which its white spots of unsullied purity form with the rich warm tints of the body plumage. The koklas and kalij are both also eminently handsome birds, that is the cocks in their spring plumage; the hens of all being more sombre-coloured and less attractive.\*

No person starting for the interior should omit a few articles to enable him to preserve any object of interest he may meet with, such as a pot of arsenical soap, four or five broad mouthed stone jars filled with spirits of wine and well corked (good corks are far preferable to glass stoppers) to receive snakes, bats, &c., and a few small glass

\* Any person desirous of procuring skins or other objects of Natural History, can do so by addressing A. P. Begbie, Esq., Simla, as that gentleman has many Shikarries always employed in collecting and preparing skins. A case containing good skins of all the above pheasants and also skins of the snow pheasant, *Tetraogallus Himalayanus*, Chakor, *Cacabis chakor*, and the black partridge, *Francolinus vulgaris*, in all 24 skins, will cost eighty rupees, a price which those who know the expense attending collections, will not consider excessive.

bottles for insects, filled to near the top with spirit; a dozen quires or so of large bazar paper with a couple of pressing boards and straps for ferns, &c.; a broad mouthed glass bottle with a false bottom of card, filled up with ammonia for capturing and killing moths, and pins and a few soft deal store boxes, pill boxes for shells, a hammer and chisel, compass and telescope.

To economise spirit, a jar should be devoted to the reception of recent captures, into which all animals may first be placed *after removing the entrails*, and allowed to remain for a couple of days. From this jar, they may then be transferred to a store jar, the spirit of which, by this plan, will not require to be changed, the spirit in the first jar alone requiring occasional renewal, as it gets foul by use. Unless an animal is opened and the entrails extracted, it is hopeless to suppose that it will keep well, as the access of the spirit is not sufficiently free to effect the preservation of the contents of the abdomen, not to mention the saving of space as well as the better preservation of the specimen this simple operation secures. All small mammals and lizards, and snakes up to 3 or 4 feet in length are most effectually and easily thus preserved.

It is a mistake too to suppose, as some people do, that a skin can be properly prepared at any time, if once dried. No skin can be properly prepared that has not been preserved with arsenical soap when fresh,—I mean for museum purposes, as of course a coarse hide may be tanned at any time,—and it is best, therefore, never to defer the process till next day, however tired one may be, if the specimen is of interest; neither is it safe to trust to a servant in such matters. Some small work, however, on Taxidermy should be procured by any one who has not previously made the subject a study, and is at the same time anxious to collect during the trip. Skulls of animals are comparatively easy to procure and carry, and are always worth so doing; but most people adopt a ruinous plan to prepare them, viz., by macerating in water or burying them. This may clear them of flesh, but it will cause the teeth to fall out. Whilst travelling, the best plan is simply to pare off the flesh and dry them, with the ligaments and lower jaw attached, in the sun, extracting the brain through the occipital foramen, without however enlarging the aperture. By this means the teeth remain fixed and the skull can at any subsequent period be properly cleaned and whitened with one or two coats

of whitewash put on and brushed off. Or, if left undisturbed, the small beetles and flesh eating larvæ will very beautifully clean in this country heads thus dried with the flesh on them. The horns too of the sheath-horned ruminants (antelopes, sheep, &c.,) require to be touched with some preservative, especially where inserted in the skin, as they are otherwise liable to be eaten and disfigured by insects.

*July 7th, Mahásu.*—Having completed my preparations, I left Simla on the 7th of July, and marched as far as Mahásu, the first bungalow on the new road. As usual on first starting, I had some difficulty with the coolies, some of the loads proving too heavy, and I at that time having several double loads carried by two men, a plan productive of much annoyance, and which I afterwards abandoned. The bungalow, like all those along the new road, was a very clean and comfortable one, and prettily situated in an open forest of the usual character of the pine and cedar forests around Simla. As far as Bowlee bungalow, the road is excellent, and the ascents and descents are mostly very gradual. Between Bowlee and Saraon (a few miles beyond which the road terminates abruptly) the road is generally good, but contains some very long and steep ascents; the Nogri bungalow being situated on a feeder of the Sutlej at about the height of Rampore, and hardly, I should suppose, in a situation exempt from malaria during autumn.

The views obtainable from many parts of this road are beautiful in the extreme, the Sutlej being often seen winding its way many thousand feet below the road, through a wild rocky glen, bounded on either side by precipitous mountains, clothed to their very summits with primeval forest. In other places, extensive patches of cultivation and thriving villages may be noticed, embosomed in fruit trees, among which the apricot, walnut and peach are most conspicuous, and whose waving crops of bátu, of a deep crimson when ripe, offer a striking contrast to the paler and more subdued tints of other cereals. The hills round Simla, however, are in many directions singularly bare of trees, the station itself being rather centrally situated in a wooded tract of rather circumscribed dimensions. All travellers in the Himalayas are acquainted with the very capricious manner in which one face of a hill will be clothed with forest, whilst the rest is bare; but much of the bareness of the hills round Simla is, I think,

unquestionably produced by clearing ; and one of the most disagreeable sounds to me, occasionally to be heard in Simla itself, is that of the woodman's axe slowly but steadily clearing a way through those umbrageous forests, at present the ornament and glory of the station. Closely connected with this subject is that of the supply of water, which of late years has been found to fail and prove inadequate to the wants of the inhabitants ; this may in part arise from the growth of the place, but the actual supply of water furnished by the springs has, on undoubted testimony, alarmingly diminished of late years. The authorities have driven a tunnel into the hill side not far from the Church, with the view of tapping fresh sources of supply, but taking the nature of the ground into consideration, I have no great hopes of the success of the plan. A far more certain and practicable method, it seems to me, would be to construct a series of dams across the narrow nullah intersecting the station, giving rise thereby to a number of small pools one above the other, whose aggregate capacity would be very considerable, some of which might be reserved for drinking, and the others for washing and general purposes. As the nullah has a rocky bed, no difficulty would be experienced in constructing masonry dams of the requisite strength and proportions. A few miles from Simla the road passes through a tunnel of some hundred yards in length, excavated in massive schists, but very wet and slushy under foot from incessant drippings from the roof, to drain off which no provision appears to have been made.

8th, *Fagu*, 8718 ft.\*—This bungalow is situated on the old road, but is much frequented being an easy march from Simla, and though small, prettily situated. The road between Mahásu and Fágú is well wooded and very picturesque, the road in many places affording a

\* All heights marked thus \* are from observations made with two carefully compared boiling-point thermometers by my colleague Mr. Mallet, and the few taken by myself are made with an ordinary thermometer corrected by comparison with the above instruments. The tables used in calculation are Boileau's tables published at Meerut in 1849. It is important to state this, as the tables of Col. Sykes supplied with the boiling-point thermometers, (Casella's Thermohypsometer) give a much too low result, amounting at the Parang Pass to a difference—991—compared with result of a calculation on the same observation by Boileau's formula, which, as far as my scanty means of verification go, appears to give the more correct result. The following are the heights determined by my colleague Mr. Mallet in a part of the valley unvisited by me.

Shalkar, 10089. Changrizang, 12420. Huling, 10598.

Sumra, 10624. Lari, 10845. Thabo, 10804. Po, 11424.

The heights are those of the camping ground of the respective villages.

profusion of wild strawberries which, though of a beautiful colour, are watery and insipid. Near Fagu I first obtained two species of limax which I believe are undescribed, and which are not uncommon along the southern side of the Sutlej at elevations between 6000 and 9000 feet. The largest may be thus described:—

*Limax altivagus*, n. s. Corpore limaciformi, pallio lente-granuloso, dorso rugose reticulato, more frondis brassicæ, colore virescente-fuscosive lutescente-fulvo, interdum nigrescente, et rarissime pallide aurantiaco pallio, minus colorato corpore. Tentaculis quatuor nigris, capite nigro, infra pallescente. Ano ad dextrum latus pallii, prope marginem posito, ad mediam partem vix attingente. Longitudinis (corpore extenso) 9 unc. Habitat montibus cis-Sutlejensibus prope Fagu Narkanda, Saraon &c. 6000 ad 9000.

This limax is rather variable in colour, and large specimens, when in motion and extended, exceed 9 inches, though their ordinary dimension is about 6. It feeds on fungi.

The second species of limax is much smaller and rather more elegantly-shaped, and occupies the same tract of country, and is perhaps rather more numerous, though the first is far from uncommon.

*Limax modestus* n. s. Corpore limaciformi, postea acuminato, colore cinereo, fuscis punctis notato; dorso duobus lineis maculosis cateniformibus ornato, a sese et a margine equidistantibus et a pallio usque ad extremitatem extensis, spatio his lineis incluso paullo fuscente et elegante fuscis lineis striato et marmorato. Tentaculis quatuor rubro-fuscis. Longitudinis  $1\frac{1}{2}$  unc. Habitat cum precedente.

*Vitrina monticola*, B. also accompanies the above. The animal is about 2 inches long, colour pale reddish brown, paler beneath. Tentacles dark. Spire covered by mantle. A thin dorsal keel down the body in front of the shell; shell carried in the centre of the body. Tail compressed, obliquely wrinkled, and truncated. Anus situated at the extremity with a small overhanging tentacular pore.

This vitrina is very generally distributed, though individuals are nowhere numerous, and it appears to be the favourite food of the toad.

9th, Theog.\* 7192 ft. A short march to the next bungalow on the new road, distance about six miles. I was much annoyed at this bungalow, as well as at some others, by the multitude of house flies which at this season are perfect pests. A pair of swallows had com-

menced a nest in the verandah, but did not appear to prey on the flies which swarmed in the rooms, though it may have been timidity which prevented their entering. Along the road, one or two species of flower-eating beetles were common, and exhibited considerable agility and powers of perception, flying away readily on any attempt to capture them. Towards dusk, numbers of a beetle having the heavy flight of our English melolontha made their appearance, but it was too dark to capture many, though flying round the bungalow in considerable numbers.

10th, *Matiána*, 7700 ft.\*—A rather pretty march, the road winding round the head of the deep valley beneath Theog. Pheasants are plentiful, and in the glens I heard the bark of the kakar (*styloceros*), but the vegetation was too thick to afford much chance of sport to a single gun. Musk deer are found near *Matiána*, and in winter time bears.

11th, *Narkanda*, 8796 ft.\*—A longish march, but along a very pretty road: indeed no part of the hills I think prettier than the country round Narkanda. The bungalow is situated on the ridge separating the drainage of the Sutlej and Jumna, and close to the verge of a magnificent forest. From the verandah a fine view is obtained of the lower slopes of the hills, leading down to the Sutlej and the village of Kotgurh at which is a resident Missionary (recently deceased), who has a tolerably attended school near the dâk bungalow. The mission house is a neat building with vines trained over the verandah, and the native catechist is also provided with a very neat cottage close by. Narkanda being the last place at which potatoes are procurable, the traveller should lay in a supply there, as no sort of vegetable is procurable in the higher hills, except the green leaves of the bātu which form tolerable spinage, and the young shoots of fern which are not unpalatable. About Narkanda many *rous* trees are found, which make capital walking sticks, the wood being hard and straight grained. Hazel trees are also plentiful, the nuts ripening about the end of August.

12th, *Kotgurh*.—After leaving Narkanda, the road winds through fine forest, many of the pines and cedars being truly magnificent trees. Kotgurh is situated on the old road at an elevation, I should think, of less than 6000 ft., and about four miles from the Sutlej. The first half of the march is along the new road to a spot where a small

wooden temple is erected, where the footpath to Kotgurbh branches off. The descent from this is in places very steep, and after rain rather difficult, from the slippery nature of the stiff yellow clay over which the path lies. At Kotgurbh, besides the Missionary stationed there, is a gentleman of the name of Berkeley who is engaged in tea-planting; and a retired officer, named Begbie, also has a house in the neighbourhood which he occasionally occupies. Mr. Berkeley's house is near the highest limit at which the tea-plant will thrive, and his chief plantations are at a somewhat lower level; but the quality of the soil has also considerable influence, and varies considerably, probably according to the nature of the rock immediately beneath it. Kotgurbh, from its low elevation, is hot and sultry, and not exempt, I should think, from malarious fever. The vegetation round it is rank in all open spots, and rice is grown just below it. Bears and leopards are found in the forest above it, the last animal being far more numerous than might be suspected. Several have been taken in traps near Simla this season, (as many as three in one month by the same individual), but yet it is an animal which is never seen abroad in the day time. The bears are the black hill bear (*Ursus Himalayanus*) a perfectly distinct animal from the black bear of the plains, and considerably smaller, to judge by the relative size of the skulls of the two species. The plain bear is in fact another genus (*Procheilus labiatus*) and the skulls may be readily discriminated, as the former has six incisor teeth in the upper jaw, whilst the latter has but four.

15th, Nirt-chokee.—Nirt is situated on the banks of the Sutlej, and the descent to it from Kotgurbh is in many places extremely steep and difficult. The Sutlej is here under 100 yards broad, and rushes over a rocky bed, the whole valley being so contracted as to afford few open patches fit for cultivation on either side. At this low level the heat is very great, and the hills are covered with the same sort of cactus which occurs round Subathu and Kasouli. Pipal trees are also met with near villages, but all of them planted, and none occur much above Rampur. Remnants of terraces of old river shingle may here and there be noticed at different heights; some at not less than 500 feet above the present level of the river. These evidences of former river action have induced some writers to indulge in fanciful speculations respecting vast cataclysms, and the sudden disrup-

tion of rocky lake barriers along the course of the Sutlej, but they are rather to be regarded as a guage whereby we may estimate the extent to which the Sutlej has deepened its channel by the ordinary process of erosion during the most recent geologic periods. Cataclysms produced by landslips or the descent of glaciers into a river bed, however devastating in their effects, are quite incapable of giving rise to such regular deposits of sand and shingle as constitute the elevated terraces along the Sutlej; neither have I anywhere seen deposits of such a nature as to induce the belief of their lacustrine origin, as they every where present the appearance of ordinary river sands and shingle, such as in the present day are forming in existing river channels. In the village is a Hindoo temple in a ruinous condition, with images of Bulls and Lingums, and the whole place presents an aspect of dilapidation and decay.

16th, *Rampur*.—Passed the village of Datnaga, near which the Sutlej is spanned by a jhula bridge. A good deal of cultivation exists hereabouts, and transplanting rice was being carried on vigorously. The town of Rampur is snugly situated within a bend of the river, which here rushes impetuously through a narrow rocky bed, hurrying down numberless pine logs at a rate of some six miles an hour.

Above the town are some commodious native houses, a temple and a large, well built room facing the river, for the convenience of travellers. In the temple are two figures of Devi and some other goddess, with silver faces and a profusion of long hair. When I was there, these images were brought out and paraded, with music and attendants waving chouries over them. They were carried on a litter placed on two very long and elastic poles, supported by a man at either end, after the fashion of a sedan chair; and at intervals the bearers would, by means of the elastic poles, jerk the images violently up and down, causing their long ringlets to fly about their ears in a mad fashion, to the intense delight of the spectators, comprising many of the elders and most of the juveniles of Rampur. This strange manœuvre was, I think, a clumsy attempt to represent the inspiration and actual presence of the divinity in her idol, thereby imparting to it life and motion, as in Bengal the idol of Kali is, during the festival of the Durga Pujah, supposed to be animated by the spirit of the goddess, and is thrown away uncared for, when the “real presence” (to borrow the appropriate catholic phrase) is supposed to

be no longer in force. How clumsy, however, the whole performance, when compared with the somewhat similar, but vastly more refined deceptions of the inspiration of the Pythoness or Priestess of Apollo when delivering the responses of the god.

“ Cui talia fanti

Ante fores, subito non vultus, non color unus,  
Non comptæ mansere comæ, sed pectus anhelum,  
Et rabie fera corda tument, majorque videri,  
Nec mortale sonans, afflata est numine quando  
Jam propiore dei.” *Virg. Æneid. vi. 46.*

I have subsequently been told that this ceremony is had recourse to, when some special visitation is to be averted, and in the present instance was intended to put a stop to the severe cattle murrain which this year has swept the hills and caused immense loss in Bissahir and Kunawar, affecting both cattle, sheep and goats; and these animals had been driven away from most of the villages I passed through in the valleys to the higher mountains, in order to escape the disease, which is most prevalent at lower levels. The houses at Rampur are all covered with thick rough slates, and are many of them built in the form of a square, with an open courtyard in the centre into which the rooms open. Cloth and blankets are manufactured here, and a little trade is carried on by means of mules, of which I noticed a good number grazing in the neighbourhood; but the bazaar is wretchedly supplied, and nothing but the most ordinary necessities is procurable.

17th, Gaora.—The road, after quitting Rampur, keeps for some distance along the Sutlej, and then rises up a steep but picturesque ascent to the village of Gaora, prettily situated on a rocky but well wooded slope. The apricot harvest is now being collected, and every house top is seen covered with the fruit spread out to dry. The finer fruit is dried or eaten fresh, but the poorer is heaped together, till it becomes pulpy, and then thrown away, after extracting the stones, the kernels being reserved to make oil. A familiar plant common round Gaora, and recalling many pleasing reminiscences, is the mistletoe, which grows here as luxuriantly on apple trees as in any orchard or park of old England. Blackberries too are tolerably common and very pleasantly flavoured, and also a small berry which grows in astonishing profusion, and is, I think, a species of carissa or some

allied plant. These berries are pleasant to eat either raw or stewed; and their expressed juice is of an extremely dark and beautiful purple, and, when mixed with a proper amount of sugar and spirit, and flavoured with a few peach kernels, forms an extremely elegant liqueur. The hemp plant grows here in the utmost profusion as a common weed, and indeed everywhere in this part of the Sutlej valley below 7000 feet, but does not seem to be cultivated, though the soil and climate appear to suit it perfectly. It being very wet and the ground completely sodden, I preferred putting up in the verandah of an empty cow-house to my tent, though the midges and fleas in such places are usually very annoying. I was provided, however, with musquitoe curtains, which relieved me almost completely from the attacks of these tiny but implacable enemies, and I would advise no one who values a good night's rest, to travel unprovided with this article.

18th, *Saraon*, 6632 ft.\*—A rather severe march, the road about half way descending into a deep valley and ascending again on the opposite side by a very steep and in some places difficult path, and joining the new road a few miles from Saraon bungalow, which is the last one completed along the new road. During the summer months, this is the residence of the Bissahir Rajah, a stout sensible young man who speaks English tolerably, and who rode down alone to the bungalow, on hearing of the arrival of a European, unattended by the ragged mob of followers which natives of his rank usually consider necessary for their dignity to carry along with them.

19th, *Taranda*.—A rather long but very picturesque march, for the first few miles along the new road, through pine forest, or along the sides of precipitous rocky glens opening down to the Sutlej, of which glimpses are now and then caught. The camping ground is situated on the crest of a rather lofty spur, in the midst of a forest of really magnificent cedars, at some little distance above the village.

20th, *Nachár*.—About six miles from the last camping ground is the Paindah bungalow which, though finished, is not regularly opened. Before reaching it, the road descends into and crosses a large valley, on the opposite side of which the bungalow is built. Bears, I believe are found in the vicinity, and I have rarely seen ground which I should think would afford them better cover. Before reaching Nachár, a large village is passed, situated on the verge of a forest of the most magnificent cedars I ever beheld. The profound stillness which

reigned here, combined with the subdued light caused by the spreading boughs of these majestic trees, (the only sound indicative of life being the melancholy coo of a wood pigeon,) exerted a very solemn influence on the mind, such as all must have experienced who have trodden alone the depths of a pine forest either in India or Europe. One of the largest of these trees measured 36 feet in girth, and at about 10 feet from the ground divided into two trunks, each in itself a tree of superb dimensions. No other tree near the road approached this in size, but numbers of single trees must have measured fully 20 feet in girth, and in their growth were as straight as arrows.

By the time I reached Nachár, the rain was falling in torrents, and I was glad to take shelter in a sort of rest house, in preference to my tent which was dripping wet. The building was open on all sides, being merely a pent roof of massive shingles supported by pillars formed of short cedar logs laid cross-ways on each other, and underneath having a sort of kitchen in which the servants found shelter and were enabled to prepare dinner. The houses in Bissahir are usually regular and substantial buildings, built of alternate courses of cedar timbers and rubble masonry, and often two or three stories high, with projecting eaves and a balcony running round the upper story, which gives them much the appearance of a Swiss chalet. They have often pent roofs, formed of a double layer of stout cedar planks or shingles, some three inches or more in thickness, rudely dressed with an axe, and ranged at right angles to the ridge pole. These, as may be imagined, form a very inadequate protection from the rain, but have the advantage of giving ready exit to smoke, through the gaping interstices between the planks. Another form of roof equally prevalent is flat topped and formed of beaten clay. On these roofs grain and fruit are spread out to dry, as opportunities offer for so doing between the showers during the rainy season.

21st, *Chargaon*.—Quitting Nachár the road descends to the Sutlej at Wangtu (or, as it is pronounced, Oángtu) where there is a handsome wooden bridge. The river here rushes through a narrow rocky channel not more than sixty feet broad. On either side two square towers are erected of alternate courses of cedar beams and large stones. From beneath these, three tiers of pine trees project over the river, having a considerable upward slant, and each tier consisting of four large trees a little advanced beyond the one supporting it, the whole

firmly held down by the towers or gateways, which, for greater security, are filled at each side of the roadway with stones to the height of three or four feet. From the ends of the uppermost or most projecting tier of logs, two trees are laid across, spanning the river, and on which a roadway of planks is firmly secured, forming a very safe and easy bridge over which a horse might easily be taken. Shortly after passing the bridge, the Wangur river is crossed, a turbulent brawling stream which descends from the Baba pass and enters the Sutlej above Wangtu. After crossing the Wangur, the road ascends a ridge which is so precipitously scarped by the Sutlej that no path round it exists, though one could readily be made at a small cost and a troublesome climb thereby saved. From the summit of this ridge the road descends gradually to the Sutlej, along which it keeps till near Chargaon, which is situated on a cultivated slope at some height above the river. In some places the road is very steep and difficult, and had been much damaged by the heavy rain of the previous day. Near Chargaon I saw a pair of Goral (*nemorhædus*) and some pigeons, among the superb cliffs overhanging the Sutlej. On the opposite side of the river, the banks were very precipitous and scored by numberless "shoots," down which pine logs would occasionally come rolling and plunging with heavy thud into the river below. So steep, however, is the incline, and so clumsy the mode of sending down the timber, that I think more wood is spoiled, than finds its way into the river in a sound state, and when in the river, the loss among the logs, by stranding or remaining in some eddy or reach till they rot, must constitute a very large percentage on the number that eventually reach the plains. This state of things will of course continue as long as any timber merchant or agent is permitted without any let or hindrance to destroy whole forests, by a reckless system of clearing, having nothing in view but his own profits, and not caring if fifty years hence not a stick remained large enough to make the handle of a broom out of. This is surely a matter calling for Government interference, though a topic I cannot enlarge on here, but content myself with expressing a hope, that something may be effected to retard this wholesale and wanton destruction of our forests, and a remedy not applied only when the mischief done has almost become irremediable.

22nd, *Meru*.—A short march of not more than seven miles. The camping ground, a dirty spot in the midst of the village.

23rd, Chini.—A stiff march, the road often steep and difficult, especially near Chini where it is in some places carried along very precipitous ground by means of stairs and scaffolding. Near Chini saw two bears in the valley beneath the road, but sport must have greatly deteriorated since Col. Markham saw bears in the Busba valley, (across the Sutlej,) feeding literally by dozens on the hill sides. At Chini there is a large, but unfinished and comfortless bungalow, and close to it some fine old poplar trees. The village is wretchedly small, though there is a very large spread of cultivation near, and supplies are dear and with difficulty procurable. Height 9096 feet, the village being about 3000 feet above the river.

25th, Pengi.—A short and uninteresting march, the trees in places dwarfed from the close proximity of the uppermost limit of their growth. On the hills across the Sutlej, the highest limit of trees is sharply defined and is somewhere about 12,500 feet. Poplars, apricots and walnuts plentiful and thriving round Pengi, and also excellent blackberries, or the Kunawar representative of that home fruit, which with the addition of a little sugar formed a very palatable desert. In the vestibule of the temple of Devi at this place, I noticed some fine apricots hung up, which called to mind the ancient Roman custom of votive offerings to the rural deities—

“Flava Ceres, tibi sit nostro de rure corona

Spicea, quae templi pendent ante fores.” Tibullus, El. I.

One of my Hindustani servants, who let no opportunity slip of exhibiting their own superiority and contempt for the unsophisticated inhabitants of the hills, enquired of the headman somewhat superciliously, of what use the apricots were to Devi—“Did she eat them?” His reply rather pleased me, for instead of returning an abusive answer, as any Hindustani would have done in the plains under such provocation, he quietly asked who it was that caused those same apricots to grow. “If you” he continued “can make so much as one such apricot grow, I myself will give you five rupees for it.” This reply, made with much dignity and without any temper, was evidently not what my servant expected, and completely silenced him, for he had sense to perceive that his sarcasm had failed to produce any irritation, and that he was getting the worst of the discussion.

At this village I got the skin of the lesser flying squirrel, the fur of which is beautifully soft; the larger species I have shot at dusk in my own compound in Simla, and both appear pretty generally diffused and not rare, though from their crepuscular habits they are not often seen.

26th, *Gaugera*, 11294 ft.\*—This is a mere camping ground, about 500 feet below the upper limit of trees. Wild thyme and other flowers abounded and a species of potentilla, with thicker and more downy leaves than that which grows at a lower elevation. Many of the plants which occur at high elevation are possessed of an aromatic fragrance and leaves furnished with down, as though to meet the increased rigour of the climate.

27th, *Lipe*.—On quitting camp, the road immediately commences to ascend, and crosses a pass of some 14000 feet, to which no name is given in the map. Wild flowers were growing in great profusion near the summit among the rocks, and some way down on the other side birches and rhododendrons. Lipe is situated on the northern bank of a considerable stream, which is crossed by means of a wooden bridge. A little above Lipe vast beds of river sands and shingles, some 250 feet thick, are seen reposing on the rocky slopes of the gorge, some 600 feet above the present level of the river; and much of the cultivated land below the village is on a river terrace which has been abandoned by the stream during a comparatively recent period, the river having worn for itself a deep channel, almost a rapid, on the opposite side. Close to the river are extensive vineyards, but the present year has been unfavorable for grapes, especially about Chini where the vines have almost entirely failed. About Lipe there was better promise of fruit, but it was too early in the season when I was there, to get any.

28th, *Tabang*, 11755 ft.\*—A very short march, the road rising considerably from Lipe and crossing a low pass, near the summit of which I noticed small rhubarb plants among the furze covering the hill side, and also a few straggling cypresses, which certainly ill-deserved the poetic epithet of Aerial or lofty cypress,\* being little else than mere bushes. The camping ground is a mere depression in the bleak hill side, above the village. The water of a spring close by was 44°. Not-

\* "Non sine nutanti platano, lentaque sorore  
Flammati Phaethontis et aëria cypressu." Catullus Nup. Pel. et Thet.

withstanding the lowness of the temperature, the larvæ of some insect were numerous in it, and what seemed an aquatic acarus or tick, and a small species of leech, rather less than an inch in length. These quick-scented animals soon found out and attached themselves to some garbage of a sheep, which my servants had left in the water, and I subsequently found these animals to abound in running water both in Bissahir and Spiti. Leeches are known to be one cause of cattle epidemics, especially in excessively wet seasons, as this has been, and it would be interesting to ascertain, by the dissection of cattle which have died of epidemic disease, if they are infested internally by these rapacious creatures; as, if the disease can be traced to this cause, a remedy might easily be applied by carefully debarring the cattle from all access to streams containing them. I myself had no opportunity, as the epidemic among the cattle had occurred in the spring, and most of the survivors had been driven up the mountains to escape its effects.

29th, *Sangnam*.—Early in the morning I was awakened by the flight over my tent of many noisy birds, which I afterwards ascertained to be red-legged crows. These birds are social without being gregarious, and when feeding on the hill side, keep together in small companies, but without forming flocks. Their food consists of wireworms and other insects, which they search for under stones and among tufts of grass, but they are usually very wary, and difficult to approach within range. This is evidently an instinct or caution peculiar to the bird. It cannot be attributed to the result of experience, as they have no reason to regard man as their enemy, being unmolested and rarely in their lives hearing the report of a gun. After quitting camp, commenced the ascent of the Ranang pass, 14361 feet, the ascent being gradual and easy. From the summit a fine view is obtained of the Sangnam valley and the hills across the Phanam river, on the opposite bank of which Sangnam is situated, and in the far distance the snowy peaks surrounding the Manirang pass, towering up to 21845 ft. The descent to Sangnam is very abrupt, and the river is crossed by a wooden bridge a little above the village. A good breadth of land was under cultivation along the river above the village, and beans were being gathered in, though not quite ripe. Apricots were the only fruit-trees I remarked, and their fruit was also being gathered. Flour was only five seers per rupee, or one seer dearer

than at the last village. Many of the cattle had long hair, due probably to an admixture of yâk blood, but the place is too low and hot for yâks to bear at this season, and I saw none before crossing into Spiti. Blue pigeons very numerous.

30th, *Thorapa*, 10548 ft.\* (or Kajakajing).—The road up the valley keeps along the course of the stream, through cultivation, and sometimes descends into its bed. At the village of Rupa, the last or highest up the valley, procured fresh coolies and pushed on a few miles to the camping ground, at which is some cultivation but no village. On the valley sides, noticed in places thick beds of river shingle and boulder, sometimes 400 feet thick. Hills bare and uninteresting, little game beyond a few chakor and pigeons, but procured the skull of a snow bear shot two months previously, an old but small animal, probably a female. These brutes often attack the flocks of sheep when feeding on the mountains, and are accordingly destroyed, when they appear near villages, all the inhabitants turning out for the purpose. In general, however, the people of Bissahir and Kunawar are singularly devoid, for mountaineers, of all taste for sport, though they will occasionally beg a little powder and shot to kill birds with, but very rarely. At the camping ground the wild or scentless briar with its red hips abounded, and also a wild cherry bush two or three feet high, with very palatable bright red fruit, no larger than large currants. Apricot trees were also common, but the fruit, though plentiful, was very small and unripe.

31st, *Sando*, 12451 ft.\*—(Pamachan of the maps.) A very severe and in places difficult march, the road sometimes a precipitous hill side, covered with loose and very slippery slates where great care was requisite to avoid dangerous falls. About half way, the path crossed a broad moraine-like talus of rocky fragments, detached by frost, as I suppose, from the high hill on the right, and as sharp and angular as though fractured the previous year, though doubtless the accumulation of ages. The last part of the road led in many places along the face of vertical crags, where a single false step was inevitable death. The footing was firm and rocky, but often so scanty as to render it necessary to hold on pretty tightly by the hands as well. Early in the day, met a number of Tartars from Spiti with a flock of goats, sheep and donkeys laden with salt on their way to Sangnam. They complained bitterly of the road, which I soon found they had ample

reason to do, and had I not seen them myself, I could never have credited the possibility of any solidungulate animal getting over places which they certainly had done, and though convinced of the fact, cannot understand *how* these donkeys get over spots which taxed a man's powers to climb. On the march saw many traces of bears, but none recent, and judged therefrom that their food chiefly consists of roots, grasses, and vegetable matters. Around the camping ground, which is a mere sheepfold in the mountains, gathered a little rhubarb, small and stringy, and along the stream and on the hill side remarked poplar trees and birches.

*August 2nd, Largoo.*—Glacier at the foot of the Mánirang pass. Camp 15521\* feet. The road lies up the course of the stream which descends from the Mánirang pass, and is often rather difficult, from crossing piles of loose stones and coarse gravelly debris precipitated from the hills adjoining it. Snow bridges span the stream in many places at the foot of the pass, and eventually the road fairly enters on the glacier.

It requires a little reflection here to realize the fact that one is actually on a glacier, as nothing is seen around but huge piles of shingle and rocky fragments heaped up in an irregular manner, like some Brobdignagian ploughed field. Long ravines and somewhat anomalous looking pits or depressions are everywhere met with, and occasionally pools of water, which, on closer inspection, are seen to be encircled with walls of ice—not the crystal product, but a dirty looking mass embedding large stones and coarser mud and gravel, and at the surface completely covered up by rocky debris melted out of it. Pitched my tent on a small patch of green sward a few yards square, a little oasis in the midst of an Arctic Sahara. No wood was of course procurable, save a scanty supply I had brought up with me; but in spite of the cold, I enjoyed greatly the grandeur of the scene, encircled by snowy peaks which seemed to impend over my little camp and among which the avalanches might occasionally be heard crashing and booming with a roar surpassing the heaviest artillery.

A little below the camping ground I met a European descending the pass from the North, attended by a few coolies, and we of course halted and “liquored” together and held a brief conversation as to our respective routes, game, provisions, &c., with regard to which last, he gave me to understand that I had been absurd-

ly imposed on hitherto as to the price of flour, and that every European not a fool, in Ladak, insisted on having sixty seers of flour for the rupee, a statement regarding which I had doubts, notwithstanding the local knowledge of my informant. He informed me that he was Lt. Melville, attached to the Grand Trigonometrical Survey in Kashmir, and eventually accepted the loan of a small sum of money, as his own funds were barely adequate to carry him into Simla. On my return to Simla, however, I discovered that I had been swindled, (alas for the frank Saxon physiognomy of my friend) and Lt. Melville (verus), to whom I wrote, was able to give me some particulars regarding the gentleman who had thus honoured him by assuming his name. He turned out to be a man who had been recently turned out of the Grand Trigonometrical Survey for disreputable practices, and who also, I believe, so conducted himself in Simla as to give the trades-people there a higher opinion of his talents and impudence than of his honesty. To punish the European swindler, however, who exercises his talents in the Upper Provinces is, in the present state of the law and the practical difficulties and expense attending a prosecution at the Presidency, one thousand miles away, far from easy.

*3rd, Camp.*—Northern foot of the Manirang pass, 15273\* feet (Sopana of the Maps.) The ascent of the pass is very steep and extremely laborious, from the heaps of loose debris one is forced to climb over. The labour of climbing over this sort of ground at this height was so severe, that in one or two places I thought I should have fainted from sheer exhaustion, and once or twice rocks and mountains seemed to swim round, so that I was forced to throw myself on my back to avoid falling over the steep rocks I was at the time ascending, the result of which would have been an abrupt termination to my journey and life. On gaining the snow bed near the summit, the path was much easier, though the snow was rather slippery, and there were a few crevasses to be avoided. The summit of the pass is but a little under 19000 ft. (18889\*) and the descent lies over a glacier much finer and larger than that on the south side. Both myself and servants all got severe headaches, but strange to say not till we had effected a considerable descent from the top of the pass: they remained all that evening, but left no traces the next morning. Spirits I believe only aggravate the headaches, and I contented myself after my

hard day's work with a rasher of bacon and two cups of hot coffee, before turning in for the night. The camping ground was four hundred feet below the upper limit of furze and on the opposite side of a stream issuing from the glacier, which had to be forded, a most unpleasant operation in such cold water, though not reaching much above the knees. The glacier on the north face of the pass terminated in a sheer wall of ice, from beneath which a muddy torrent was springing, and the lateral moraine over which the road descended was but little less abrupt. I crossed the Parangla pass, of nearly equal or perhaps greater height, without any headache, the ascent being much more gradual than at the Manirang, and to the excessive exertion which is called for on this pass I attribute, quite as much as to its height, the severe headaches from which all who cross it suffer.

4th, *Máni*.—11893 ft.\*—A short march to the village whence the pass receives its name. A little way below the camping ground, passed the bluff termination of a moraine, some three miles below the spot where the glacier at present terminates. The road generally speaking is easy, over limestone rocks. Wild leeks were growing in great profusion, though I had noticed none the other side of the pass. On first entering the Spiti valley, the traveller is struck with the unexampled bareness and sterility of the hills, which are devoid of even a trace of trees and merely support a few grovelling furze shrubs on the slopes at their base. Though a result of their geological structure, it does not require much geological knowledge to be struck with the extraordinary manner on which the strata composing them are twisted about, or with their extremely sharp and serrated outline which far surpasses any examples of the kind either in India or Europe. Another marked peculiarity is the enormous heaps of angular debris of rock, which in many places cumber the ground, and clearly result from the severity of the winter frost, unmodified as to outline by rain, which, in countries within range of the monsoon, would soon disperse, or at all events greatly smooth down and outspread such heaps of loose incoherent material. This last surface peculiarity far more impresses one with the sense of desolation, and one's entire separation from the Cis-Himalayan countries, than the bare hills whose mural precipices and serrated peaks bound the landscape on every side. After a sharp descent, the village of Mani is reached, situated at a height of 11939 ft.\* on a plateau of old river alluvium. The heat here during the

day was intense, and inside a tent the thermometer rose to over 100°. The temperature of the air may be taken at however about 85° at midday, sinking to 45° at sunrise, which gives a daily range of from 40 to 50 degrees. The whole scene is striking and peculiar and totally unlike anything met with in Cis-Himalayan countries; the bare and precipitous hills of a peculiar and uniform yellow colour, their sharply defined and jagged outline, the total absence of trees, save a few poplars planted about the village, amidst rich crops of wheat and barley, the square flat-topped houses, with their tiny windows, and stores of furze for winter fuel accumulated on the roofs, the yáks and shawl goats grazing among the rocks, and lastly the inhabitants themselves, genuine Tartars in physiognomy, and with their nationality stamped on every particular of their figure, dress or speech, combine to form a complete contrast with the country and people on the opposite side of the pass.

Pitched tents in a rather confined spot a little above the village, and was soon surrounded by an enquiring group of the inhabitants. Unfortunately I had no interpreter or servant who understood the language sufficiently to carry on a conversation, a want which I severely felt, as it precluding my getting information which I was often anxious to obtain.

Both men and women dress in loose coats and trousers of a coarse woollen cloth and puttees or boots of untanned leather. These boots are very warm and substantial articles, composed of a sole of leather which is turned up all round the foot and stitched to a thick woollen stocking or legging which is tied above the knee. Though rather clumsy in appearance, these boots afford perfect protection against cold and from injury from rough ground or ice; and after a march a cooly may often be seen with a needle and thread, putting a few stitches into a weak place in his boots, which often exhibit signs of having had half a dozen soles added from time to time one over the other. The men wear either conical caps, or ones much the shape of a comfortable travelling cap, and their hair in a pigtail, except the Lamas or priests who are closely cropped. The women wear their hair braided behind in numerous small plaits, often twenty or upwards in number, sometimes tied loosely together at their ends, and sometimes kept equidistant by having their ends passed through a horizontal ribbon half way down the back, the plaits then recalling

to mind the bars of a *gridiron*. Most of the men wear necklaces of large amber beads or turquoise of very irregular shapes, but very frequently an inch or more in diameter. The amber is mostly sulphur-colored and it is by no means easy to purchase a fine necklace, as they seem to be regarded as heir-looms, and are all brought from "Maha-chin." Besides these large beads, the less affluent wear smaller ones of glass, agate or coral, though usually with a few beads of their favorite amber or turquoise intermixed. Some beads are a very clever imitation of dark onyx of Chinese manufacture, which is not readily detected, save on close examination. They are the same I believe as are met with occasionally in Hindustan, where they are called "Solimains," and are greatly prized, though none here can tell where they originally came from.\* The women wear similar

\* I have subsequently been able to procure a good number of these antique agate beads at Benares, and have little doubt that the whole of them are originally derived from the mounds and ruins at Bamean and other spots in the Cabul territory, where gems, beads, coins and other relics of Græco-Bactrian manufactures are found after the rains have ploughed up the soil.

The beads are of all shapes and sizes, spherical, cylindrical, fusiform or barrel shaped, and of various materials, dark agate with white bands, onyx, carnelian, jade, black schist with white bands, lapis lazuli, rock crystal, obsidian (?) blue and white porcelain, and glass and enamel of various colours. Many other sorts of stone as amethyst and bloodstone also occur, but I could not satisfy myself that these were antique, though they possibly may be. The single obsidian bead is cut as a polygon with numerous small faces, and I consider it as obsidian rather than a dark enamel, from its having been drilled, which glass or enamel beads never are, and consequently exhibit a much larger and more irregular or gaping perforation; and as obsidian occurs in Kattiawar, it might have been procured.

The most curious beads of all are, however, of agate or carnelian inlaid with a cream-coloured enamel. Of these I have several patterns, cylindrical, spherical, fusiform or flattened. One round bead is ornamented all over with elongate spots formed by pitting the surface of the carnelian and filling the depression with enamel. Another is ornamented with circles formed in the same way, while the fusiform beads have two narrow circles at either extremity, from which alternately five lines are carried half way down and connected round the middle of the bead by a zig-zag line, like that uniting two layers of cells in a honeycomb. Of this sort of bead I have a curious but rough imitation in enamel which is probably antique, and the same pattern is also wrought on smaller polygonal beads of dark agate. The cylinders are either carnelian or dark agate with four or five cream-coloured beads carried round them. In all these the pattern is engraved as a deep groove on the surface of the agate and then filled in, flush with the surface, with enamel, and so nicely executed are some of these beads that a good glass in well executed specimens fails to reveal the mode of manufacture save in a fractured or weather-worn part.

The better-shaped of these brown beads are largely used for studs and buttons, after being carefully rounded and polished, which last process brings out the white bands in beautiful contrast with the brown colour. This brown is sometime so intense as to be even black and is merely superficial, being probably produced by some process similar to that now in vogue in Europe, where a similar result is produced by steeping the agate in oil, which sinks into the porous bands of the stone and then boiling it in sulphuric acid which chars the oil and

ornaments, but rarely so large or fine as the men. They also wear white shell bangles imported I believe from China, though India could supply them I should imagine far cheaper, and also head lap-pets of cloth, extending some way down the back and ornamented with large turquoises, glass, &c. Both men and women too invariably carry a small willow-wood cup, some five inches in diameter, a flint and steel at their side, and a leathern tobacco pouch filled with the dry tobacco leaf. The Spiti pipe is of iron, about a foot and a half long, with a small shallow bowl an inch across, and a square fluted stem, half an inch broad and tapering off to a round mouth-piece, but very strong.

Dr. J. G. Gerrard accords but scant justice to these unsophisticated mountaineers, when describing their personal appearance and characteristics in the Asiatic Researches. Having passed a severe condemnation on the women for their want of personal charms, to their shortcomings in which respect they have the impudence to add want of virtue also, he proceeds to say, "The men, without any superior pretensions, have their peculiarities less out of place, but they are black, greasy and imbecile, without any noble qualities whatever,"—"such is their general character, and it will apply to the whole nation of Tibetan Tartars." No impartial traveller will admit the truth of this estimate, though in features they may be unprepossessing, if judged by a European standard, in manners coarse and unrefined, and their notions of morality very different from our own. Gerrard is, however, inconsistent with himself; for only on the previous page he accords them a certain amount of praise which he afterwards seems to overlook, but which is founded in a far more candid and philosophical spirit than his subsequent condemnation. "Strangers, especially Europeans, arriving amongst them and passing rapidly on their way, see nothing in the country or inhabitants to raise a favorable impression on their mind. They observe them in black bare-headed groups, timid, squalid and in rags, and every third person a priest, but, however unintelligible their conduct when debating in

stains the stone consequently as far as the oil has penetrated. The white bands are of course mere crystalline layers which have not absorbed any oil and remain in consequence unaffected by the acid. This art is, however, unknown at the present day, to the best of my belief, in India, and these beads are declared by all the writers I have ever questioned, to be brought from the North-West or Cabul.

an unknown dialect about supplies or the propriety of our progress (both of which are doubtful in such a territory), in their houses *we were treated with friendship and hospitality, unaccompanied with that savage feeling which protects a traveller as a guest and betrays him beyond the threshold of his sanctuary.*" And again a little further on, "The absence of female chastity is a singular commentary *to their honest and pacific conduct*, and the other social qualities of their natural society." In the above passages Gerrard himself describes them as hospitable and honest, or in other words possessed of *truth* and *generosity*, two qualities indispensable to and *a pars magna* of true nobility. It must be remembered that in Buddhist countries chastity is a virtue in very slight estimation, and breaches of it viewed in a far other light than among ourselves, and it is absurd therefore to measure the breach of it among Mongolian Buddhists by the standard prevalent amongst ourselves, but utterly unknown among them. As well might a Brahmin argue (which few are so illogical as to do,) the total moral debasement and impiety of Europeans who touch beef, repugnant as the practice is to their religious feelings. The morality or immorality of an action can only be truly estimated with reference to the habits of thought or motive with which it was committed. In Hindustan for instance, the son who shortens his parents' days by stifling his father with the mud of the sacred Ganges when stretched helpless on a sick bed, or burns his mother on her husband's bier, far from being considered in the light of a parricide, is regarded as having performed a pious and exemplary part; and the Christian prelate or Mahomedan conqueror who, out of the pure love of God, dooms heretics to the flames and the sword, is viewed by his respective co-religionists as following the strict line of duty in so doing; and it is the motives which actuated them, and not a difference or disparity of the results, which prevents our regarding such bloody-minded bigots as Mahomed or Calvin with the same detestation as we regard the sordid murderers Burke and Hare.

I cannot quit this subject without remarking on the amiable and pacific disposition of the men of Spiti, in which respect they contrast most favourably with the Hindus and Mahomedans of Hindustan. I have often heard disputes regarding provisions or the loads to be carried, argued with considerable noise and animation, but the idea

of resorting on such occasions to the filthy slaver of abuse which seems to flow spontaneously from the lips of a Hindustani, never seems to occur to them. In Hindustan, the child not long after he can stand will have acquired command of the foulest language, which it is impossible he can understand, and which he vents unchecked in presence of his father or even his female relatives ; and this callous indifference is not confined in all cases to natives, as I have heard the servants of English gentlemen lavish the foulest and most abominable abuse on villagers on the slightest grounds within hearing of their masters and without reproof, though it is difficult to understand how any one possessed of refined or gentlemanly feeling can reconcile himself to, or tolerate in his servants, conduct at once so odious, despicable and unjust.

*5th, Danka* 12740 ft. (camp 12416 ft.)—From Main descend into the bed of the Spiti river, which is crossed a little above the village by a fine suspension bridge of considerable length. Throughout Spiti, these bridges are constructed of ropes made of birch or willow twigs. The supports are two stout cables each composed of some twelve or fifteen small ropes, stretched over rude piers on either bank at about five feet apart and firmly secured by being buried deeply beneath the stones forming the piers. Between the main cables, and about two feet below them, a third of smaller dimensions is stretched and supported by light ropes passed over the side cables ; and when the bridge is in good order, a passenger treading on the central cable and supporting himself by the ones on either side, can cross a river with perfect ease and safety, far more so than over the best cane bridge of the Eastern Himalayas and Khasia hills, as the cane and bamboo of which they are constructed is far more slippery than the ropes which are used in their place throughout Spiti ; when, however, out of repair and the small side ropes supporting the central cable in many places deficient, the job of crossing is trying to the nerves, and actually dangerous.

Along the course of the Spiti river are seen old river terraces or deposits of shingle and sand coarse and feebly stratified, and reaching to a height of some four hundred feet above the present river level. Behind these regular deposits, and both from beneath, and also encroaching over them, rise almost mountainous accumulations of debris precipitated by frost from the abruptly scarped limestone

cliffs bounding the valley. The height of this gravelly mass mainly depends on that of the cliff at whose base it has accumulated, but not uncommonly reaches to 1,500 or 2,000 feet above the river. This incoherent formation has in some places been denuded by atmospheric action, the scanty streams occasionally traversing it being adequate for the purpose, not to mention the former action of the Spiti river, but it is in some places cemented into a firm rock, by the percolation of water depositing calc tuff. This is the case at Danka, a place built on a mass of the consolidated debris rising abruptly 1,100 feet above the river, which by the action of the elements is worn into the most fantastic pinnacles and perfectly honey-combed with irregular cavities, produced by the falling out of huge blocks or the removal of loose earthy portions of this extremely heterogeneous mass. Gerrard in his own quaint language thus describes the place, "Danka itself is perched upon a projecting ledge of conglomerate, which the erosion of time has filed into slender spires, and the percolation of snow eaten away at their bases, till they present a group of turrets and ravines almost deceiving the senses by the effect of natural agents." The camping ground is a small grassy plot some three hundred feet beneath the village, which looks down upon it from the brow of a beetling cliff, round which were flying many blue pigeons and red-legged crows. A small stream close by contained a small species of *Lymnæa* (*L. truncatula*), the sole fresh water mollusk I noticed in the valley.

6th, Geumal.—Crossed the Lingti river by a small suspension bridge, about six miles from Danka to the village of Sanglang. From this to Geumal, which must be at an altitude of nearly 15,000 feet, the road ascends the steep face of the hill, over beds of limestone in which the forms of pentacrinites may be distinguished, till near the village, which is situated among some open flat valleys on dark shales and behind which the hills rise some hundred feet more. The high land on which Geumal is situated is cut into a narrow wedge by the Spiti river and a considerable feeder of the Lingti river which enters below Sanglang, and viewed from Mani has the appearance of an isolated, flattish hill, of horizontal strata, (their dip from that aspect not being seen) rising with majestic cliffs some four and a half thousand feet above the Spiti river which flows at its foot, though in reality it is merely the termination of a lofty spur of land running

down into the Spiti valley from the great boundary chain to the north; the highest peaks near Geumal attaining a height of 16,266 feet, the Spiti river but two miles from this point being about 11,600 feet.

8th, *Kaja*, 12,200 ft.\*—Descend into the Spiti valley to Kaja, a wretched village in an arid and stony plain, but with a fair extent of cultivation along the river. Great numbers of pigeons are found in the neighbourhood. On the open plateau above half way from Genmal came on a large pitfall constructed in the centre of the path, in which in winter animals are sometimes caught, chiefly "burrel" I believe. It was a circular pit with upright sides, about 7 feet deep and 15 in diameter. A projecting rim of slates inclining upwards and inwards was carried round it, over which the earth from the pit was spread and carefully levelled, so as to give the pit the appearance of being a slight rise in the ground and prevent its being seen. An animal coming along the path, in the centre of which this was, could hardly fail to fall in; and, once in, the projecting ledge of slates rendered escape impossible.

9th, *Kiba*, (Gyihbar apud Cunningham and Kibber of the map) A village situated some two miles up from the mouth of the Parilanghi river, at about 13,890 feet. The road passes the village of Ki, with its pretty monastery capping a very steep and commanding hill, and even more picturesque than Danku. The ascent to Kiba is in places difficult for quadrupeds, though the road must be bad indeed which is impracticable to the hardy and semi-caprine ponies of the valley. Kiba is prettily situated on a rocky ridge, beneath which a grassy plot affords a convenient camping ground. Near the village two piles of stones are passed, ornamented, after the usual fashion, with several rough sticks with bits of rag waving from them, and the horns of the "burrel," numbers of which are killed in winter and their horns attached as trophies to piles of stones near the village. The same piles are erected at the summit of all the passes, and welcome is the sight of these rags, fluttering from many a weather-beaten stick, to the wearied traveller, as he slowly nears the summit and catches sight of them. Nearly opposite the village of Ki (12500 ft.\*) was a large pile of stones covered with inscribed slabs, which are so common in the vicinity of Spiti village. These piles of stones are some 4 feet high by 6 broad on an average, and often a hundred feet

in length. They are covered with flat slates or smooth round boulders, from 6 inches to a foot or more across, inscribed with the mystical formula "*aumi mani padme hun*," or some others which are given by Major Cunningham in his work on Ladak. The same author mentions some piles of far greater length, one of half a mile near Bazzo, and another near Le of 2,200 feet. The characters are Tibetan, or "mediæval Devanagri called Lantsha," the latter I think most frequently in Spiti, the style of execution varying extremely; the inscription being sometimes rudely scratched, at others carefully engraved with elaborate ornamentation, either in sunk or raised characters. Regarding the object of these *Manis*, Cunningham observes:—

"Does a childless man wish for a son? or a merchant about to travel hope for a safe return? Does a husbandman look for a good harvest? or a shepherd for the safety of his flock during the severity of winter? Each goes to a Lama and purchases a slate, which he deposits carefully on the village *Mani*, and returns to his home in full confidence that his prayer will be heard."

11th, *Camp, West bank of Parilanghi river, 15,427 ft.*—As Kiba is the last village in Spiti this side of the Parang pass (in the Map, Parangla, rightly Parang La, *la* being a *pass*) and the nearest village in Rupshu (Rukchu) a distance of six days' march, it became necessary to make preparations accordingly; and I started therefore with some six or eight sheep and goats, each carrying twenty pounds of "suttoo" and flour, for the use of the coolies on the way, secured in goat skin bags across their backs. This day's march was a very short one; the halting-ground a grassy spot at some height above the river and well supplied with spring water of the temperature of 61°.

A small lizard was numerous among the furze bushes, *Mococa Sikkimensis*, and a small *lagomys* inhabited the rocks, though not numerous. Many snow partridges were seen, and I managed to run down and secure a half-fledged bird as large as a chicken. The flesh tasted strongly of the wild leek on which the birds feed. A large flock of upwards of 200 sheep and goats was also encamped here, bringing down borax, each sheep carrying over 20 pounds. Towards evening the whole flock returned from grazing on the hill side, and I watched with interest the process of securing them for the night. For this purpose, numerous hair ropes, some forty feet long, are securely pegged down in parallel

lines, to which the animals are one by one fastened by means of a loop and button they carry on their necks, the goats and sheep being tethered separately. It was pleasing to observe the docility of these animals and the readiness with which they allowed themselves to be tied up. Each of them, on being secured, lay down and was fast asleep before a second had been well secured to the next place on the rope, so that in a surprisingly short space the noise and animation produced by the return of this large flock was exchanged for the most perfect stillness. The encampment was protected from the wind by the bags of borax piled into a low wall, and guarded by several fine but savage mastiffs. By day-break the whole flock was once more in motion with its freight towards Spiti.

12th, *Camp at the foot of the Parang pass, at 16,448 ft.*—Cross the Parilanghi river, and shortly afterwards ascend the camping ground, a bleak bare valley without the smallest shrub on the bare rocks. The coolies having brought up little or no fuel, all passed an uncomfortable night, a high wind often howling up the pass with occasional sleet, and the only fuel procurable being a little dried ass's dung scattered along the road. Another large flock of goats with borax passed in the afternoon *en route* to Spiti and Kulu.

13th, *Camp, east bank of the Pará river, north of the pass, at 16,163 ft.*—The ascent to the pass is steep but far from difficult; a little snow is met with in hollows and sheltered places, but the road is free of snow to the summit. The crest of the pass is a rocky ridge of vertical limestone strata, forming a gap between high snowy peaks on either hand. From this rocky ridge one steps off on to a fine glacier, which is seen filling up the valley beneath, and which is mainly augmented by the gradual descent of lateral glaciers and ice from the high snowy peaks to the west. Few crevasses exist in this glacier, and the descent over it is gradual and easy, though there are some awkward bits of road just after quitting it, where the ground is very steep and the road creeps along the chasm that yawns between the mountain side on one hand and the glacier on the other, and which is produced by the melting of the glacier in contact with the dark warm rocks of the valley. The summit of the pass I determined by a subsequent observation to be 19,132, ft. which I believe to be very nearly correct, though Cunningham makes it only 18,502 ft. This difference of 630 ft. is the more remarkable as three heights in the Spiti valley

given by Cunningham give a mean excess of + 781 feet over my determinations, and the Chomoriri Lake also as much as + 728 over what I make it. I am not so sure that the height of the pass is so much too low, as I am that the other heights are too high; and the estimate of the pass made by gentlemen on the G. T. Survey whom I met, leads me to incline towards my own or the higher estimate: but as far as I can judge, Col. Cunningham's observations of heights as compared with mine, exhibit an increasing proportionate difference from 17,000 ft.; this difference being — for all heights above 17,000 ft. and + for those below. The Parang pass, by me made 19,132 ft., exhibiting the extreme difference of — 630 ft.; whilst Lari, at 10,845 ft., exhibits a gain of + 1,049 ft. according to Col. Cunningham. At the camping ground the Para river is already a considerable stream, spread over a wide channel in numerous small streams, some of which, however, at midday are over the knees, and the sheep and goats required to be unladen before crossing.

14th.—*Camp on the Para river, a few miles above the mouth of the Chomoriri valley.* Day very inclement, rain and sleet falling and new snow whitening all the peaks around. Met large flocks of sheep and goats hurrying on towards the pass. The Para river receives three considerable tributaries from the eastward, in whose valleys thick deposits of old river gravel are seen, forming steep cliffs along the river course, and fully one hundred feet thick.

15th.—*Camp at South end of Chomoriri Lake, 14,272 ft.* The temperature of the water was  $56^{\circ} 4'$ , that of the air  $51^{\circ}$  and a stiff north-easterly wind. The waters of the lake are beautifully clear and pleasant tasted, though they are stated by the natives to be unwholesome, which I think may possibly be the result of some superstition. Col. Cunningham states that the lake has "no outlet, and its waters are consequently brackish, *although not very perceptibly so to the taste.*" This question of an outlet to the lake is important, but not having read the above passage or being aware that others have stated the same thing, I did not ascertain if such was really the case. Any how I think that there can be no question that the lake has an ample outlet for its waters, though very probably not a visible one. Above Mani, a sort of small lake is found by a talus of gravel and rocky accumulation stretching across the valley and damming up the stream from the glacier; but considerable percolation is always going

on, and gives rise a little way below the obstruction to a stream as large as that above it. In like manner I believe the Chomoriri lake is relieved of its superfluous waters; at all events a gentleman connected with the G. T. Survey, whom I met near the mouth of the Chomoriri valley, informed me that the stream I saw entering the Para river at that spot came from the lake, and the following extracts from Col. Cunningham's work I think incontestibly prove that some outlet the lake *must* have. "On the 18th September I fixed a pole in the water which I examined twice during the day and again early the next morning; but I find no perceptible difference between *the levels of the day and night, the extra quantity of water that is supplied during the day must therefore be compensated by the greater evaporation during the heat of the day.* In the same month of the year, Dr. Gerrard could not find any water-mark above *five feet* which he consequently fixed as the limit of fluctuation, but I doubt if the rise and fall of the lake *amount to so much as one foot.*" Again, "Towards the end of May or the beginning of June, the ice breaks up and melts, and by the end of July the surface of the lake attains its highest level, which from the water-marks that I saw *cannot be more than one foot above the winter level.*" With this estimate I fully concur, though Dr. Gerrard may have noticed rubbish and rejectamenta heaped by gales to leeward to a greater height. Now, if we consider the manner in which streams descending from snow swell during the day, several of which enter the lake, it amounts to demonstration that the lake must have an outlet of some sort, not to exhibit a greater fluctuation than might almost be accounted for in a large sheet of water by the mere force of a strong wind. Mere evaporation could never hold the balance so nicely or dispose of the vast body of water the lake must receive from the surrounding country which it drains, when the ice and snow melt over hundreds of square miles and are precipitated into it.

Col. Cunningham classes this lake with the others which constitute the old lake system of Ladak, of which the existing lakes, large and numerous as they are, form but mere remnants. Geographically perhaps this view is true, but lake Chomoriri owes its existence to very peculiar local causes, and the same climatal deficiency which has dwarfed the other lakes of Ladak and converted some of them from fresh water to salt, has paradoxically enough actually given rise

to lake Chomoriri, which a restoration of a more humid climate, such as formerly existed, would very speedily once more obliterate.

How far the theory which I have formed regarding lake Chomoriri is applicable to any of the other lakes of Ladak, I cannot say ; but a glance at the map suggests such a possibility, as some of them seem to be, what I take this lake to be, a *river valley* dammed up, in consequence of changed climatal condition and a *diminished rain-fall*. In two important points, this lake differs from those which at present constitute the remnants of the old lake system of Ladak.

1st.—It nowhere affords any indication of having ever obtained larger dimensions than it at present occupies.

2nd.—Its waters, though they abound in animalculæ (*entomostraca*), do not yield a single mollusk ; nor are any shells to be found in the sand and shingle along its banks, which is merely such an accumulation (often a thick one) as the mountain torrents pouring down from the neighbouring hills have spread out along its shore.

The diagram in the annexed plate will help to explain better than description how a river valley has been converted into a lake, and the peculiar configuration of the ground which has aided such a result. By this sketch it will be seen that the valley in which Chomoriri lake is situated, is, not far above where it opens into the valley of the Para river, much narrowed and constricted by hills which approach within less than a mile of each other, the valley expanding to a breadth of several miles higher up. Not far above this narrow part of the valley a large stream, which when I crossed it had two channels with water rising above the knees, enters and turning round abruptly runs into the Para river. This large stream sweeps down a large quantity of boulders and gravel which it spreads over the valley in the form of a huge bank, on the summit of which it scores ever changing channels, and which entirely shuts out all view of the lake to any person ascending from the Para river, till he has attained its summit and crossed the stream which has caused the obstruction. The rise over this bar from the Para river seemed much steeper than the descent towards the lake, which it will be seen is nothing more than the drainage of the main valley dammed up by a barrier raised by a powerful affluent stream, favoured somewhat by the configuration of the ground, but also by the inability of the recipient stream to remove that shingle swept into it by one of its feeders and

to maintain a sufficient scour to keep clear its own channel. The result is of course a lake. I am not sufficiently acquainted with the surrounding country to account for the feeder becoming more powerful than the stream into which it falls; it is evidently a result of change of climate, and it is quite certain that if a considerable body of water was again supplied to the lake, it would speedily overtop its present barrier, cut a channel through it and eventually drain itself, the only requisite being an adequate supply of water to remove the obstructions brought down by its feeders and to maintain a proper preponderance of the main stream over its tributaries. To bring about such a state of things, a change of level only is required, such as we know has repeatedly taken place, with its corresponding change in the amount of rain fall; and the same phenomenon, viz. an elevating movement, which has dwarfed the once mighty inland seas of Ladak by curtailing their supply of rain water, has in some places, owing to peculiar and local circumstances, produced precisely opposite phenomena and actually given rise to lakes where none existed before.

The bottom of the lake is in some places near the shore covered with waving patches of a long grass-like weed; but I noticed no fish, though I doubt their absence from the lake, as in the stream below it I noticed small fish, though I was unable to secure any, and in the Spiti river I observed fish in water of only 41°.

Several wild horses or kiangs inhabit the shores of the lake, usually occupying the gravelly plain spread out across its eastern end, though when alarmed they take to the hills. Burrels are I believe to be got among the hills, and I was told of a flock of *ovis ammon* which used to frequent the neighbourhood of the lake, but which was driven away some years since by an unusually severe winter and has not been seen since.

A few old geese and several flocks of goslings just commencing to fly were the only birds I saw. One large flock of goslings I noticed on the side of a high hill, and at sight of me they ascended to a much greater height than I cared to follow them to on a march. A few *totani* or snippets were seen in a marshy flat at the mouth of the valley, but I was disappointed at the paucity of birds, after the accounts I had heard of their abundance.

16th, Korzo, 14,450 ft.—The road lies along the west border of the

lake and crosses a small ridge jutting down to the water just before reaching Korzo. The village is a wretchedly small one, situated on the opposite side of a small feeder of the lake, on a bare rocky eminence; yet from the square castellated form of the houses, with mere slits for windows, and their quaint ornamentation by poles with streamers and bunches of yaks' hair at the end, it presents rather a picturesque appearance. On my arrival I was waited on by the headman bringing a "nuzzar" of dried apricots. He was smartly dressed according to Tibetan ideas, and had on a pair of veritable Chinese boots with thick soles and tops of handsome embroidered silk, of which he seemed proud; indeed Chinese articles are esteemed here much as Paris goods are in London.

A Kashmiri Mahomedan of a very Jewish cast of countenance acted as interpreter, though not very fluently, and I soon found that provisions were very scarce and dear. The day was remarkably fine, quite a contrast to the weather of the last few days, and I should have been glad to have devoted a fortnight to the examination of the neighbourhood of the lake, but the great difficulty of procuring supplies and the appearance of the mountains, which during the last few days had become sheeted with snow far and wide, coupled with a warning I received that in so severe a season as the present has been the Parang Pass might any day become closed for laden coolies, determined me to hasten my departure back again towards Spiti, and accordingly I gave orders for returning on the following day. It now appeared that no fresh coolies were procurable, as the few available men of the village had been carried off by some other travellers; but the headman said the coolies whom I had brought with me, would gladly act again on my return; this, however, I found they stoutly refused to do, and they began preparing to move soon after being informed what was expected of them. In the afternoon word was brought that the Spiti coolies were moving off with their goats, and the headman, perceiving the urgent necessity of "taking action" in the matter, (though I warrant he never heard of father Daly's tactics or the Galway contract), sallied forth with some followers, and, aided by my Simla coolies, captured and brought back the run-aways. Hereupon the most tremendous uproar ensued, the Spiti coolies stoutly declaring that they would not lay a finger on the baggage, and my men insisting in equally loud tones that they must

and should. Whilst the row lasted, I was reminded of that spirited passage in the Cid where the Cid's knight strikes in the Council one of the Counts of Carrion.

“Then arose the cry of Cabra,  
Here Valencia the fair,  
There Castille and here Galicia :  
Many a war cry rent the air.”

In something under an hour, however, terms were come to, and the coolies agreed to act, if firstly they were paid in advance, and secondly if the headman, in consideration of their acting in place of men he was bound to furnish, would present them with a fat sheep for dinner. Matters thus arranged, peace and good humour were restored, and the headman carried them all off to his house under pretext of hospitality, but also, I suspect, to guard against their changing their mind during the night. As I had already, in consideration of the hardship of the road, paid the coolies double the usual hire, I was somewhat at a loss to account for their unwillingness to earn an additional sum, and their preferring to return empty handed. As, however, I am not one of those ingenious theorists who solve such questions by supposing “niggers” act on principles unintelligible to other mortals, I made some enquiry and soon found a reasonable ground for their conduct. The coolies I found were furnished by the headman of Kiba who supplied them with food, but appropriated their wages himself. No wonder, therefore, the poor fellows objected to so much extra labour, from which they would reap small advantage. The traveller is powerless to remedy this, save by a small present which he may make to the men themselves, and in this case a few annas a piece, with the sheep they got at Korzo, made all happy and contented.

17th.—Return to former camping ground at the south end of lake.

On the march, it being a fine sunny day, captured a number of small lizards among the stony ground along the lake, *Phrynocephalus olivieri*, Dum. These animals associate together in pairs, as I usually took a male and female near each other, often under the same stone, under which when alarmed they would rush. They also form regular burrows in the ground, either under bushes or in the open plain, to a depth of 8 inches or a foot, according to the nature of the soil. The most curious point connected with these lizards is, that

they are viviporous, one female containing three foeti, though two seemed the commoner number. This departure from the plan of oviparous reproduction usual among lacertines seems intended to meet the exigencies of a severe climate, for in a region where snow sometimes falls at midsummer, eggs exposed in the usual manner would run considerable risk of having their vitality destroyed by an untoward frost. Those naturalists who adopt Darwin's theory of "natural selection," and the progressive mutation of species, will find it an interesting problem to explain (rejecting the old fashioned view of creative adaptation I have assumed above) how the oviparous progenitors in mythical times of these lizards came to adopt or acquire a viviporous organization, one problem of the many which the *new developement theory*, I should say "*Natural selection*" raises at every step. Near the camp the shores of the lake were perforated by the holes of a short-tailed rat or lemming, *Phaiomys leucurus*, Blyth. Their holes frequently were ranged in a long line against a bank and usually extended so far that all attempts to capture an animal by digging or flooding the holes with water proved fruitless. After infinite trouble, however, I managed to dig out an adult female, which on examination I found to contain six young ones the size of horse beans, three in each horn of the uterus. The total length of this specimen was 6.15 inches, of which the head was 1.30, and the tail 1.25. Colour yellowish mouse brown, merging into pale gray beneath. This colour, however, only extended to the tips of the hair, the body of each hair being dark slaty-blue only visible when the fur was thrown back; fur loose, length, three-eighths of an inch; whiskers, seven-eighths; ears rounded, medium size, rather oppressed. I subsequently got several more, mostly half-grown, by watching near their holes with a gun.

18th.—Camp a little below halting-place of the 15th.

19th, *Phalang-palra*.—A mere halting-place among loose rocks which afford shelter from the wind. A few miles from last night's camp recross the Para river, which here was in several channels, in two of which the water nearly reached to a man's hips.

20th, *Tatung*.—(Tratung Kongma of Cunningham). A mere halting-place close to the highest limit of furze on the west bank of the Para river, a little above where I halted on the 13th. Sleet fell dur-

ing the day, and the thermometer in my tent went down towards morning to 30°.

21st.—Recross the pass to camping ground in the Parilanghi river. Temperature of the air at the top of the pass 56°. Much fresh snow had fallen since first crossing it, the glare of which was very unpleasant.

22nd, *Kiba*.

23rd, *Chikim*.—Having procured fresh coolies, cross the stream separating Kiba from Chikim and devote a day to the examination of the neighbourhood. Chikim is situated in a broad valley partially cultivated and well watered. The barley crops are now either ripening or being gathered in; at Kiba they were still green in some places, but heavy in the ear.

24th, *Ki*, 12,500 ft.\*—Halt a day here to examine the neighbourhood. The monastery adjoining is one of the most picturesque buildings I have ever seen, or rather group of buildings, perched on the summit of an isolated peak a couple of hundred feet above the plain, and protected behind by a stupendous limestone cliff, some fourteen hundred feet high.

26th, *Kuling*.—Cross the Spiti river four miles below Ki, where the rocky chasm through which it rushes like an arrow, is spanned by a bridge formed of two trees, on which are laid wicker hurdles which, though rather shaky, will support a horse or yak.

27th, *Chang*, 11,568 ft.\*—A tedious march, road in parts very steep and bad. In the small stream flowing into the Spiti river below Kuling, found a species of *Limnæa* adhering beneath stones, the same as noticed at Dankā; and near the camp, among river rejectamenta, a *pupa* and a couple of *helices*,\* small but very abundant. These are the only land mollusca noticed in the valley, but they were nowhere found in a living state. In a small feeder of the Spiti near the camp saw some small fish, long and eel-like, sheltering under stones, but could not capture any. Temperature of water 43°.

29th, *Mikim*, 11,762 ft.\* A rather pretty village situated on the west bank of the Pin river, a little better than eight miles from its mouth.

30th, *Muth*, 12,306 ft.\*—(*Mud* of Cunningham). Cross the Pin river a little below Mikim. Like all rivers flowing from glaciers, this

\* *Pupa muscorum*, *Helix fulva*, *H. pulchella*.

should be crossed early in the day, as in the afternoon the melting of the snow raises it to a dangerous height. I crossed on a pony about 8 A. M., and the water was then up to the coolies' hips, and so powerful the current that a single man could barely stem it; the plan adopted being for all to join hands and force their way over in a body. A gentleman who crossed the day before had been separated all night from his baggage, owing to the men delaying to cross with him and being subsequently prevented following by the rapid rise of the river as the day advanced;—an unpleasant accident to happen anywhere, but particularly unfortunate in such an inhospitable region as Spiti. At the village of Tiling, three miles from Muth, noticed a large number of Ibex horns, which I have nowhere else seen in the valley, "burrel" horns being those commonly met with. Camping ground on the opposite side of the stream from the village, opposite which there is a wretched suspension bridge.

31st, *Balair*, 13,225 ft.\*—A mere halting-place, eight miles from the crest of the Tári or Bába pass. Near Balair passed large flocks of sheep and goats driven up here for pasturage, which is very luxuriant. I purchased one very fine ram of the Hunia breed of sheep with a fine pair of horns for four rupees. It was amusing to see how he sent my men reeling like ninepins, when they attempted to separate him from his fellows; but when my sheep came up, he suffered himself to be led along with them easily enough. Notwithstanding his size and fine horns, he proved to be little more than four years old, if so much. As I only required his skull, I gave the body to the coolies, who were more pleased than if I had given them a sheep with greater pretensions to edibility. The blood was carefully collected and cooked into a sort of pudding, but the headman first dipped his fore finger into it whilst still reeking, and flipped a little into the air and over the stones three or four times, muttering a short prayer whilst doing so. This I presume was a sort of expiation, or lustration for the act of shedding blood, which is theoretically a crime according to Buddhist notions. Among the loose rocks round the camp, shot several specimens, with feet furred to the toes, of *Lagomys Roylei*, Ogilvie. Though not rare here, I saw none south of the pass, though the ground was very favorable for them; and I conclude they do not range south of the Spiti valley. In a stream crossed in this march, collected many *diatoms*.

*1st September, Camp, south of Bába pass 12,793 ft.\**

The ascent to the Bába pass is far from difficult, though a large glacier descends from the summit. This glacier is fissured by numerous crevasses stretching nearly across it, and at short intervals from one another. Few of these crevasses are so broad as to be impassable, but in order to select the best spots for crossing, the road winds considerably, and it would be decidedly difficult to cross without a guide who knew the track. The day before I crossed much new snow had fallen, which made the walking rather laborious and from its dazzling whiteness proved very annoying, though not to the extent to necessitate the use of a veil, though travellers would do well always to provide themselves with this article or a good pair of tinted spectacles or eyeshades.

On the southern descent of the pass a small glacier was crossed, but a very inconsiderable one compared with that to the north. The descent was extremely steep, far more so than on the opposite side, and soon brought me to the region of birches and verdure, the encamping ground being a rather straitened plot on the hill side covered with a rank crop of grass, wild flowers, and ferns.

*2nd, Camp on east bank of the Wangur river, at Umpti 9,317 ft.\*—* There is no village here, but a mere camping ground in a fine forest of pines. This day's march appeared much longer than the map shows it to have been. The whole of the Wangur valley is remarkably picturesque, the central portion being well wooded with pines, oaks, birches, &c., whilst on either side rise up steep mountains terminating in snowy peaks and glaciers, and in many places scarped into precipices of the grandest dimensions. One of these magnificent precipices opposite the camp exhibited a sheer wall of rock springing from the Wangur river to a perpendicular height of three thousand feet, unquestionably the most majestic scarp I have ever beheld.

*3rd, Wangtu Bridge.*—At the village of Yangpa, some few miles below camping place, changed my Pin coolies, who from this return to Muth. About Yangpa, apricot, peach and walnut trees were flourishing in abundance, and in front of a wooden temple two trees very like fine elms. Some way below Yangpa the Wangur river is crossed by a timber bridge, after which the road keeps along its west bank to Wangtu. This portion of the road is steep and difficult, ascending and descending most precipitous rocks and is quite impassable

for any quadruped larger than a goat. In one spot the road crosses a highly inclined slippery surface of gneiss, on which a footing is impossible, but small holes have been drilled at intervals in the rock in which one can place one's toes whilst others above support the fingers, and by their means a passage across is effected. Ascending this place is comparatively easy, but to descend requires some nerve, as in going down all the danger of the spot is clearly discerned, to say nothing of the greater actual difficulty of descending than ascending a difficult slippery incline, where a single slip is annihilation.

The last descent to Wangtu is excessively steep and difficult, from the precarious footpath being to a great extent concealed by long grass, which greatly impedes walking over such ground, and on this account some of my coolies did not reach Wangtu till after nightfall. Luckily met here a large company of grain merchants conveying wheat into the interior, from whom my coolies purchased some flour, of which their supply was completely exhausted; and there being no village here, I was at first sadly afraid, before meeting these men, that my coolies after their hard day's work would have had to pass the night supperless.

In the book at this bungalow I noticed several complaints from travellers regarding the difficulty of getting coolies and the impudence of the man who had to supply them. No doubt the charges were well founded, but there are some people who seem to suppose that all natives, official and others, should always bestir themselves with alacrity for the mere pleasure and glory of so doing, and my own experience goes to prove that in places where delay is to be anticipated from any cause, a small present coupled with a few civil words is all that is required to obtain anything that is obtainable. Men, accustomed to deal with European travellers along this road soon distinguish for whom they are working, and if they find the new arrival a close fisted individual, they are liable of course, naturally enough, not to exert themselves as they otherwise might. Travellers are too apt to forget, when they arrive perhaps in the middle of the day and want a fresh relay of coolies, that at such a time all the villagers around are scattered in the fields at work and cannot easily be gathered together. I myself experienced no difficulty or incivility at this bungalow, wherefore I have been induced to offer the above remarks.

4th, *Painda bungalow* 6,354 ft.\*—Made a forced march to this bungalow which is a comfortable one on the line of uncompleted new road, but not quite finished. Felt quite jolly at being once more under a comfortable roof, instead of a dripping tent.

5th, *Sáraon bungalow* 6,632 ft.\*—Made a forced march into Sáraon. In the woods near Sáraon hazel nuts were plentiful, and many of them ripe and falling from the trees.

I put up for the night in a large well built room, probably intended for labourers employed on the bridge or road, the only drawback being a few fleas which occupy such situations. The building stands in what evidently once formed the gorge of the Sutlej, before the river had cut its present deep channel a little to the north; though during floods possibly the superfluous waters may still find an exit down this channel. At present, however, it is used as a camping ground for the flocks of sheep which convey grain into the interior, and the whole is clothed with a thick crop of "Batu" dropped by passing grain merchants or travellers, and which flourishes luxuriantly in this moist well manured spot. After my hard march I slept soundly, aided perhaps by the subdued murmurs which reverberated among the rocks from the surging river below.

4th, *Painda bungalow*, 6,354 ft.\*—Before breakfast strolled out and shot several blue pigeons which abound on the precipitous rocks which line the Sutlej here. Large lizards, (*laudakia melanura*?) also abound among the rocks, to the crevices of which they retreat when frightened. They seem to attain their largest size at a height of 4000 or 5000 ft., occurring much smaller at Simla than at lower elevations along the road. Their abdominal cavity usually contains a great number of entozoa lying freely among the viscera, probably the undeveloped or couchant stage of some tænia, whose perfect form must be sought for in the viscera of some carnivorous bird or mammal.

6th, *Dhurni bungalow*, 9,275 ft.\*—This bungalow is situated on the crest of a ridge, and the road is carried over a very sharp ascent, with little attempt to preserve a uniform gradient. In the village just below walnuts were being gathered and peaches covered the trees in profusion, but mostly small and unripe. *Limax altivagus*, *mihi*, was also common in the early morning, its traces being numerous, though I noticed none of the animals during the day.

In front of the bungalow was a large piece of ground under pota-

toe cultivation, of which long untasted vegetable I made free to dig up a few pounds. This must be near the highest limit at which they will thrive, and they certainly could not compare with the potatoes of Kursiang (Darjiling) or Cherra, though it was too early to obtain them of their full size. I do not know if the seed potatoes are cut up in the hills or planted whole, as is invariably the case in the plains, a plan which would account for the smallness of the tubers, independently of other causes affecting the plant.

7th, *Nogri bungalow*, 4,355 ft.\*—Road descends sharply to a feeder of the Sutlej, on the banks of which the bungalow is situated in a narrow picturesque valley, but not, I should be afraid, above the region of malaria. On the way down witnessed the rude way in which sheep are sometimes shorn here. The unfortunate animal I saw, when being operated on, was firmly secured on his side by a rope round his horns, the other end of which was secured to a peg driven into the ground, his hind legs were in like manner pulled out taught, and fastened to another peg, so as to prevent much flinching, whilst his owner was leisurely carving off his wool in short strips by means of a small cheese knife, or a knife of precisely that shape. Up the valley chakor were numerous, but I saw no other game.

8th, *Bowli bungalow*, 7,709 ft.\*—A steep ascent to the bungalow, which is situated on the ridge opposite to that on which Dhurni bungalow is built. This bungalow has an evil repute for fleas, but seemed to have just been cleaned when I used it, and I was not consequently troubled with bed-fellows.

9th, *Sungri bungalow*, 8,356 ft.\*—An extremely good and pretty road, rising slightly to the bungalow. In the morning was awakened by the noise made by the koklas pheasants in the brushwood close by; but so thick was the vegetation that I could not catch a glimpse of a bird. Monal are also common about here, and I purchased a couple of fine skins well prepared by a shikaree.

10th, *Bághi bungalow*, 8,591 ft.\*—Two short stages, amounting to about sixteen miles, passing the Kandála bungalow half way; road excellent and country open and rather pretty. Noticed a swarm of wild bees in a hole in a clay bank, or rather beside a large block of stone embedded in the bank, but only a small chink for entrance. Such a situation is I suspect unusual, and strange to say I have noticed no wild bees' combs on the rocks adjoining the Sutlej, though



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