



Another common tree on the *churs* is a species of date (*Phoenix palustris*), which with its bunches of fruit at once attracts notice. At False Point I embarked on the steamer "Satara" and reached Calcutta on the 23rd.



CHAPTER XII.

SECTION I.

ORISSA AND SAMBALPUR.

1875-76.

INSTRUCTIONS FOR SEASON—LEAVE CALCUTTA BY STEAMER FOR GOPALPUR—RAJA OF VIZIANAGRAM—LAND AT GOPALPUR—CHILKA LAKE—PURI—TEMPLE OF JUGERNATH—SACERDOTAL DISPUTES—CUTTACK—ANCIENT KITCHEN-MIDDEN—COMMENCE MARCH—FOSSIL PLANTS—BRAHMINI RIVER—SHOOT A GARIAL—BEAR SHOT—TIGER WOUNDED—SAMBAR SHOT—URIA CONSERVATISM—THE SECRET OF HOW TO MANAGE THE URIAS—RAJA OF DENKENAL—RAJA OF TALCHIR—COLD SEASON IN ORISSA—ANCIENT STONE IMPLEMENT—BOTANICAL COLLECTOR—TELLINGAS—COAL AT GOPALPERSAD—BEATS FOR GAME—TALCHIR RAJA—CHARACTER OF THE URIA CHASAS—ENTER UNGUL—COAL AT PATRAPARA—HILLY FOREST—TRACK TO WEST OF UNGUL—VALUE OF THE TALCHIR COAL-FIELD AS A SOURCE OF FUEL—RARE BIRDS IN REHRAKOLE—FIRE A CHARGE OF SHOT INTO A LEOPARD—MAN WOUNDED BY A BEAR—A SPIDER LIKE THE COMMON RED ANT—SAMBALPUR—FEVER—NATIVE PANTOMIME—SMALL GAME—ROCKS OF THE MAHANADI VALLEY WEST OF SAMBALPUR—BRINJARAS OR GIPSIES—SAMBALPUR AND CHUTIA NAGPUR DIAMONDS—SAMBALPUR GOLD—MARCH TO ORISSA—BAD WATER—FEVER—UNGUL—ATGARH SANDSTONES—KHURDA—HOT SPRING AT ATARI—CADASTRAL SURVEY—BUDDHIST CAVE TEMPLES OF KHUNDAGIRI—HINDU TEMPLES AT BOBANESHWAR—CUTTACK—CHANDBALLI—CHANDIPAL—RETURN TO CALCUTTA.

My work for this season was to report on the quality and amount of coal in the Talchir Coal-field in Orissa, and on the prospects of making it commercially available. It had been thought by the local authorities, and by the Lieutenant-Governor of Bengal, that if the field could be profitably opened up considerable benefit would accrue to the Province of Orissa. Twenty years had elapsed since the field had been reported on by the Geological Survey.* Indeed, though difficult of

* "Memoirs of the Geological Survey of India." Vol. I.



access, its examination was one of the first pieces of work which was accomplished by the Survey. A rumour had been spread abroad that the field was really of greater value than the geological report had indicated, and an officer of the Public Works had been sent to open up some of the coal-seams, and to bring the coal down to Cuttack for experimental trial in steam-engines. I was further instructed to examine a basin of sandstones in the Mahanadi Valley, above Cuttack, and to give whatever time I could spare besides to the continuation of my examination of the geology of Sambalpur.

I left Calcutta in the British India Steam Navigation Company's steamer "Khandalla," on the 29th October. On our way down the river some little excitement was caused during our transit of the James and Mary shoal, where many good ships have been lost. The steamer drew eighteen and a-half feet, and as it proved there was only twenty feet of water over these treacherous sands. Had we touched, the Pilot afterwards told us, we should have immediately gone over. Among the passengers were the late Raja of Vizianagram and his son, together with a considerable following, both male and female. He was journeying from Benares to his own country, whence he purposed to proceed to Madras, to be present there on the arrival of the Prince of Wales. As being one of the most enlightened native members of the Governor-General's Council, the Raja was well known throughout India. It was therefore with some surprise that I learnt that he countenanced a superstitious belief, to the effect that the growth of indigo, or the employment of iron in the construction of buildings, &c., in his territory would be inevitably followed by epidemics of small-pox and other diseases.

On the following morning we anchored off False Point at ten o'clock. I had intended to land, but as the only boat available was taken up by the Raja and his followers, who being Hindus had to cook their food on shore, I thought it better not to intrude into their company. and accordingly gave up the trip.

Next morning I landed at Gopalpur. I have already described this sea-side town on a previous page. On the following day I



drove into Berhampur, where I had an interview with the Assistant-Collector on the subject of a discovery which had been made of what were supposed to be fossil-bones, and which I had come to investigate. I then first heard that the locality was distant ten days' march in the hills, and the particulars I received convinced me that the deposit was none other than a calcareous tufa, similar to those I have described on p. 254, and elsewhere in preceding pages. I accordingly determined, after a visit of a few days duration to Aska, to push on to Cuttack, where my servants and equipment were already awaiting my arrival.

November 5th.—Aska to Ramba.—I made the journey between these two places by night in a palki, and on arrival next morning at the latter, which I have described in a previous chapter, I could see, far away on the Chilka Lake, the Police boat which was to convey me northwards to Puri or Jugernath, slowly making her way towards Ramba. I embarked during the afternoon, and sailed throughout the night and following day, except where we lay to in order to land and get a shot at the antelope on the strip of sand which separates the lake from the sea, or took fishermen's small boats to go in pursuit of the flocks of geese and ducks which were just commencing to arrive with the beginning of the cold weather. I saw a number of pelicans and other birds, and I felt satisfied that a month or so later the sportsman or ornithologist, or, better still, he who combines both characters, and most ornithologists in India are sportsmen, would find the Chilka to be a perfect paradise for a week or fortnight's sojourn.

Owing to slackness of water we were unable to continue the voyage beyond a place called Urkata, from whence, after a second night spent on board, I travelled twelve miles by palki to Puri, which I reached by mid-day on the 8th. The houses of the English residents at Puri are on the sea-shore, in the middle of a zone of drifting sand-dunes, which at times threaten almost to bury them. The position seems to be not well-selected, since the glare from the sand and the grit in the air are very real



sources of discomfort. The native town surrounding the temple of Jugernath lies further inland, and is surrounded by a luxuriant vegetation, which presents a markedly tropical aspect, owing to the presence of screw-pines and palms.

November 9th.—Puri to Cuttack.—In the morning, in company with the Superintendent of Police, I rode round the outer wall of the great temple of Jugernath, and through the suburbs of the town. I should be very glad to give a description of the temple could I do so at first hand, but since it is surrounded by a high wall, and no European is permitted to pass the threshold of the gates, information on the subject cannot be obtained by a personal visit. It is stated that it was under discussion among the priests whether they should not invite Lord Mayo to enter the temple when he visited Puri, as he intended to do, towards the end of the tour which was cut short by his assassination at the Andamans. The pilgrims whom I saw were a dirty and beggarly-looking lot; the female portion consisting, for the most part of decayed and excessively-ugly old women, who were clad in soiled raiments.

There was a bitter discussion and controversy going on in Puri in reference to the temple: it was a case of Church *versus* State; the Raja, in whom the guardianship and a portion of the revenues were vested by the Government, being on the one side, and the priests with a portion of the worshippers on the other. Under former Governments the paramount authority always secured for itself a portion of the revenues of Jugernath, as well as of other places of pilgrimage throughout the land; but it was not thought advisable that the British Government, or the Company before it, at least for many years back, should avail themselves of such sources of income, and hence they have devolved upon the Raja.

Although on bad terms with the priests, and compelled to obtain the interference of the local authorities to bring them to order, the Raja was regarded as a person of exceptional sanctity. About two years ago, however, he was sentenced to a term of penal servitude for a murder committed in his presence,

and by his orders, which for cruelty in its details has perhaps not often been equalled. The punishment, nay, even the trial of this almost deified personage, who richly merited hanging, caused great excitement in Hindu society; an excitement almost equal to that which arose when, a century ago, the first Brahmin Nund Kumar was sentenced to death by the British, who had previously not ventured to make Brahmins amenable to the common law. One curious cause of discord had arisen just before the time I write of. In consequence of the insecure and dangerous state of the great central dome in the temple—of which, indeed, a portion had already fallen—it had been necessary to remove the image of Jugernath from its lofty throne, and place it in a sort of chapel-of-ease, or minor shrine, where there is no throne. One party of ecclesiastics maintained that so long as this state of things continued, and Jugernath remained away from his throne, the holy food, which is prepared for and distributed to the pilgrims, would be shorn of its sanctity and efficacy, and that no pilgrim would derive any benefit from a visit to the temple during the same period. This must have been rather distressing intelligence for those who had travelled many hundreds of weary miles from their homes. Other Pundits likewise learned in ecclesiastical law held a contrary opinion, and hence a very pretty quarrel was in progress.

November 10th.—Cuttack.—I arrived at Cuttack this morning, having travelled during the night by palki from Puri. I should have liked to remain there a day or two longer in order to visit the Black Pagoda, an extensive ruin situated on the coast a few miles further north; but I was anxious to push forward, and expected that two or three days spent in Cuttack would serve to enable me to make all necessary arrangements about carriage and some extra servants. I found, however, that Urias are not to be hurried, and, as I have previously remarked, and also subsequently found to be the case, Cuttack is a very difficult place to get out of when once you have got into it. During the week which I was thus compelled to remain there, I paid a visit to some laterite quarries at the site of an old town called



Chaudwar on the north bank of the main branch of the Mahanadi. My object in visiting these quarries was to examine the circumstances under which a bed of laterite, which was said to contain fragments of pottery, occurred. The specimen from these quarries which had attracted the notice of one of the engineers in charge of a section of the irrigation works, was a large block of laterite which had been rejected as unsuitable for building purposes. Although I could detect no very sharply-marked line of demarcation between the portion of the block which contained the pottery and that which was free from any trace of it, still it was apparent that, in so far as this particular specimen was concerned, the layer of pottery was superficial—in other words was *on* not *in* the laterite. On reaching Chaudwar, I found that throughout a considerable portion of the area occupied by the quarries, the cuttings down to the surface of the laterite disclosed sections of from one to three feet of a layer of broken pottery and bones,—in fact, the remains of an ancient kitchen-midden. The base of this layer, the portion in contact with the laterite, is firmly cemented by ferruginous matter; but higher in the sections the deposit becomes looser and looser as it rises to the surface. In some cases the pottery is so firmly attached to the laterite that it cannot be detached without fracture. It is not, I think, necessary to suppose that the laterite was in a soft or only partially formed condition when the pottery was first thrown down upon it. The percolation of waters from above, more or less charged with organic matter, may have acted upon its upper surface in such a way as to cause the solution and subsequent deposition of the ferruginous matter which now includes and binds to the laterite the fragments of pottery.

Had this been a *bonâ-fide* case of the occurrence of pottery *in* laterite it would have had an interest very much greater than it can be now said to possess. Although evidence, that of stone implements, has been found of the existence of man while one of the forms of laterite was being deposited, it still remains to be proved that man, so far advanced in knowledge of the arts



as to manufacture pottery, lived in India at so early a period. As to the age of the deposit, the date of the founding of Chaudwar, the capital of Orissa, would only furnish a rough indication; but even it is not certainly known. Mr. Beames puts it at probably A.D. 350, other authorities so far back as A.D. 23.* Either is probably sufficiently remote for the completion of the operations giving rise to the phenomena above described and which belong most distinctly to the, geologically speaking, present period.

November 17th.—Cuttack to Kukur.—At length, having completed my list of servants, purchased a second horse, and made other arrangements, I parted to-day from my friends in Cuttack, and made my first march, a short one in consequence of the river crossing, to Kukur. On the following day I was fortunate in making a discovery of fossil plants in some sandstones which occupy the already mentioned basin to the west of Cuttack. These fossils have since served to determine the age of these rocks as being identical with that of those which occur interstratified with the basalt of the Rajmahal Hills. Two days later I reached Denkenal, the chief town of a native state of the same name. Here the Raja had provided a commodious bungalow for the accommodation of English visitors. In the evening I joined him in a beat for game close to the village, but nothing save a jungle-fowl was shot. There are animals in the neighbourhood, however, and my men sent on in advance, had seen two wild elephants. From Denkenal I marched to Bowlpur where I found two Greeks, the agents of a Calcutta house, engaged in collecting timber and country produce generally, such as oil-seeds, &c.

November 24th.—Kurakpershad.—Three marches along the banks of the Brahmini brought me to Kurakpershad, where I took a boat in the afternoon in order to try to get a shot at the crocodiles and garials which were very abundant in the river.

* See on this subject "Indian Antiquary," February, 1876, p. 55.

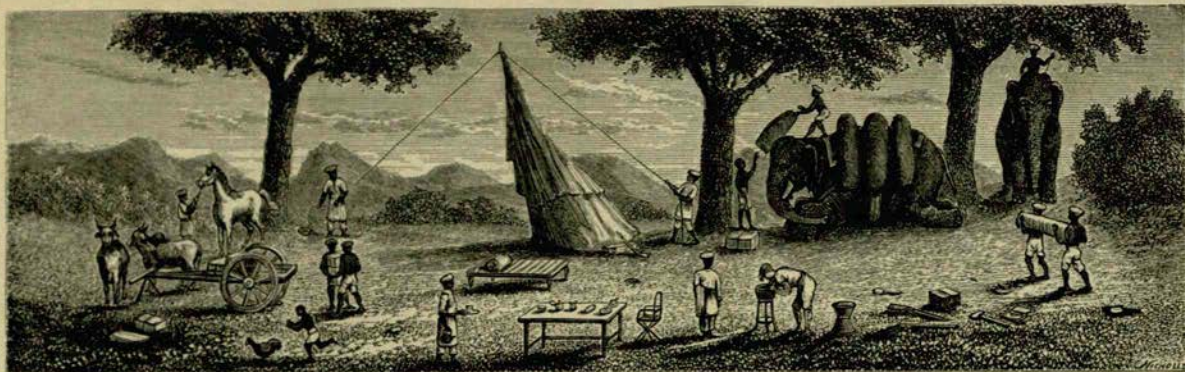


Plate VIII.]

THE CAMP AT 6 A.M. AND 6 P.M.



One of the latter, which I hit with an Express bullet in the neck, was unable to reach the water near which he was lying in consequence of his fore-limbs becoming paralyzed, though he lashed about vigorously with his tail. He proved to be about ten feet long, and it was rather a difficult job to hoist him into the boat. At the next camping-place, Kumlong, the camp was prettily-situated on the banks of the river, and commanded a good view of the rocks which make the navigation of the Brahmini so difficult at and above this point. The river is most dangerous when in flood, as these rocks are then concealed beneath the surface, and should a boat come in contact with them, it immediately capsizes and is broken-up. This subject was one of importance for my consideration in connection with the subject of bringing the coal down to Cuttack, upon which I had to report.

November 30th.—Karpada.—To-day I arranged with the jemidar of the Denkenal Raja, who accompanied my camp to provide supplies, to have a beat for game in a range of hills to the north of Karpada. Men were ready in the afternoon after my return from work. I was placed in what was considered to be the most likely pass for the game, with some village shikaris with their guns thrown out on either flank. I saw no animals during the beat, but a shot was fired on either side of me. The first proved to have been at a bear, which was badly wounded, and to which I gave a finishing bullet. The other was at a tiger, which had also been wounded. Getting on its track, which was marked with blood, I followed it up, and in one place saw the jungle moving in front, but failed to see the animal itself, and the tracks were lost; but before I gave up a sambar crossed our path, and I shot him. On the following day I resumed the search, beating over the same ground, when I shot another sambar. But the men were very inefficient trackers, and we saw no more of the tiger. Some time afterwards I heard that the remains of a tiger had been found a few miles off, on the other side of the Brahmini river.

The jemidar whom I have mentioned above was a Mahomedan, and amused me by his stories of the Urias, whom he

regarded with no little contempt on account of their uncleanly habits, their superstition, and their aversion to all change and improvement. He told me of some villages where in the hot months there was no water, and what was required had to be daily brought from several miles distant. The people were urged by the Raja to make wells for themselves, but declined to do so on the ground that their fathers before them had not had wells, and that therefore they would not have any. During the Keonjur war in 1868 the Raja of Denkenal was called upon by the local authorities to furnish carriage for the conveyance of grain to the troops, whereupon he invited the proprietors of pack-cattle to attend with their beasts; but they replied that they would rather be excused. The jemidar then asked permission of the Raja to be allowed to exercise his powers of persuasion on them. This being granted, he in a very short time had assembled more pack-bullocks than were required, and, on the Raja asking for his secret of "how 'twas done," he replied to him by telling a story, which was something to this effect:—Once upon a time a Raja had a favourite who took umbrage at something that was said to him, and retired to the forest in high dudgeon. The Raja became disconsolate, and sent a series of deputations, and even his own private palki as a conveyance, and besought the favourite to return; but he would not. At length one of the courtiers asked for permission to try whether he could not bring the favourite back. This being granted, he went up to him, and, removing one of his shoes from his foot, proceeded to give him a severe castigation with it, whereupon he cried out for mercy, and forthwith marched back to court. "Similarly," said the jemidar, "I gave one of the bullock-owners a thrashing, when not only he, but all the others, who feared a like treatment for themselves, brought their bullocks without further delay."

The Denkenal Raja, though possessing an establishment, it was said, of about sixty wives and concubines, was without male heir, and, at the time I write, was very anxious that the Indian Government should become heir, not only to his



estate, but also to a considerable sum of money invested in Government securities. To this, however, the local authorities were opposed, and, under their influence, I believe, he adopted an heir from the neighbouring family of the Raja of Bôd, and this heir has since succeeded to the Raja. In view of the backward state of Denkenal (though one of the best managed of these estates) and its capabilities, it seemed to me to be somewhat unaccountable that the Government should have declined the offer of so valuable a bequest. However, these were probably good reasons for the action taken in the matter. There is no doubt that some of the Rajas of the adjoining estates regarded the prospect of its absorption into British territory with alarm, and several of them expressed to me, pretty openly, their views on the subject.

December 3rd.—Egaria.—I had now entered another state—that of Talchir—and I was at Egaria visited by the Raja, a young man of about one-and-twenty years of age, whose appearance and manner did not prepossess me much in his favour; but as I shall have to refer to him again, I shall reserve my account of him for the present. Several beats which he gave me for game were such miserable fiascos that I declined to join him in any others. The matchlock-men were so noisy that it would have been a miracle if any animals had broken in our direction. They were, moreover, far more numerous than the beaters, who were the worst I have ever seen.

I often longed at this season for the cool weather of the Chutia Nagpur highlands; for the cold season of Orissa is rather a delusion. At night I commonly slept with little or no covering and with both the doors of my tent open, while by day the heat was often very oppressive. At the same time I used to read in the papers how at the camp, then being held at Delhi, it was necessary, on account of the cold, to have stoves in the tents, and to wear great coats at dinner.

December 11th.—Kusramunda.—To-day I found an ancient stone implement of the chipped quartzite type, very similar to a form of which great numbers have been found in Madras.



Subsequently I met with a few others. These will be found figured in Appendix B.

I had promised the Superintendent of the Botanical Gardens at Calcutta to collect plants for his herbarium, and for this purpose when in Cuttack I had engaged a Mali or gardener to accompany me who was said to know something of wild plants. He had, however, played me false, and never joined my camp. On writing to the magistrate about him, I received in reply a note something to this effect :—"When you engage an Uria to do anything he has to pass through three stages—first, he gets fever; secondly, his mother dies; and thirdly, his sister gets married. After which he may begin to consider the propriety of fulfilling his contract. The mali has not yet got through the first of these stages."

December 16th.—Sundrapal to Chindipuda.—To-day the camp was visited by a party of acrobats, who called themselves Tellingas; though their professional language was Hindi, I heard them talking Uria among themselves. Considering that they had none of the usual European appliances, such as springboards, &c., their performances were marvellous; two of them turned complete summersaults, springing off the bare ground. They were of an inky blackness, and possibly belonged to a gipsy race.

December 19th.—Royjono to Gopalpershad.—At Gopalpershad there is a considerable seam of coal exposed in the Tengria River, and some trial shafts had been sunk in it, and fifty tons of the coal taken to Cuttack for trial. It had proved to be very poor fuel, as might indeed have been concluded from an examination on the spot, and much more expensive than English coal considering the work it was capable of performing.

I had several beats here in the afternoon, in one of which two bears, a hyæna, and several deer were seen, but I did not get a shot at them, and none were bagged by Saidon or the matchlock-men, of whom a considerable number assembled. The people were very sad at this result, but attributed it to the deity who presided over the forest. It was hinted to me, as it had been under similar circumstances in Singhbhum, that he



might be induced to withdraw his protection were I to present the local priest with some sweetmeats. This I declined to do, though I rewarded the beaters liberally as they had done their work uncommonly well for Urias.

December 25th.—Talchir.—Yesterday, after my arrival at Talchir, the chief town of the State of the same name, the Raja called on me, and to-day I went to pay a return visit at the palace. I was received in the cutchery, or office. As I approached I could see preparations being hurriedly made to give an appearance as though formal business, a trial, was going on. The whole thing was a stupid farce, and was wretchedly enacted. After I had witnessed it for a short time, I proposed an adjournment of the court, and we moved into what might be called, perhaps, in Mahomedan phraseology, the Dewan-i-Khas, or private audience-chamber. Dirt and squalour were prevalent all round, and the Raja's people very deficient in everything like courtesy of manner. All were supremely ignorant, or seemed to be so, of matters out of the Province of Orissa. They did not know even the names of many notable places in India. I noticed in one corner a pile of Uria newspapers lying in their covers unopened. The paper is published in Cuttack, with the view of conveying information about public affairs to readers of the Uria language; but these people were too apathetic to take the trouble of reading it. The Raja had some slight knowledge of English, and blundered through a page of a two-syllabled class-book for my edification. The book belonged to an educational series consisting of first, second, and third books, &c., and I felt somewhat posed for an answer when he asked me how many books there were in the English language. He was apparently under the impression that the whole literature of England was arranged in a progressive scale of this nature.

About the only article of English manufacture, besides guns, which he possessed, was a telescope, which indeed he sent for my examination before he first called upon me. I presented him with a pocket sun-dial, to which he seemed to have taken such a fancy, that I was somewhat disconcerted by his off-hand way of



receiving it. Although his appearance and manner were not pleasant he must have some good points about him, as I have continued to receive up to within the last few months, and since my arrival at home, letters from him, which shew a decided improvement in his knowledge of English. The following is a specimen :—

TALCHIR FORT 25th May 1878

MY DEAR V. BALL ESQ

I become more glad to receive your acknowledgment letter of the 13th Instant and felt rather than before to hear that you are in good health and immediately ready for marching to England for two years before leave. I Do not know where and in which plese being your own house. I request the favour of your informing me by the Post letter. The above requests before are after your going there.

I also beant to state you that I had lately been travelled to Moffussils for inspections and shootin some of animals as below
2 Deers, 4 Hogs, 1 Khoarung, 1 Tiger Totals 8

I am quite well hoping you and your householders are the same

Yours truely

RAM CHUNDER BEERBUR HURRI CHUNDUN

MOHINDER BHADUR, Raja of Talchir.

The dalli which he sent me during the day was a very considerable one, covering many brass trays, which were borne on men's heads. There was a lamb, fish, vegetables, and sweet-meats *ad nauseum* as far as I was concerned ; but they were very speedily divided and gobbled up by the servants. Before I left Talchir I had several more visits from him, but obtained little information of interest.

December 29th.—Kompur to Porongo.—To-day I dismissed the people of the Talchir establishment, who had been sent with my camp by the Raja to provide supplies ; they were a useless and ill-conditioned lot, being headed by a confirmed opium-eater, who used to precede the camp by way of making preparations, which he however never did make. I was heartily glad to pass from a State occupied by a population so debased and degraded into another, Ungul, where the people might be better, but could not easily be worse. And here I may as well attempt to describe the Chasas, or Uria cultivators of the Orissa tributary Mehals.



They are of a spare and weakly habit of body, their features hard, with high and prominent cheek-bones, and a generally forbidding aspect, the hair of the head is often completely shaved, save one lock on the poll. Frequently their gnarled-looking countenances reminded me of those representations of hobgoblins that one sometimes sees in old oak carvings in cathedrals. They are untruthful to the last degree. Writing of them many years ago, Lieut. Kittoe said:—"It is next to impossible to obtain any correct information even on the most trivial subjects. Every question put by a stranger is considered and re-considered ere a reply is given, and that too is an interrogation as to the object you have in asking it." I found this to be still quite true. Often in a village one man out of a crowd would tell me an obvious and foolish lie, and all the rest would invariably affirm the same to be the case. Their ideas as to their own personal sanctity, and the restrictions put upon them by caste, are not the least extraordinary points about them. In some of the villages the Chasas would refuse to hold a rope or help to carry a log of timber with a Chatia, though both were living as neighbours. I found it very difficult to arrange for the carriage of my sick, as these people generally refused to act as bearers, and moreover there were no charpoys or bedsteads in the villages upon which they might have been carried, while on the other hand my Uria cartmen refused to allow certain of the lower classes of the servants to sit with the baggage on the carts, as they said it would defile them, and cause them to be fined by their co-religionists. Their curiosity is insatiable: occasionally they would walk up to my tent and peer in at the door in a way that most other natives would hesitate to do. Sometimes when passing a village crowds would flock out like a troop of monkeys and squat down on and about the path I was taking, not offering to move out of the way till I almost rode or walked on top of them, when, without rising, they would simply draw themselves crab-like on one side. They never offered the customary salute or *salaam*, while a chance Mahomedan or up-country man met on the roads in Orissa would seldom fail to do so. Their strident

voices, their eternal chattering and gossip, often carried on close to the tent, used to drive me nearly mad. They might be sent away to a distance, but, like flies, they or others would soon be back again, shouting at and squabbling with one another. It is a fact that two Urias engaged in *conversation* as they walk one behind the other along the road can be heard distinctly at a quarter of a mile's distance. Whether engaged at work, or in search of game, I naturally preferred to go quietly through the jungles, yet it was well nigh impossible to keep the coolies' tongues from wagging. Gossip is the salt of existence to most natives of India, but their tongues are generally under some restraint—not so those of the Urias.

January 2nd.—Durgapur to Handiguda.—I had now entered Ungul, which is a state directly under British management, there being no Raja. On arrival at Handiguda I was told that a cow had been killed, and that two tigers had been heard fighting over the carcase during the night. Early this morning the meat had been removed by the Chatias of the village for their own consumption. Men in sufficient numbers were not to be obtained for a beat, and no persuasion could induce the people to let me have a cow to tie up, though I entrusted the getting of one to a Christian Constable who himself should have had no scruples. I declined the offer to sit up over a couple of kids as I had previously had enough of that kind of thing.

January 6th.—Patrapara.—In the neighbourhood of Patrapara is one of the few exposed seams of coal in this field. The quality is somewhat better than that at Gopalpersad, but it is still very poor stuff. It can only become of value should a line of railway ever pass in its vicinity, connecting Cuttack with Sambalpur. To the west of Patrapara, extending thence into Rehrakole in the Central Provinces, there is a wild tract of forest and hills in which gaur and buffaloes are to be found. On its margin I met with a colony of very black-looking people called Soundas, who are probably identical with the Sowras or Savaras of Ganjam and Southern Orissa. There were also some Khonds and Bowries in this neighbourhood. Up to the foot of the hills



there were extensive clearances planted with castor-oil; the plants rarely exceeded three feet in height, and are generally not half that—being, therefore, very much smaller than the bushes which are grown near villages, and which sometimes appear to be perennial. Other oil-bearing seeds are cultivated largely in these tracts, and the yield must be considerable.

In a field of cotton at one place I saw a single house the proprietors of which were there and then, on the spot, engaged in spinning and weaving the cotton into a coarse fabric. If Manchester could only have her way altogether, such a sight would never more be seen in India. In Dacca and elsewhere where the finer fabrics used to be made in large quantities, the industry has been almost crushed out of existence.

The results of my examination of the Talchir Coal-field, which formed the subject of a special report to Government, may be stated in brief as follows:—

First. The known coal-seams contain fuel of a quality very inferior to ordinary Ranigunj coal.

Second. The thorough exploration of the field by boring would be very costly.

Thirdly. The coal consumption in Orissa is too trifling to support a regular mining establishment; and, further, were coal even to be found hereafter in Talchir, equal to that of Ranigunj, it could not, owing to expensive land and river carriage, compete successfully with seaborne coal, whether Indian or English, at the Orissa seaports.

I could not, therefore, recommend any further expenditure being incurred in reference to the development of this field.

January 12th.—Nakrideol.—I had now left the coal-measures of the Talchir field behind me, being on the way to Sambalpur. I was, therefore, rather surprised to find a large fragment of coal lying in the bed of the Tikaria river to the north of Nakrideol. The discovery first caused me to suspect that there might, perhaps, be another hitherto undiscovered field higher up the valley, but I afterwards ascertained that it had in all probability been brought from Patrapara, as a priest in the neighbourhood was in



the habit of using coal, brought from thence, in his religious ceremonies. At Nakrideol, in a very ancient mango-grove, I shot a number of rare and beautiful birds, including a trogon (*Harpactes fasciatus*, Gmel.), only one specimen of which had ever been previously obtained so far to the north, the regular home of the bird being in the western and southern forests of the Madras Presidency.

January 16th.—Balum to Konchonpur.—To-day I took a shot at a jungle-fowl which rose out of a field at the foot of some hills; as he dropped wounded among the bushes, I ran forward to intercept him, and suddenly found myself within about thirty yards of a leopard, which had apparently not been much disturbed by the shot, but proceeded to run off as he caught sight of me. There being no time to put in a bullet I rather imprudently let him have the charge of shot. He fortunately did not resent this, but disappeared in the cover without giving me another chance.

At this place a man came up to the camp who many years previously had been wounded by a bear. A more horrible disfigurement of the face I have never seen—one eye, the nose, and the front-teeth, had been torn away. It is said that bears when attacking more commonly injure the face than any other part of the body. Several other villagers here shewed me old wounds which had been caused by bears.

January 17th.—Konchonpur to Megpal.—While waiting at Megpal for the arrival of the camp I occupied myself in watching a number of red ants (*Formica smaragdina*, Fabr.) which were scampering about among some rocks. What I at first supposed to be one of them had the abdominal portion somewhat shorter, and carried it higher than the others; a little closer examination shewed it was a spider—a veritable wolf in sheep's clothing. Even its way of running resembled that of the ants. Although I have in previous pages alluded to several cases of close imitation or mimicry in structure between very different animals, I have certainly never met with a more remarkable instance than this. I unfortunately lost this specimen, as it spun a



thread, dropped from my hand, and disappeared amongst leaves. I have never since been able to find another like it, and I do not know whether it has ever been described or named.

Two days after this I reached the station of Sambalpur, where I was glad to meet with friends after my two months spent in the tributary States of Orissa.

January 23rd.—Sambalpur to Tabla.—I found the climate of Sambalpur very pleasant after the damp heat of Orissa; but ere long I had my usual attack of fever, which crippled me for some little time. The country which I was about to examine, in continuation of last year's work, lay to the north of Sambalpur, and east of the Ebe river. The inhabitants in this tract belonged to a great variety of different races, including Kultas, Bhumias, Gores or Gonds, Pabs, &c. At one place called Kudderbuga I was entertained by the villagers with a kind of pantomime. There were two young and good-looking boys, gorgeously appareled, who sang and danced very cleverly. Then there were various characters, such as the Raja with a huge wooden mask, the comic man, the fakir and his son, and other miscellaneous personages.

Tanks and jheels in this tract often afforded me some shooting, ducks, teal, and snipe, being occasionally met with. On the dry uplands two species of sand-grouse (*Pterocles*) were sometimes to be found, but they were not very abundant, being scarcely more than stragglers. In the sandy and rocky tracts of Western India they sometimes occur in vast flocks. I revisited Laikera, the place where I last year shot the gaur or bison, but could not find any more, nor did the buffaloes then appear to be any longer in that part of the country; the only animal which I shot was a nilgai which hardly rewarded me for so long a journey.

February 25th.—Bulwaspur to Sambalpur.—To-day I returned to Sambalpur, and, after a day's rest, marched south-westwards along the southern bank of the river, in order to make a preliminary examination of a series of rocks which occur there, and are intermediate in age between the coal-measures and the



crystalline or metamorphic rocks. This series consists of sandstones, shales, and limestones, which, though unfortunately not containing fossils, may safely be identified with a portion of the great Vindhyan formation which occupies a large area in North-Western India. As I shall presently describe, the series includes some diamond-bearing strata.

From day to day I marched westwards along a narrow belt of flat ground intervening between the foot of the Barapahar hills, which are formed of these rocks, and the southern bank of the Mahanadi. Near the village of Kurumkel I shot two specimens of a very rare bird, the spotted creeper (*Salpornis spilonota*, Frankl.), which I had only once obtained in Chutia Nagpur. Ten years ago there were only two or three specimens of this bird in collections: of late years it has been found in several different parts of India; but it is still a treasure for the ornithologist.

March 11th.—Pudampur.—I had now forded the Mahanadi and crossed to Pudampur, on the northern bank, from whence I purposed returning eastwards. To-day when passing through the village of Labanatand, a sort of standing camp or depôt of the Labanos or Brinjaras, I was at once struck by the peculiar costumes and brilliant clothing of these Indian gipsies. They immediately recalled to my memory the appearance of the Zingari of the lower Danube and Wallachia.* In about two minutes I was surrounded by all the women of the place, who commenced to chaunt and escort me across the fields. This attention, however, I declined, as I was at work and did not care for their company, and they retired, somewhat crestfallen at my repelling them. Afterwards, however, in the evening two parties about thirty strong each, came to the camp and sang for an hour or so in the peculiarly melancholy minor key which characterises all the music of these people which I have heard.

* I was informed by a Russian Prince who travelled in India in 1874, that one of his companions, a Hungarian nobleman, found himself able to converse with the Brinjaras of Central India, in consequence of his knowledge of the Zingari language.



Later on, after I had returned from a cruise among the rocky islets of the Mahanadi, where I shot several birds which I had not met with before—further detachments, not only of Brinjaras, but also of other tribes, performed their respective dances and songs, so that the amount of *largesse* which I had to expend amounted to a considerable sum.

March 12th.—Pudampur to Kudibuga.—To-day I passed through another Brinjara hamlet, from whence the women and girls all hurried out in pursuit, and a brazen-faced powerful-looking lass seized the bridle of my horse as he was being led by the sayce in the rear. The sayce and chuprasi were both Mahomedans, and the forward conduct of these females perplexed them not a little, and the former was fast losing his temper at being thus assaulted by a woman; *volens volens* they wished to persuade me to stop to listen to their singing again, but the previous day's performance had been quite sufficient for me.

From the Dewan of Kudibuga, whom I mentioned in the last chapter, I heard that according to tradition the Bairias, Chirus, and Bhils, were the earliest inhabitants in this part of the country, and that there are remains of old forts made by some of them. A few small colonies of these tribes still remain. The Kultas, who form a large section of the inhabitants, say they first came from Ajudiah or Oude. The Dewan also told me that the strong-minded Brinjara women are in the habit of inflicting severe chastisement on their husbands with very large sticks (*bara bara lathi*). A similar custom prevails in the Nicobar Islands. This fact, I find, I have omitted to mention when writing of the Nicobarese in Chapter V.; but I may, perhaps, though it is somewhat out of place, here quote Dr. Rink's remarks on the subject. Speaking of the women, he says:—"I have reason to believe they even occasionally exercise palpable authority over the men, and that a closer view of their matrimonial life would shew that the respect of these people towards the fair sex did not, strictly speaking, originate in the free-will of the men, and is not, therefore, to be considered a virtue."

A week after this I had completed the work of examination of



the rocks in the valley of the Mahanadi, so far as time had admitted, and it was now necessary for me to march back to Orissa, where there was still much to be accomplished before my season's operations would be completed. But before passing away from Sambalpur I shall give an account of what I have been able to ascertain regarding the occurrence of diamonds in Sambalpur, together with a sketch of such historical notices on the subject as I have been able to trace. Already this account has in substance been published elsewhere,* but as diamonds have always an interest for the general reader I believe that I do not err in reproducing it here.

In Rennell's "Memoir on a Map of Hindustan," † the following passage occurs:—"On the west of Boad and near the Mahanuddy river, Mr. Thomas passed a town of the name of Beiragurh, which I take to be the place noted in the Ayin Acbaree as having a diamond mine in its neighbourhood. There is indeed, a mine of more modern date in the vicinity of Sambalpur; but this whole quarter must from very early times have been famous for producing diamonds. Ptolemy's *Adamas* river answers perfectly to the Mahanuddy, and the district of *Sabaræ*, on its banks, is said to abound in diamonds. Although this geographer's map of India is so exceedingly faulty in the general form of the whole tract, yet several parts of it are descriptive."

With reference to Beiragurh I can find no place of that name in Sambalpur, and the late Mr. Blochmann, to whom I referred the matter, informed me that the Beiragurh mentioned in the Ain Akbari is there stated to be in the *Subah* Berar, and was therefore probably not identical with the place mentioned by Mr. Thomas, according to Col. Rennell. In Ptolemy's map ‡ the *Adamas flus* flows into the *Gangeticus sinus* (Bay of Bengal),

* "Records of the Geological Survey of India." No. 4, 1877.

† "London," 1792, p. 240.

‡ *Asiæ x. tab. "Geographiæ libri Octo, Gr. et Lat. Opera P. Bertii Lugduni."* Bat. 1618. Fol.



mid-way between Cosamba (Balasore?) on the north and Cocala (Sicacole of Arrowsmith's map, the modern Chicacole). The Dosaron and Tyndis rivers probably represent the Godavari and Kistna, so that it is very likely that the Adamus may safely be identified with the Mahanadi. Ptolemy represented the Adamas as flowing through the district of Sabaræ, across which runs the following description:—"Apud quos adamas est in copia," which is otherwise given in an earlier edition of the map,* "*Sabaræ i his habundat adamas.*" Both sentences read strangely from a classical point of view, but mean that in Sabaræ the diamond occurs in abundance. The upper portion of the river passes through a district named Cocconage, which would include Chutia Nagpur. There are good reasons for believing that diamonds were found in Chutia Nagpur also. The following notices on the subject I quote from a paper by the late Mr. Blochmann †:—"Kokrah (the ancient name of Chutia Nagpur) was known at the Mughul court for its diamonds, and it is evidently this circumstance which led the generals of Akbar and Jahangiri to invade the district. I have found two notices of Kokrah in the Akbarnamah, and one in the Tuzuk-i-Jahangiri, from which it appears that Chutia Nagpur was ruled over in 1585 by Madhu Singh, who in that year became tributary to Akbar. He was still alive in A.D. 1591, when he served under Man Singh in the Imperial Army which invaded Orissa. Tuzuk-i-Jahangiri (p. 155):—"On the 3rd Isfandiarmuz of the 10th year of my reign (A.D. 1616) it was reported to me (Jahangiri) that Ibrahim Khan (Governor of Bihar) had over-run Kokrah and taken possession of its diamond-washings. This district belongs to *Subah* Bihar, and the river which flows through it yields the diamonds. When the river contains little water, tumuli and hollows are formed. The diamond-diggers know from experience that

* Tab. x. "Cosmographiæ," libri viii. Lat. Justi de Albano, Ulmae. 1486. Fol.

† "Journal Asiatic Society of Bengal." Vol. xL.



chiefly those tumuli contain diamonds over which insects hover, called by the Hindus *Jhingah*. They pile up stones on all sides of the tumuli, and then cut into them with hatchets and chisels and collect the diamonds from among the sand and stones. Sometimes diamonds are found of the value of a lac of rupees each. The district and the diamond river are in the possession of the Zamindar Durjan Sal. The governors of Bihar frequently sent detachments into Kokrah; but as the roads are fortified and the jungles impenetrable, the governors were generally satisfied with a tribute of two or three diamonds. When I appointed Ibrahim Khan Governor of Bihar, *vice* Zafar Khan, I told him at the time of departure to invade the district and drive away the unknown petty Raja. No sooner had Ibrahim entered on his office than he prepared himself to invade Kokrah. The Raja, according to custom, sent a few diamonds and elephants; but Ibrahim was dissatisfied, and invaded the district before the Raja could collect his men. When he received news of the invasion he was already besieged in the pass where he used to reside. Some of Ibrahim's men who had been sent out to look for him, found him with several persons, among them his mother, another wife of his father, and one of his brothers, concealed in a cave. They were deprived of the diamonds in their possession. Twenty-three elephants besides were taken. * * * The district is now subject to me. All diamonds found in the river are forwarded to court. Only a few days ago a diamond arrived which had a value of 50,000 rupees, and I hope many more will be added to my store of jewels.' The diamond river alluded to is the Sunk." To the present day a spot in the Sunk river* is pointed out by the inhabitants as the place where the diamonds were washed for.

Mr. Blochmann also gives a quotation from a history of the

* The geological structure of the valley of the Sunk river is at present very imperfectly known, and it remains to be seen whether the rocks resemble those of Sambalpur.



Maharajahs of Chutia Nagpur, in which is described a method of testing diamonds for flaws by affixing them to the horns of fighting rams, and states that, "Jahangiri says the diamonds which Ibrahim Khan had brought from Kokrah had been given to the grinders, 'They were now submitted to me, and among them is one which looks like a sapphire. I have never seen a diamond of such a colour. It weighs several *rattis*, and my lapidaries fix its value at 3,000 rupees, though they would give 20,000 for it if it were quite white and stood the full test.'"

Colonel Dalton (*Ethnology of Bengal*, p. 163n), states that the Raja of Chutia Nagpur's family still possesses a diamond valued at 40,000 rupees, from these now fabulous mines. As illustrating the methods by which English officials in the olden time shook the pagoda tree, the following will be read with interest. In the year 1772 the Raja appeared before Captain Camar, commanding a force in Palamow, and after exchange of turbans acknowledged himself as a vassal of the Company. "In regard to this exchange of turbans," writes Colonel Dalton, "the family annals tell a strange tale. In the Raja's turban were some very valuable diamonds, which, it is insinuated, had excited the cupidity of Captain Camar. The proposal for the exchange emanated, it is said, from him. He declared it was the English method of swearing eternal friendship, but the Captain had no diamonds in his head-dress, and the Raja evidently concluded that he had been rather 'done' by the Company's officer."

In comparatively recent times, so far as I have been able to ascertain, the first published notice on the subject of Sambalpur diamonds is to be found in the narrative of a journey which was undertaken by Mr. Motte in the year 1766.* The object of this journey was to initiate a regular trade in diamonds with Sambalpur, Lord Clive being desirous of employing them as a convenient means of remitting money to England. His attention had been drawn to Sambalpur by the fact that the Raja had, a few months

* "Asiatic Annual Register," London, 1799.



previously, sent a messenger with a rough diamond, weighing $16\frac{1}{2}$ carats, as a sample, together with an invitation to the Governor to depute a trustworthy person to purchase diamonds regularly. The Governor proposed to Mr. Motte to make the speculation a joint concern, "In which," writes the latter, "I was to hold a third; he the other two: all the expenses to be borne by the concern. The proposal dazzled me, and I caught at it, without reflecting on the difficulties of the march, or on the barbarity of the country, &c."

In spite of his life being several times in danger from attacks by the natives, the loss of some of his followers by fever, and a varied chapter of other disasters, Mr. Motte was enabled to collect a considerable amount of interesting information about the country. Owing to the disturbed state of Sambalpur town, however, he was only able to purchase a few diamonds. After much prolonged negotiation, he was permitted to visit the junction of the Rivers Hebe (Ebe) and Mahanadi, where the diamonds were said to be found. A servant of the Raja's, who was in charge there, informed him that "it was his business to search in the River Hebe, after the rains, for red earth, washed down from the mountains, in which earth diamonds were always found. I asked him if it would not be better to go to the mountains and dig for that earth. He answered that it had been done, until the Mahrattas exacted a tribute from the country; and to do so now would only increase that tribute. He showed me several heaps of the red earth—some pieces of the size of small pebbles, and so on, till it resembles coarse brick-dust—which had been washed, and the diamonds taken out."*

The next mention of Sambalpur diamonds is to be found in Lieutenant Kittoe's account† of his journey, in the year 1838,

* This description suggests laterite as the matrix from which the diamonds were proximately derived. In this connection it may be noted that one of the principal sources of Cape diamonds is said to be a superficial ferruginous conglomerate.

† "Journal Asiatic Society, Bengal." Vol. VIII., 1839, p. 375.



through the forests of Orissa. He speaks of the people as being too apathetic and indolent to search for diamonds. His remarks on the localities where they occur seem to be derived from Mr. Motte's account, to which, indeed, he refers.

Although published in the same number of the Asiatic Society's Journal* we find a paper, dated two years later, or 1840, which was written by Major Ouseley, on the "Process of Washing for Gold-dust and Diamonds at Heera Khoond." In this we meet the following statement :—"The Heera Khoond is that part of the river which runs south of the islands. The diamonds and gold-dust are to be washed down the Ebe River, about four miles above the Heera Khoond; but as both are procurable as far as Sonpur, I am inclined to think there may be veins of gold along the Mahanadi." No mention is made by Major Ouseley of the system of throwing an embankment across one of the channels, which is described below; but from my enquiries I gathered that that method of washing was in practice for many years before the period of Major Ouseley's visit. He describes the operations of individual washers—not the combined efforts of the large number, which made that washing successful. The diamonds found became the property of the Raja, while the gold was the perquisite of the washers, who sold it for from twelve to fifteen rupees a *tola*.

In the *Central Provinces Gazetteer* it is stated that "during the period of native rule some fifteen or twenty villages were granted rent-free to a class called *Jhiras*, in consideration of their undertaking the search for diamonds. When the country lapsed in 1850, these villages were resumed." So far as can be gathered from the various sources of information, large and valuable diamonds have been occasionally met with; but the evidence on this point is somewhat conflicting. I do not think, however, that what we know is altogether consistent with the statement in the *Gazetteer*, that "the best stones ever found here were thin and flat, with flaws in them."

* "Journal Asiatic Society, Bengal." Vol. VIII., p. 1057.

Local tradition speaks of one large diamond, which was found during the Mahratta occupation. Its size made its discovery too notorious; otherwise it would in all probability, like many other smaller ones, found at that time, never have reached the hands of the Mahratta agent. It is said to have weighed two tolas and two mashas (at ten mashas to the tola),* which would be about $316\cdot2$ grains troy, or expressed in carats $99\cdot3$. It would be impossible, of course, to make any estimate of the value of a rough stone of this size, regarding the purity, colour, &c., of which nothing is known. Another diamond, in the possession of Narain Singh, is said to have weighed about a *tola*, the equivalent of which, calculated as above, would be $45\cdot35$ carats. Already one of $16\cdot5$ carats has been mentioned as having been sent to Calcutta in 1766. One large, but slightly flawed, diamond, which I saw in the possession of a native in Sambalpur, was valued in Calcutta, after cutting, at Rs. 2,500. Mr. Emanuel, in his work on "Diamonds and Precious Stones," gives some particulars regarding the diamonds of Sambalpur, but the limited information at his disposal does not appear to have been very accurate. He records one diamond of 84 grains having been found within the period of British rule, but does not mention his authority. There are said to be a good many diamonds still in the hands of the wealthier native in Sambalpur. Of course, large diamonds such as those above mentioned were of exceptional occurrence; those ordinarily found are said to have weighed, however, two to four *rattis*, equal on an average, say, to the thirtieth part of a tola, or $4\cdot7$ grains = $1\cdot48$ carats. In the Geological Museum at Calcutta there is at present a diamond which was sent to the Asiatic Society of Bengal from Sambalpur by Major Ouseley. It weighs only $\cdot855$ grain = $\cdot26$ carat.

As is usual, I believe, in all parts of India, the diamonds were classed as follows:—

I.—*Brahman*.—White, pure water. II.—*Kshatrya*.—Rose or

* (One masha = $14\cdot37$ grains troy) : properly speaking there are 12 mashas in a standard tola.



reddish. III.—*Vasiya*.—Smoky. IV.—*Sudra*.—Dark and impure.

From personal enquiry from the oldest of the Jhiras, or washers, at the village of Jhunan, and from various other sources, I have gathered the following details as to the manner in which the operations were carried on in the Raja's time:—In the centre of the Mahanadi, near Jhunan, there is an island, called Hira Khund,* which is about four miles long, and for that distance separates the waters of the river into two channels. In each year, about the beginning of March or even later, when other work was slack and the level of the water was approaching its lowest, a large number of people,—according to some of my informants, as many as five thousand,—assembled and raised an embankment across the mouth of the northern channel, its share of water being thus deflected into the southern. In the stagnant pools left in the former, sufficient water remained to enable the washers to wash the gravel accumulated between the rocks in their rude wooden trays and cradles. Upon women seems to have fallen the chief burden of the actual washing, while the men collected the stuff. The implements employed and the method of washing were similar to those commonly adopted in gold-washing, save only that the finer gravel was not thrown away until it had been thoroughly searched for diamonds. Whatever gold was found became the property of the washer, as already stated. Those who were so fortunate as to find a valuable stone were rewarded by being given a village. According to some accounts, the washers generally held their villages and lands rent-free; but I think it most unlikely that all who were engaged in the operations should have done so. So far as I could gather, the people did not regard their (in a manner) enforced services as involving any great hardship; they gave me to understand that they would be glad to see the annual search re-established on the old terms. Indeed, it is barely possible to conceive of the

* *Lit.* Diamond mine.



condition of the Jhiras having been at any time worse than it is at present. No doubt the gambling element, which may be said to have been ever present in work of the above nature, commended it to the native mind. According to Mr. Emanuel, these people shew traces of Negro blood, and hence he has concluded that they are the "descendants of slaves imported by one of the conquerors of India." They are, however, I should say, an aboriginal tribe, shewing neither in their complexions, character of their features, nor hair, the slightest trace of a Negro origin. And here I may note that a statement made recently by Professor Flower * to the effect that "The presence of a Negrito element in the population of India is based at present on very slender evidence," is wholly confirmed by the results of my observations in those tracts of the country which I have visited. I have never in India met with any race having the slightest resemblance to the Andamanese or to the Somali. Some writers who have suggested a Negrito or Negroid element in people whom they have described, appear to have given undue weight to the presence of a black skin, coupled with thick lips, and depressed and broad nostrils, all of which may occur in races quite distinct from each other and from the Negritos.

When Sambalpur was taken over by the British, in 1850, the Government offered to lease out the right to seek for diamonds, and in 1856 a notification appeared in the Gazette describing the prospect in somewhat glowing terms. For a short time the lease was held by a European, at the apparently low rate of two hundred rupees per annum; but as it was given up voluntarily, it may be concluded that the lessee did not make it pay. The facts that the Government resumed possession of the rent-free villages, while the Raja's operations had been carried on without any original outlay, materially altered the case, and rendered the employment of a considerable amount of capital then, as it would be now, an absolute necessity.

* Hunterian Lectures delivered at the Royal College of Surgeons, on the Comparative Anatomy of Man. *Vide* "Nature," July 10, 1879, p. 246.



Within the past few years statements have gone the round of the Indian papers to the effect that diamonds are now occasionally found by the gold-washers of Sambalpur. All my enquiries failed to elicit a single authentic case, and the gold-washers I spoke to and saw at work assured me that such statements were unfounded. Moreover, they did not appear to expect to find any, as I observed that they did not even examine the gravel when washing.

With regard to the origin of the diamonds, the geological structure of the country leaves but little room for doubt as to the source from whence they are derived. Coincident with their occurrence is that of a group of rocks, which has been shown to be referable to the Vindhyan series, certain members of which series are found in the vicinity of all the known diamond-yielding localities in India, and in the cases of actual rock-workings, are found to constitute the original matrix of the gems.

In several of the previous accounts, the belief is either stated or implied that the diamonds are brought into the Mahanadi by its large tributary the Ebe. It would not, of course, help the point I am endeavouring to establish to say that the Ebe, at least within our area, except indirectly,* is not fed by waters which pass over Vindhyan rocks, but I have the positive assurance of the natives that diamonds have not been found in that river, although gold is and has been regularly washed for. On the other hand, diamonds have been found in the bed of the Mahanadi as far west as Chanderpur, and at other intermediate places, well within the area which is exclusively occupied by the quartzites, shales, and limestones of Vindhyan age.

The fact that the place, Hira Khund, where the diamonds were

* By a few small streams which rise in an isolated outlying hill, called Gotwaki. It should be stated, however, that one of the tributaries of the Ebe, the Icha, far away in Gangpur, is said to produce diamonds; but the statement needs confirmation, and the geology of that part of the country is at present quite unknown. Near its sources, in Chutia Nagpur, I have heard the Ebe spoken of as the Hira Nad, or Diamond river.



washed, is on metamorphic rocks, may be readily explained by the physical features of the ground. The rocky nature of the bed there, and the double channel caused by the island, afforded unusual facilities for, in the first place, the retention of the diamonds brought down by the river; and, secondly, for the operations by which the bed could on one side be laid bare, and the gravel washed by the simple contrivances known to the natives.

It is impossible to say at present which the actual bed or beds of rock may be from whence the diamonds have been derived, as there is no record or appearance of the rock ever having been worked; but from the general lithological resemblance of the sandstones and shales of the Barapahar hills, and the outlier at Borla, with the diamond-bearing beds, and their associates at Panna in Bhandelkand, and Banaganpalli in Karnul, I have very little hesitation in pointing to these rocks as in all probability including the matrix. Above Pudampur, the Mahanadi runs through rocks of this age, and I should therefore strongly urge upon any one who may hereafter embark upon the undertaking of searching for diamonds in Sambalpur, to confine his operations, in the first instance, to the streams and small rivers which rise in the Barapahar hills and join the Mahanadi on the south. Besides the obvious advantage of being—as I believe would be found to be the case—close to the matrix, these streams would, I think, be found to contain facilities for obtaining a sufficient head of water for washing purposes. Such works would require but a few labourers, and could be carried on for a much longer period every year, say for eight or nine months, than would be possible in the case of the washings in the bed of the Mahanadi itself.

According to the accounts received by me, the southern channel of the Mahanadi used not to be emptied in the Raja's time; but from various causes I should expect it to yield, proportionately, a larger number of diamonds than the northern. In the first place, the stronger current in it would be more efficient in removing the substances of less specific gravity than diamonds, while the rocks and deep holes in it afford admirable means for



the retention of the latter. Again, it is in direct contact with the sandstones and shales (presumably diamond-bearing) of an outlying ridge near a village called Borla. Owing to the greater body of water to be dealt with, it would be found to be more difficult to divert than, that which flows in the northern channel; but the result in a greater harvest of diamonds would probably far more than compensate for the greater expenditure incurred.

In the country to the south of Sambalpur, in Karial and Now-agurh, where rocks occur of similar age to those of the Barapahar hills, I have failed to find any traditional record of diamonds having ever been found or searched for. It is just possible, however, that the names of several villages in which the word *Hira* (diamond) occurs, may have reference to some long-forgotten discovery.

In addition to diamonds, pebbles of beryl, topaz, carbuncle, amethyst, cornelian, and clear quartz, used to be collected in the Mahanadi; but I have not seen either sapphires or rubies. It is probable that the matrix of these, or most of them, exists in the metamorphic rocks, and is, therefore, distinct from that of the diamonds.

Gold in all probability occurs pretty generally throughout those portions of the district in which metamorphic rocks prevail. So far as I have been able to gather from personal observation, the washers confine themselves to the beds of the Mahanadi and Ebe; but in the rains they are said to leave the larger rivers and wash in the small jungle-streams.

In the Ebe, below the village of Tahud, I saw a party of gold washers encamped on the sand. The places where they were actually washing were within the area occupied by rocks of Talchir age; but whether the gold was proximately derived from them, or had been brought down by the river, as is possible, from the metamorphic rocks a short distance higher up, I am unable to say.

There is, of course, no *prima facie* improbability in the Talchir rocks containing gold. On the contrary, the boulder-bed, including as it does a large proportion of materials directly derived from the metamorphic rocks, might naturally be expected



to contain gold. In the original description of the Talchir coal-field, the following passage occurs:—"Gold is occasionally washed in the Tikaria river, and was also a few years since obtained from the sands of the Ouli." The latter case is rather interesting, since the localities are in a sandstone country, through which the Ouli mainly flows.* In this connection it may be mentioned that in Australia, quite recently, a conglomerate bed of carboniferous age has been found to be auriferous.†

As to the methods employed by, and the earnings of, the gold-washers, the remarks already made on the gold of Singhbhum apply equally to Sambalpur, and need not be repeated here.

March 30th.—Rampur.—To-day I reached Rampur, the chief town of Rehrakole, having taken nine days by a somewhat circuitous route to accomplish the distance. I found a condition of anarchy prevailing in the State, and supplies and even guides were only obtained with the greatest difficulty, while the coolies who were employed would deposit their loads in the middle of the jungle and decamp. There is a deficiency of good drinking water on this route, and three days later, or on the 2nd of April, I had a sharp attack of fever, which I felt sure was due to the bad water I had drunk at night in consequence of thirst, brought on by the great heat at this season. Owing to this attack I was obliged to halt for some days in the bungalow, at Ungul, which, since my previous visit, had reverted to its legitimate purpose as a rest-house for travellers.

April 10th.—Daiserah.—At this place, in the neighbourhood of the basin of sandstones, in the Atgurrh State, which I had still to examine, I dismissed the carts which had been with me for the past five months, and forwarded my heavy baggage to Cuttack, a dozen coolies being retained to carry such necessities as could not be packed on the elephants. During the remainder of the month I was engaged in the examination of the sand-

* "Mem. Geol. Surv., India." Vol. I., p. 88.

† *Vide* "Geol. Mag.," 1877, p. 286.



stones, both in order to determine their actual geological age, and to ascertain what probability there was of their overlying and concealing a deposit of coal-measures. Owing to the dense, thorny, and practically impenetrable thickets which cover the area, this work was not accomplished without much difficulty, which was further increased by a return of the fever. I can look back with no pleasure to the three weeks so spent. The heat at night was most trying and enervating, and it was difficult to obtain an adequate amount of sleep, and when to this I add that the people I had to deal with were Urias of the degraded type I have previously described, it is unnecessary perhaps to enlarge further upon the subject.

April 29th.—Mundasol to Khurda.—This morning I rode into Khurda, which is a sub-divisional station subordinate to Cuttack. The afternoon was devoted to the examination of some hills of garnetiferous gneiss in the neighbourhood, and the massive ruins of the fort and dwelling-place of the Khurda Rajas. On the following morning I rode out with the Settlement Officer to visit a hot-spring at a place called Atari, about seven miles distant. We found that the water rose in the centre of a rice-field, no rocks being visible in the vicinity. The discharge of water, which is caught in an artificial basin, is copious, and with it a quantity of sulphuretted hydrogen is given off. The temperature was 138° , or too hot to permit of the hand being retained in the water. Annually, at a particular festival, the spring is visited by numbers of people, and I was informed that scrambles for betelnuts, thrown by priests into the mud, through which the overflow-water of the basin trickles, are a leading feature. The scramblers are principally barren women, and those among them who succeed in finding a betel-nut will, it is believed, have their desire for children gratified ere long.

At this time preparations were being initiated for making a cadastral survey of the Khurda estate on the scale of thirty-two inches to a mile. In the maps it was intended to represent every field and small plot of cultivation, and it was believed that the settlement of boundaries would prove to be a check to



litigation in the future. So far as I could form an opinion the survey was of too costly a nature for the country, and out of all proportion to the annual revenue of the estate, which is wholly in the hands of the Government.

May 1st.—Mundasol to Jagamura.—To-day I visited the Gumpas, or cave-temples of Khundagiri, which have been described and illustrated in various works of late years, more particularly in Dr. Hunter's "Orissa," Mr. Fergusson's "History of Indian Architecture," and Dr. Rajendra Lal Mitra's "Antiquities of Orissa." Their age is not yet quite satisfactorily determined. Knowing that they had been carefully explored by experts, I did not make more than a cursory examination of them, giving my attention rather to the rocks, in which I hoped to find some fossils, but was unfortunately not successful.

On the following morning I visited Bobaneshwar, which is famous for the number of its temples, some of which are in good preservation, and are covered with well-executed carvings. The principal temple is enclosed, and not accessible to Europeans, but most of the others can be entered, and indeed many are suffering much from neglect. Great complaints were made to me by a Brahmin, who acted as a guide to me, of the maladministration of the funds intended for the preservation of the temples. In not a few cases trees of the Pipal, &c., have taken root amongst the carvings, and have caused steadily-widening fissures and cracks. All the temples which I saw were built of the local sandstone—laterite being employed only for walls, revetments of tanks, &c. Carvings of an indecent character are less common than is often the case on the temples of southern India, and those which do exist are generally in out-of-the-way niches, and are not given a prominent position.

May 5th.—Chundkar to Cuttack.—To-day I marched into Cuttack, having completed my season's work, intending to proceed at once to Calcutta, to enjoy a much wished-for season of rest, quiet, and iced beverages; but my experience on this occasion only served to further justify the remark I made in the last chapter as to Cuttack being a very difficult place to get out of



once you have got into it. Two night-journeys on the 9th and 10th, with a halt during the heat of the day at Kendapara, which is a sub-divisional station about mid-way, brought me to Chandballi, a newly-opened port on the Dhumra River, one of the mouths of the Brahmini. The journey from thence to Calcutta, when the tides suit, can be made within twelve hours, and I expected to be in Calcutta by the following morning; but on arrival at Chandballi, I heard that the steamer had broken down, and that it would not be on the line for another week, so that I was perplexed as to how I should occupy the time. While considering whether it would be worth my while to pay a visit to Balasore, which was seventy-five miles distant, the arrival of a party of officers from Calcutta, who purposed spending some days encamped at a place called Chandipal, near the mouth of the river, turned my attention in that direction, so that I joined them, and though our morning and evening rambles in the *Tamarix* jungle, in search of game, did not result in a very large bag, still some few head of spotted deer, &c., were killed, and we managed in spite of the great heat to spend a pleasant week together. At last, on the 18th, the steamer from Calcutta, with an enormous cargo of betel-nuts and some piece-goods and metal, appeared, and having filled up with rice and deck-passengers, which are the principal articles of export from Chandballi, left again for Calcutta, where we arrived on the evening of the 19th.



CHAPTER XII.

SECTION II.

NAINI TAL.

1876-77.*

NAINI TAL AND ALMORAH—LUCKNOW—FAKIRS OR ASCETICS—URDU LITERATURE—PATNA—RICE GOLAH—SECOND VISIT TO NAINI TAL—ACCIDENT ON THE ROAD—MONKEYS AT MALWA TAL—MR. WATERTON ON MONKEYS—LEOPARD KILLED IN TRAP—SPORT AT BHIM TAL—POSITION OF THE KUMAON LAKES—NAINI TAL—BHIM TAL—MALWA TAL—NAUKACHIA TAL—SAT TAL—CONCLUSIONS.

IN July, 1876, I took a month's leave in order to pay a visit to Naini Tal, in the Himalayas. While there, and also during a short trip which I made from thence to Almora, I familiarized myself with the general geological features of the area, and availed of the opportunity of making a small collection of birds, which I supplemented by purchases from the local dealers, from whom also I obtained a series of heads and horns of the principal Himalayan mammals.

On the return journey, down-country, I stopped for a day at Lucknow, where I visited all the principal show places of that historic city; but these I do not propose to describe here. The buildings, being chiefly of brick and stucco, are not to be compared with the magnificent stone structures of Delhi and Agra. The great beauty of the place, which has been called the "Garden of India," is derived from the luxuriance of the vegetation

* For convenience the account of two separate visits to Naini Tal are combined in this chapter.



and the abundance of flowers. In and near the city I noticed several Fakirs or ascetics, who appeared to be objects of considerable adoration. One of them reclined on a heap of kunkur, which forms a couch about as luxurious as would be one made of engine-house clinker. Were it not probable that the bodies of these men have from exposure become almost devoid of feeling, such mortification of the flesh could hardly be endurable. Such ascetics, and those who allow their elevated arms to stiffen and wither, are seldom seen in Bengal—at least, such is my experience. Many early and some recent accounts of India have had the effect of causing the English public to believe that one meets with them, and also with cars of Jugernath, &c., all over the country and at every turn; but such is not the case at the present day, at least.

In the streets of Lucknow I bought several lithographed books in the Urdu language. One of these was copiously illustrated with a number of quaint pictures of mythical animals; it was, in fact, a sort of native zoology. The descriptions are not very explicit, nor are local habitations for the various monsters assigned; but many of them can evidently be identified with the chimerical animals of Arab literature. Thus there is a representation of Sindbad's roc; of the men with dog's heads, by whom the Andamanese were intended; and of the unicorn, besides many others of similar character, and some which were, perhaps, solely the creation of the author's pencil. The whole work reminded me of Aldrovandius' celebrated volume—"Concerning monsters."

At Patna, where I also stopped for a day, there is a lofty brick golah, or receptacle for grain, which bears some resemblance to a glass-factory cupola. It was erected, in 1786, to serve as a storehouse for grain, in order to prevent the recurrence of famines, or, more correctly perhaps, to mitigate their effects. On a tablet which states this, there is a blank left for the name of the person who might first fill the golah with grain; but neither blank nor golah were ever filled. As the door at the base opens inwards it would have been impossible to have opened it had the



interior ever been filled with grain. Inside there is a most extraordinary echo. If you stand in the centre, your words, and even the noise of your footsteps, come back with a wonderful celerity and exactitude, the return wave of sound seeming actually to strike you on the top of the head. I could not for some little time believe but that there was some one mimicking me; and, indeed, at first I turned sharply round on the custodian of the place to rebuke him for what I conceived to be his impertinence. I could not help contrasting the echo in this building with that in the Taj at Agra. While the latter has a wonderfully mellowing and softening effect, the former produces a harsh and particularly unpleasant sound.

In September, 1877, I spent a week at Simla, and then went to Naini Tal for a second visit, where it was my intention to examine the Kumaon lakes, and, if possible, discover their origin. As it would have taken about three weeks' hard marching to reach Naini Tal from Simla through the hills, I was obliged to descend again into the heat of the plains to Umbala, from whence I went to Moradabad by train, and thence drove to the foot of the hills at Kaladungi; but this last part of the journey was not effected without the occurrence of an accident, which, though only causing inconvenience, might have been more serious. At about 4 a.m., just after leaving a changing station, I was disturbed by the rolling from side to side of the *dāk ghari* or sleeping carriage. Supposing, however, that a pair of bullocks or buffaloes had been yoked to the carriage, as is sometimes done, in order to draw it through the boulder-strewn bed of a river, I lay quite still. After one or two more lurches, however, the carriage went over on its side with a crash. As soon as I was able to disentangle myself from the *dēbris* and climb out by the window, I found that what had actually taken place was, that a pair of utterly-untrained ponies had, soon after starting, completely broken away from the control of the coachman, and had drawn the carriage off the embanked road down into a ravine, where the collapse took place. The carriage was extracted and placed on the road again with no little trouble; and I then found that I had been wounded in the



foot by a splinter of wood. My servant had been flung off the top of the vehicle, but, though he lighted on his chin, sustained no serious injury. Having at length reached Kaladungi, I had an opportunity of seeing how these natives love one another, when the two local agents of other carrying firms came to me to beg me to send in a complaint against the one which had supplied my carriage with such dangerous ponies. The agent of the latter, however, was, I believe, ready to refund my fare had I asked for it. One of the former amused me by the persistence of his efforts to make me cause trouble to the opposition. He actually laid paper, pens, and ink before me in order that I might send in a formal complaint to the magistrate. Perhaps I ought to have done so on account of others, especially ladies, who might have to travel by the same route.

I remained at or near Naini Tal for nearly four weeks, during which time I visited most of the lakes and made the observations recorded below, and which I have thought may be of sufficient interest to some of my readers for reproduction here. Others will, no doubt, make use of the privilege of skipping, which, in all probability, they have already exercised with reference to other matters discussed in these pages. I make no attempt to describe the social life of Naini Tal, as that is a topic outside the limits which I have prescribed for myself.

When at Malwa Tal, which is one of the lakes where I spent a day, I was warned that in passing under a landslip which slopes down to the lake, I should be liable to have stones thrown at me by monkeys. Regarding this as being possibly a traveller's tale, I made a particular point of going to the spot in order to see what could have given rise to it. As I approached the base of the landslip near the road on the north side of the lake I saw a number of brown monkeys (*Inuus rhesus*) rush to the sides and across the top of the slip, and presently pieces of loosened stone and shale came tumbling down near where I stood. I fully satisfied myself that this was not merely accidental; for I distinctly saw one monkey industriously, with both fore-paws, and with obvious *malice prepense*, pushing the loose shingle off a shoulder of rock.



I then tried the effect of throwing stones at them, and this made them quite angry, and the number of fragments which they set rolling was speedily doubled. This, though it does not actually amount to throwing or projecting an object by monkeys as a means of offence, comes very near to the same thing, and makes me think that there may be truth in the stories of their throwing fruit at people from trees; but, be this as it may, the late Mr. Waterton's generalized statement that the act of throwing things does not exist in any animal except in man, whose reasoning faculties enable him to repeat the feat,* is certainly not correct, as I have, in Chapter VII., related that I have seen recently-captured elephants project branches of trees with the object of striking persons out of their reach.

Just before leaving Malwa Tal, when exploring the valley below the lake, I came upon a couple of men who had just taken the body of a remarkably fine leopard out of a trap very similar in character to that which I have described as having seen in the Rajmahal Hills (Chapter VI.). The leopard was very beautifully marked, and measured within half-an-inch of seven feet.

In the fields of Ragi or Murwa (*Eleusine corocana*), near Bhim Tal, quail and black partridge occurred in some abundance about the beginning of October. These, with Kalege pheasants (*Gallolophasis albocristatus*), afforded me some very fair sport when not engaged in exploring the hills and lakes.

In so far as the outer and lower ranges of the Himalayas are concerned, the group or series of lakes about to be described † is quite unique. To many out of the thousands who have visited the beautiful part of the country where these lakes are situated the question of their origin must have presented itself.

Of the age of the unfossiliferous metamorphosed schists in which the lakes occur, nothing is certainly known. In the account of

* "Natural History Essays," by Charles Waterton, p. 153.

† The following is abstracted from a paper published in the Records of the Geological Survey of India, Part II., 1878.



the Geology of Kumaun and Gurhwal, by Mr. H. B. Medlicott,* will be found such information as exists on the subject. Some casual observations on the geology which bear upon the physical origin of the lakes will be found in their places below; otherwise I have no intention of giving a detailed account of the stratigraphy here.

This series of *Tals* or lakes is included in the Chhakata purgana of Kumaun†. They are by no means all of equal size or importance. They seem, however, to fall naturally into three classes, the members of each class having certain features mutually in common. So arranged, they would stand as follows:—

Class I.—Naini, Bhim, Malwa; Class II.—Naukachia, Sat; Class III.—Kurpa, Dhobie, Saria, Sukha, Khoorea, &c.

Naini Tal.—This lake, so call after a Hindu goddess, is situated about ten miles in from the southern slope of the hills. It lies at the bottom of a valley, which runs about north-west to south-east, and is surrounded on all sides, except at the outfall on the south-east, by lofty ridges, which serve to give an unusual amount of definition to the limits of the catchment area. The greatest length of the lake itself is 4,703 feet, the maximum breadth 1,518 feet,‡ and the elevation of the surface at high water about 6,409 feet above the sea. The principal peaks on the encircling ridges are Luria Kanta, 8,144 feet; Sher-ki-danda; Ulma; China, 8,568; § Deopathar, 7,989; Iarpathar, 7,721.

The China (Cheena) portion of the ridge, at the head or north-west end of the valley, is steeply scarped above, with an under-cliff much concealed by talus, brought down by landslips. It consists chiefly of shales, with which there are some quartzites, and towards the crest there are limestones, which, so far as is

* *Vide N. W. Provinces Gazetteer*, edited by E. Atkinson, Esq., C.S.

† Excepting Malwa Tal, which is just outside the boundary.

‡ These figures are taken from a small table in the *N. W. Provinces Gazetteer*, article "Kumaun."

§ The highest point is somewhat in excess of this elevation, which is that of the peak nearest to the lake.

clearly seen, may partake either of the nature of beds or veins. Passing thence, round by north to south-east, the ridge is mainly formed of shales and argillaceous schists, which are much contorted and broken; but the prevailing dip is probably to south-west, the beds striking with the direction of the ridge. An obscurely seen trap-dyke seems to observe the same course. To these two facts—the dip of the beds and the existence of the rigid trap axis—the present form of the slope is, I believe, under the influence of subaërial denudation, to be attributed, and not to the friction of a glacier. It is true that there are no “subordinate ridges and spurs,” but such is not uncommonly found to be the case where valleys run with the strike between hard beds bounding softer ones, which have been eroded to form the valleys.

Towards the end of the ridge, overhanging the *depôt*, limestones, which are clearly seen in section to occur as irregular lenticular masses—not as beds—become somewhat abundant. I shall have to refer to them again presently. The range, on the south-west of the valley of which Iarpathar and Deopathar are the culminating peaks, is formed of massive limestones, the bedding of which is generally very obscure. There is also some trap, the combined rocks giving a very rigid and steep outline to the range, which contrasts most strikingly with that on the north.

All the rocks of this basin, whether shales or limestones, are singularly unsuited to the retention of the minor glacial marks; and if glaciation did take place, it may be from this cause that no such traces are now found.

From an inspection of the large-scale map, it is apparent that the head of the valley has very much the form of a ‘cirque,’ as defined by Mr. Helland,* who argues with considerable force that the cirques of Norway and Greenland are due to glaciers. The Rev. Professor Bonney, on the other hand, describes Alpine cirques, which he believes to be formed by

* “Cirques are large spaces excavated from the solid rock, bounded on three sides by an almost semi-cylindrical steep mountain wall, and with a tolerably flat floor.”—Quar. Jour. Geol. Soc. Vol. XXXIII. p. 161.

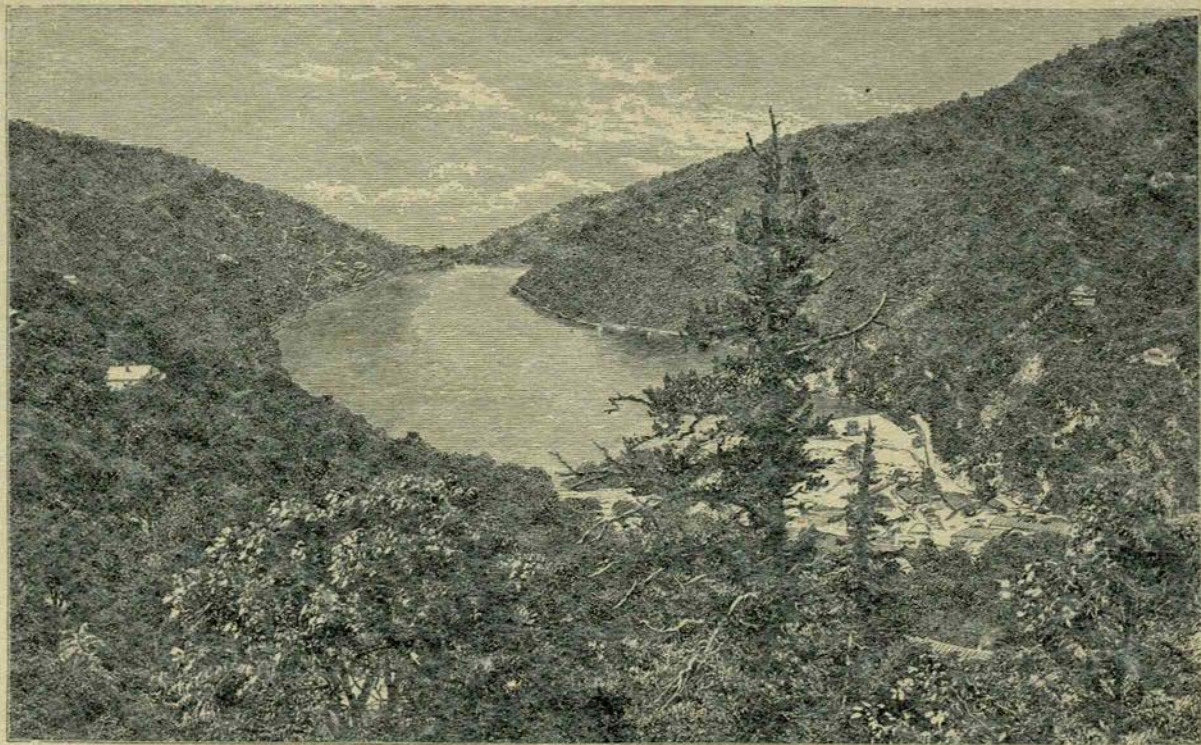


Plate IX.]

NAINI TAL.

(From a Photograph by Saché.)



streamlets pouring down the sides. It has often been remarked how some forms of our Indian alluvia, under the operation of heavy rainfalls, exhibit in miniature many of the forms of denudation and erosion. Among these forms, cirques and cirque valleys are not unfrequently met with. They are invariably due, not to denuding action from above, but to subterranean springs or streams. To a similar cause may, I think, be attributed cirque-like valleys in rocks formed of loose shales and, to some extent, even those where the rocks are limestones.

A section of the bed of the lake indicates a state of things very different from what might have perhaps been anticipated; but, however the lake has been formed, explanations to account for the peculiarity about to be described can be suggested. The soundings from which this section has been plotted have been taken from the Revenue Survey map, on the scale of ten inches to a mile. In some cases the exact character of the bottom is given, but not in all. A knowledge of this character is, no doubt, a great desideratum for the discussion of this question. It would be especially desirable to know the nature of the bottom all across the lake transversely to this line, at the point where the shallowest sounding occurs. As represented in the section, the lake consists of two basins, with the maximum depth nearly centrally situated in each case. They are separated by what appears to be a barrier. If it really be so, then it would lend considerable support to the glacial hypothesis. Indeed, if consisting of rock *in situ*, it would fairly prove the existence of a true rock basin, thus furnishing a strong argument in favour of the glacial origin. Supposing it to be so, the twin basins might be readily explained by the hypothesis that they had been successively excavated by the retreating end of a glacier. Unfortunately, the case is not susceptible of so simple an explanation, as the shallow sounding may be caused, not by a barrier, but by a mere hummock, which, if (as is possible, so far as is certainly known at present) occurring isolated by deep channels from the margins of the lake, would be on the other hand a strong argument against the glacial origin, as such an obstruction must



assuredly have been swept away by a glacier capable of scooping out the deeper hollows. Still another view of the nature of the barrier or hummock, be it which it may, is possible. It may be that it is not really formed of rock *in situ*, but is merely the remnant of an ancient landslide.

In the present state of our knowledge, therefore, no certain conclusion can be drawn from it. But the peculiar character of the basin still remains a subject for some speculation, the more particularly so when it is remembered that the operations of the present day must tend steadily to obliterate these features by the deposition of silt in the hollows.

Passing from the lake itself, to examine the nature of the barrier at the outfall, we find that it is formed of a confused mass of *débris*, in which some very large rock masses, some of them ten feet in diameter, occur. Following down the bed of the stream, rock *in situ* is not met with till near the waterfall, or at a level which must be considerably below that of the bottom of the lake where deepest. I had neither the time nor means for actually ascertaining the elevation of the exact point where rock *in situ* is first met with in the stream. But it is an important point to be determined. The result would, I feel confident, completely dispose of any belief in the existence of a rock basin.

It has been suggested that the large blocks of stone are erratics, and that they may have been derived from the limestone at the ridge at the head of the valley (Deopathar). The source of these blocks I believe to be much closer at hand. In great part they have, I think, simply tumbled down from the Iarpathar ridge and its eastern prolongation, where not only is similar rock to be seen *in situ*, but similar detached blocks are found on the slopes; one remarkably fine example being seen in the compound of Welham house. Others, on the other hand, may have fallen from the ridge to the north of the dépôt, where the already described lenticular masses of limestone occur. The remainder may, I think, have simply been eroded from their envelopment of shales at, or very close to, the positions where they are now found. Though it is convenient to speak here of these blocks



collectively as limestones, they vary much in character, and some are highly indurated, but only slightly calcareous, mud-stones. From these varying characters it may be possible, hereafter, to trace their origin individually with considerable accuracy. As to the other characters of the *débris* at the outfall, I in vain searched in it for evidence of a glacial origin, and am unable to point to any feature which is inconsistent with the idea of its having been formed by a landslip.

Further down the valley, near Joli, some 3,000 feet or so below Naini Tal, I observed, when on the road to Ranibagh, that the river has cut through an accumulation of boulders and finer *débris* to a depth of 200 feet or so, which at the time seemed to me as possibly of moraine origin. On reading Mr. Campbell's opinion of the same kind of deposit near Kalka, which I have also seen, I fear it would require stronger facts than I am in possession of to prove it other than diluvial. I merely mention it here in order to draw attention to the fact of its existence, with a view to its future examination.

Bhim Tal.*—This lake is situated about six miles, in a direct line, to the east-south-east of Naini Tal. Its elevation is about 4,500 feet above the sea, or 1,900 feet lower than Naini Tal. It lies at the bottom of a valley between two ranges, which strike from north-west to south-east. The northern one is largely made up of greenstone, which I traced from the neighbourhood of Bhuwali, through Bhim Tal, up to Malwa Tal. According to General Strachey's geological map, a continuation of the same outburst extends northwards up to Bhujan on the Kosi. The southern range consists chiefly of quartzites and shales, and rises to a height of 1,300 feet above the lake.

At the entrance to the lake, in the very throat of the gorge, occurs a small hill, about 80 or 100 feet high, which deflects the in-flowing stream, and the existence of which, if it is, as it appears to be, a stable prolongation of a spur, presents a serious

* So called after Bhim, Shib, or Mahadeo, to whom there is a temple.



obstacle in the way of a glacial theory. No one can, I think, controvert the opinion that a glacier capable of scooping out the lake could not have passed over, or on one side of, such an obstruction.

The determination of the fact, whether, or to what extent this hill consists of rocks *in situ*, is a point, I believe, of crucial importance in this enquiry. Bearing in mind the vast size of the landslips which take place in this region, no one should hastily venture an opinion on such a point. My examination of the ground was of too cursory a nature to admit of my coming to a final decision.

The maximum dimensions of this lake are, length 5,580 feet, breadth 1,490 feet, and depth 87 feet. It is, therefore, the largest, but the shallowest,* of all the series herein described.

Whether it be a historical fact or not I cannot say; but it is clearly, I think, a fact that the present outlet of the lake was not the original one. The waters now only escape through a sluice close to the temple, which is situated about midway on the eastern side; but that originally the water found its way out at the southern end, an inspection of the map alone is almost sufficient to determine.

This southern end is now stopped up by what appears to be the *débris* of a landslide. I was unable to examine the valley below, and the position and elevation of the highest rocks there remain to be determined. At the present outfall, the rocks *in situ* are apparently at a higher level than the bottom of the lake; but this, if it be the case, is a fact of no importance, if my supposition as to the position of the original outfall be correct.

Towards the southern end of the lake, on the eastern side, there is a boulder deposit, which extends along the bank up to a level of perhaps 10 feet above the water. The rounded blocks which it includes were possibly rounded by the waters of the lake when they stood at a higher level, but its appearance suggests a

* Sat Tal being excepted as regards depth.



moraine origin. The most remarkable feature about it, however, is, that it is backed by no high range on the east, so that, if derived from a landslip, the materials must have come from the west, and, of necessity, temporarily filled up a portion of the bed of the lake.

Malwa Tal.—This lake is situated about five miles, in a direct line, to the east of Bhim Tal; it lies in a deep valley, which strikes north-west and south-east, and is traversed by the Kalsa river, a tributary of the Gola.*

The elevations of the parallel bounding ranges on the north-east and south-west average upwards of 3,000 feet above the level of the lake, the height of which above the sea has been approximately estimated at 3,400 feet. The range on the north is formed chiefly of white and purple quartzites, with which there are some slates and shales. The dip of these beds is variable, but north-west at a low angle seems to be the prevailing direction. Much of the higher face of this range is steeply scarped, but landslips abound, and have, to a great extent, concealed the character of the lower portions. The range on the south consists primarily of an axis of greenstone, which stretches continuously hence from the neighbourhood of Bhim Tal. Associated with this greenstone are quartzites and shales, the beds in immediate contact often showing signs of much alteration and induration. Occasionally the effect of the former has been such as to cause the affected beds to assimilate to the character of the greenstone, and to be almost undistinguishable from it by mere examination of the outward lithological structure.

What the exact nature of the physical relations of this greenstone may be has not yet been fully ascertained; but that it does not exist merely as a single simple dyke is amply testified by the fact that branches from it cross the valley at both ends of the lake, and are cut through by the infalling and outfalling streams.

* It is perhaps worthy of note that the drainage of all these lakes is into the Gola river.

At the head of the lake is a boulder-bed through which the river cuts to a depth of eight or ten feet. This deposit consists chiefly of subangular fragments of trap and quartzite. At first I was inclined to attribute it to the effects of a retreating moraine. Temporarily this view was supported by the discovery of boulders of granite and gneiss—no *known* source for which exists within the present drainage limits of the Kalsa. It was impossible, however, to overlook the fact that there were no signs of polishing on any of the blocks, and that those which have come furthest (the granite, &c.,) are well-rounded and water-worn. Taking into consideration the professedly general character of the only existing geological map, it would be clearly unsafe to adopt the view that no source for these boulders exists within the watershed; and this the more especially as in the adjoining basin of the Gola on the north the occurrence of gneiss and granite is indicated on the map.

The importance of determining the source from whence these boulders have been derived is sufficiently obvious. If they have not come from within the limits of this catchment basin, then indeed it might be necessary to invoke the aid of an ice cap to account for their transport; but in the meantime it is impossible to assert that this accumulation of boulders at the mouth of the gorge is other than a delta of diluvial origin.

Now as to the character of the lake itself. Its maximum dimensions are:—length 4,480 feet, width 1,833 feet, and depth 127 feet. Unfortunately, as was the case with Bhim Tal, no series of soundings are available, and the form of the basin is, therefore, uncertain. The bounding ranges and their slopes, however, indicate the **V** (river) rather than the **U** (glacial) type of valley denudation.

Looking up the lake towards the course of the stream, the view just beyond the gorge is quite shut out by projecting spurs, which a glacier could have scarcely failed to modify, if not remove. At the outfall, no rocks are seen *in situ*. The barrier, now modified by a sluice, appears to be mainly formed of debris thrown down by landslips. The first rock which I detected



in situ in the bed of the stream was the already mentioned greenstone, which will, I believe, prove to be at a lower level than the bottom of the lake. As I only had a single day to spend at this lake, I was unable to examine the characteristics of the wide and unusually straight valley below the village of Malwa Tal; its examination may throw some light on the subject.

Naukachia Tal.—This curiously irregular-shaped lake has received its name from its nine corners. It is situated about one mile and a-half to the south-east of Bhim Tal. It occupies a hollow on the slope, and is surrounded by low hillocks—not by pairs of distinct ranges, as are the previously described lakes. With a very narrow outfall on the north-west, its appearance, as seen from a mile distant, suggested its being little more than a shallow pond; and it did not seem to me to be advisable to curtail my already too short time at the other lakes by paying it a special visit. On returning to Naini Tal, I found, very much to my astonishment, that its depth is recorded at 132 feet, thus being the deepest of the series. If this be the correct depth, it renders the lake one of the most singular of all. Its shape, the nature of its surroundings, and the narrow winding course of the outfall, all seem inconsistent with the view that it is of glacial origin. Its length is given at 3,120 feet, its breadth 2,270 feet, and its approximate elevation above the sea 4,000 feet.

Sat Tal.—The so-called Sat Tal, or seven lakes, are situated about the same distance to the west of Bhim Tal that Naukachia is to the south-east. They are surrounded on all sides by steep hills; a narrow valley, 100 yards wide, at the outfall of the principal lake serving to carry off the drainage. What the maximum depth may be, I do not know; but two soundings, which I took in the western arm of the principal lake, gave depths of about 58* feet. An artificial dam and sluice somewhat increase this depth beyond what it would be naturally. At

* The maximum depth was subsequently ascertained to be 61½ feet.

the outfall there is a landslip, and I do not think any rocks are seen *in situ* till a much lower elevation is reached than 58 feet below water-level. When it is remembered that this curiously-shaped lake has but one narrow outlet, and that it is otherwise surrounded on all sides by hills, but without any considerable catchment area for a glacier to be formed and fed, the difficulty in the way of a glacial theory of origin becomes strikingly apparent. I have seen in parts of the Central Provinces, where no question of glaciers can arise, denuded hollows among hills, which, if closed by landslips, would form very similar lakes.

Of the smaller lakes enumerated above under Class III., I have nothing to say at present. They have not yet been specially examined. Very possibly there may be in connection with them various points of interest yet to be discovered.

Reviewing the whole of the facts which are enumerated above in reference to each of the lakes, and considering the limited zone in which they occur—the probability that they are all the result of one general series of operations impresses itself as being an hypothesis of primary importance. If one of the lakes, then, exhibits indications which seem to connect it with one particular mode of origin, while others of the lakes do not show such or similar indications, it becomes all-important to submit the former to the severest scrutiny. In this way, I think, the appearances suggestive of a glacial origin, which are perhaps strongest in the case of Naini Tal, lose much of their force when we find that other lakes exist of generally similar character, but in which the special indications are wanting. In the single character of the outfall barriers all the lakes agree; opinions may differ as to the origin of these barriers, whether they are remnants of moraines, or have been formed by landslips; but it is almost certain* that not one of them consists in any degree of rock *in situ*, and we therefore have not the positive aid of a rock basin to determine a conclusion.

* Careful levelling only can decide this point.



There is one point geologically which links the three larger lakes together, and that is the occurrence of trap dykes in the vicinity of each. Now, I do not think it at all probable that the lakes are due to the original outburst of trap. Indeed, the above described fact in reference to Malwa Tal, where both the inflowing and outflowing streams cut through trap, renders such a view untenable. But it seems not improbable that, when the great upheaval and disturbance of the rocks of this area took place, the existence of comparatively rigid lines of trap may have been largely instrumental in determining the form which the surface assumed, and that on their flanks the soft shales, &c., may have been so much crushed and broken, as to yield more easily to the subsequent operations of denudation, thus affording an abundant supply of material for landslips, which ultimately served to close the valleys, and form the lakes.* Or even supposing the outburst of trap to have accompanied the upheaval and disturbance, its effect in determining the subsequently established lines of denudation could not fail to make itself felt. This explanation seems to me more in accordance with the known facts regarding the whole series of lakes, than any glacial theory can be.

* It is possible that the basin of Naini Tal may be connected with some local faulting, the existence of which is implied by the sulphur spring at the outfall. That a fault occurs all along the centre of the valley is, however, scarcely probable, as, did one exist, it would show in the scarp of China, the beds forming which appear to be continuous across the head of the valley.



CHAPTER XIII.

SECTION I.

ORISSA, SAMBALPUR, PATNA, KARIAL.

1876-77.

INSTRUCTIONS FOR SEASON'S OPERATIONS—VOYAGE TO CUTTACK—FALSE POINT—ORISSA CANALS—FIRST MARCH—UNINVITED CAMP—FOLLOWERS—BANKI—CLIMATE OF ORISSA—JUGERNATH PILGRIMS—TOPSIE RESCUED FROM A LEOPARD—BARMUL PASS—ANOTHER LEOPARD—FOREST SCENERY—SALT CARTS—SUPERINTENDENT OF GURJAT POLICE—HOT SPRINGS AND TEMPLES—BÔD—THE GRASSCUTTER'S CASTE—THE URIAS—SONPUR—THE RAJA AND THE DELHI DURBAR—BINKA—MEET THE ASSISTANT COMMISSIONER OF SAMBALPUR—BEHREN—SCHOOL—BURPALI—DANCING BOYS—JACKALS—DUCK—BEAT FOR GAME—BEARS AND JACKALS AMONG THE SUGAR-CANES—PART FROM MY COMPANION—MADRASSI SERVANT—PATNA RAJA—PATHAN SETTLER, HIS LIFE AND ADVENTURES—KABUL POLITICS—BOLANGIR—DUCKS—TEMPLES—THE TEHSILDAR—BEATS FOR GAME—SHOOT A TIGER—KABUL MERCHANTS—ATHGAON—SHOOT A LEOPARD—DIAGAON—SOINTILA—DURAMGURH—WILD BUFFALO—THE GAONTIA A THAUMATURGIST—GRAPHITE—LAPIR—MONDOL—BRAHMIN BEATERS—SHOOT A SAMBAR—CASTE—GUMANI—GRAPHITE—TOADS IN A HOLE—ESCAPE OF THE ELEPHANTS—GUNDAMURDAN RANGE—LATERITE—NURSINGHNATH—CAVE OF SHIV—SITAMA—SCORPIONS—HARI—SHANKAR—BINJWALS AND BHUMIAS—RAIN—GAME—PAINTED PART—RIDGES—NURSINGHNATH—SERENADED BY A TIGER—ENTER KARIAL—TARNOT—GEOLOGY BECOMES MORE INTERESTING—LEAVE CAMP TO VISIT MARAGURA—JONK RIVER—BHIM-ER-LAT—JUMLAGOR—WATERFALL—SAMBAR—MAD DOG BITES AN ELEPHANT—DRENCHED BY DEW ON THE LONG GRASS—SPUR FOWL—TORBA—THE RAJA'S OFFICIALS—SUPPLIES GRATIS—FEVER—BIRD-CATCHERS—BEAT FOR TIGER—UNDER RIVER—TROGLODYTES—HEAR OF A HERD OF BUFFALO—ADVENTURE WITH THE BUFFS—NEWS FROM THE CIVILIZED WORLD—HOT SPRING—ISOLATED TEAK FOREST—SYMPTOMS OF THE HOT SEASON—BEAT FOR TIGERS—A DYING BOY—KARIAL—THE RAJA'S VISIT—TEMPLES OF RANIPUR—JURAL—LEAVE KARIAL.

My instructions for this season were to explore as great an area as I possibly could of the wide region which extends from the Mahanadi river in Orissa and Sambalpur, to the Godavari river in the northern provinces of the Madras Presidency. The native



states of Bustar and Jaipur were especially mentioned as places to be visited, but the routes I should adopt both in going and coming were left very much to my own discretion. As it happened, circumstances arose which caused me to modify in an essential manner the programme which I had drawn up for myself; for instead of marching to Vizagapatam, on the coast, as I had intended to do from Jaipur, I turned northwards for Raipur, and concluded 1,000 miles marching at Nagpur, whence I returned by train to Calcutta instead of by sea from the coast, as I had purposed to do. In view of the preparation of a general account and map of the geology of India it was an object of some importance to reduce as far as possible the limits of the blank space in the above indicated region, regarding which our geological knowledge was absolutely *nil*. Though from analogy it was possible to speculate on the formations represented, we did not possess a single fact or trustworthy observation on the subject. Fortunately excellent maps of the whole area were available.

On the morning of the 9th of November, I started from Calcutta for False Point and Cuttack, in the British India Steam Navigation Company's steamer "Satara,"—rather, however, I should say, intended to start, for owing to the immense amount of cargo to be taken on board we were unable to leave the moorings till late in the afternoon, while there was still time to drop out of the limits of the port, by which the penalty attached to a steamer's not leaving on the advertised date is evaded. On such occasions one of these steamers, as it drops down the Hugli river, stern foremost, presents a rather singular sight, as it carries with it a swarm of native cargo-boats, the process of shipping goods going on all the time, and the boatmen constantly struggling for nearest place to the receiving-gangway.

We did not reach the mud-locked apology for a harbour known as False Point until the morning of the 12th. Large steamers can now no longer go inside, owing to a bar across the entrance which has been thrown up by the Mahanadi.

JUNGLE LIFE IN INDIA.

Anchored outside, they have to await the arrival of the cargo-boats which are towed out by a tug. On this occasion one cargo-boat was pointed out to us which belonged to a proprietor unprovided with steam-power. This wretched craft had for six weeks been trying to fetch successive Calcutta steamers. Part of its cargo consisted of the private effects of an officer and his wife, who had been put to the greatest inconvenience by their non-arrival. While we lay at anchor, discharging cargo, a severe swell, due to the rising tide, began to affect the boats exposed on the weather-side, and although there was neither wind nor a rough sea, one of them, from the intensity of its rolling, was for a short time in considerable danger of being swamped. The water-cask, though lashed to the deck with ropes, was carried away together with a number of spars. It was extraordinary that some of the Uria boatmen did not follow, but they managed to cling on like flies. All this may have been amusing to ordinary onlookers, but for my part I felt anything but comfortable, as all my stores, tents, &c., were on the deck of another cargo-boat on the lee-side of the steamer, which was gradually swinging round on her moorings with the tide. The prospect of seeing my belongings go adrift in the same way as the water-cask had done was far from pleasant. However, I had to satisfy myself with the assurance of the nautical authorities that as we swung round the swell would go down. The event proved that they were right.

Towards night the passengers who, like myself, were bound for Cuttack, left the steamer in a steam-barge, and, having passed inside the outer bar, anchored for the night, there not being sufficient water on the inner bar for us to cross it, and also in consequence of the navigation among the islets of the delta being too intricate for night travelling. The box-like deck cabin was sufficiently commodious to enable our party of five to place our beds on benches, table, or floor. Fortunately there were no ladies in the party or we should have been compelled, or at least expected, to resign this box to them, and to have "pigged" it out amongst the coals and miscellaneous crowd of native



passengers and crew. Early next morning we steamed off to the entrance lock of the canal at Marsagai. On our way we passed through churs and islets densely clad with low jungle in which a small palm (*Phoenix palustris*) was conspicuous. At Marsagai another long and dreary wait ensued till the arrival in the evening of a small steam-launch from Cuttack enabled us to continue our journey. As we entered the canal it became quite dark, but we continued on our course, taking in tow one of the cargo-boats which had on board our servants and the baggage of some of the party. As the time for turning-in arrived, some little awkwardness arose on the subject of how we were to dispose of ourselves for the night, the accommodation in the steam-launch being limited to a narrow cabin with two benches, with a well or passage between them. It was perfectly clear that two of the party would have to take up their quarters in the cargo-boat. Two did go, but seemingly they went under protest,—at any rate they seemed to go with the deliberate and foregone intention of being as uncomfortable as possible, thereby establishing a claim to growl on the morrow. According to their own account they spent a rather miserable and sleepless time. About sunrise the next morning we realized that we were still about ten hours journey from Cuttack, and that we were unprovided with any commissariat. Starving, or broaching my cases of stores, were the alternatives: the latter seemed the more preferable of the two, and was accordingly adopted. We were not, however, compelled to rely wholly upon this source of supply, as near one of the locks where we were delayed stood the house of one of the irrigation engineers in charge of a section of the canal. Here we were hospitably entertained with *chota haziri*, and were thus enabled to continue our journey at the pace of about three miles an hour.

The canal-banks were very much like canal-banks in other parts of the world, and there is little to be said about them. During the day we passed the Government steamer bound for False Point with a number of irrigation officers on board. They were apparently somewhat amused to see us towing away at the



unwieldy cargo-boat which would probably otherwise not have reached Cuttack for three or four days. In India especially, but also in many other parts of the world, time is, in the long run, actually saved by travelling with one's impedimenta. Personal presence may serve to counteract the ill effects of break-downs and delays caused by a multitude of trivial circumstances. I am not alluding to ordinary day-to-day travelling where there is a regular system established, and where, perhaps too often, native subordinates make use of means to expedite the arrival of their master's property, which means might not in all cases meet with the master's approval—but in anything like travelling out of the ordinary routine, personal presence on the line of march may save days of anxious waiting at the end of the journey.

Towards the evening we left the canal and steamed across the Mahanadi to Jobra, a suburb of Cuttack, just above the weir. Cuttack I have before described, and shall, therefore, say nothing further regarding it. I found my men, two horses, and four elephants, awaiting my arrival. Some few other servants of the minor sort had still to be engaged, and negotiations with these, and making final preparations for my start, occupied several days. However, on the morning of the 21st, everything was packed on the four elephants and despatched to the village of Ramchand, some ten miles off on the Sambalpur road. Late in the afternoon I followed up, and, as I had a wide expanse of water and sand in the Kajuri branch of the Mahanadi to cross, I did not reach my tent until some time after dark. On entering it I found that my faithful bearer had arranged all its contents with his usual neatness and care, and everything was in the exact spot to which, from long custom, it particularly appertained. A feeling of rejoicing filled my heart as I gazed through the gloom of the mango-grove, here and there illumined by the numerous fires of my followers. I had now fairly broken the last link binding me to civilization for a long season. I felt that my equipment was as perfect as the long experience I had previously had of the life could make it. Nothing that I was



likely to urgently require had been left behind, and supplies of all articles not to be found in the jungle were, I was confident, in sufficient abundance to last me through the trip. The country I was about to visit could not fail to be interesting in many ways.

While reflecting on these topics over my first log-fire for the season, I became cognizant of the presence of certain impedimenta in camp of whose existence I had not before had any idea. Female forms indistinctly seen over the fires and shrill female voices declared the presence of more than one representative of the sex as uninvited camp-followers. Calling up the Jemidar Saidon, I asked him who they were, and learnt from him that there were three of them—wives of two of the mahouts and one of the *charkuttas*, or mahout's mates. I then made the further enquiry whether they were the *pucka* (real) wives, and was assured that they were; whereupon seeing that it would not be altogether wise to insist upon their being cast adrift to find their way to their homes, which were many hundreds of miles off in the neighbourhood of Jabalpur, I was obliged to vent my indignation on the Jemidar whose business it was to have reported their presence to me. This may seem a trivial subject upon which to devote so many lines, but it must be remembered that I was starting on a very long and wearisome journey, that there was the prospect of these women breaking down from fatigue, and becoming an encumbrance. It had also been an object with me to keep down the number of followers as much as possible as there was every prospect of supplies being scarce. Moreover it required not the spirit of prophecy to enable me to tell that their presence would not conduce to the harmony of the camp. Sooner or later they were sure in some way or other to supply a *casus belli*. The event fulfilled both predictions.

A muster being called, I found that there were twenty-eight men, three women, four elephants, two horses, and two dogs, to be provided for daily, and besides these there were always several chuprasies, or police, furnished by the local authorities to escort



me through each district. The men so sent from Cuttack consisted of one chuprasi and two constables, one of these men together with one of my chuprasies always kept ahead of the camp in order to have the supplies ready.

The next march was to Patpur, a village belonging to the Domepara Zemindar, who shewed his independence by not having made any arrangements for supplies, although he had been specially written to on the subject by the magistrate. However, what was necessary for the camp was forthcoming from the village after the usual amount of Uria noise, squabbling, and delay. *En route* I visited a large jheel, where I shot a few snipe; but the birds were very wild, rising in flocks out of range. My bird-collection for the season was commenced by my shooting a honey buzzard (*Pernis cristata*) and a plaintive cuckoo (*Ololygon passerinus*). The latter is a rather rare bird in most parts of India, but abounds in the thorny zone of jungle to the west of Cuttack.

The next day I marched to Banki, passing off the sandstones of the Athgurb basin on to an area in which metamorphic rocks, much concealed by alluvium, prevail. Close to Banki there is a steep peak of gneiss, which was formerly the abode of a fakir, regarding whom various stories of his miraculous powers are still current. Banki is a Tehsil, or head-quarters of a Tehsildar. There is an excellent travellers' bungalow there, which is picturesquely situated on the banks of the Mahanadi. It is the only one worthy the name on the road. Most of the others are merely mud hovels, but they served sufficiently well for my purposes, and generally enabled me to dispense with my tent. Imperial pigeons (*Carpophaga Aenea*) and golden plover, and some smaller birds, especially the white-browed bulbul (*Ixos luteolus*), contributed to my bag to-day.

The next march was to Bydesur, thirty-seven miles from Cuttack. Most of the country was open alluvial land, but there are hills of garnetiferous gneiss close to Bydesur. On this, the 24th of November, the afternoon was exceedingly warm, the temperature at 6 p.m. standing at 81° F. This was, of course,



abnormal ; but I very much doubt if anything like a real cold season ever occurs in these parts.

Leaving Bydesur, the next march of thirteen miles brought me to Kontalu, in Daspala, where the Raja's Muktiar or agent was in waiting to receive me. Here there are several temples, which are sacred to Kali, I believe. They are built on a small hill, and form a picturesque group. From hence onwards the rest-houses were in a wretched condition, and the chowkidars in charge said that they were quite incapable of restraining the people from making free with the compounds surrounding them. The village of Kontalu is a tolerably large one. Among the inhabitants there is a colony of braziers, who seemed to be at work both day and night, to judge from the incessant tapping.

The next day's march to Belpara, ten miles distant, was through jungle, part of it more properly forest. In the densest portion I shot a fine specimen of the large Central Indian red squirrel (*Sciurus maximus*). Many pilgrims to Jugernath were passing along this road ; most of them appeared to be badly off, and some, who were quite destitute, were begging for aid. Among them were some miserable old women, with their feet bound up in rags. They were dismally hobbling along at a rate, perhaps, of five miles a day, to their still distant destination.

In the evening, accompanied by my two dogs, "Topsie" and "Skinny," and carrying with me a shot-gun, I went to examine a small group of jungle-clad hills in the neighbourhood of the bungalow. While ascending to the main peak, the dogs rushed off in pursuit of some animal, but what it was I could not see. After a long time spent by me in whistling, they at length returned, and I resumed my walk to the top of the hill. As the sun set, I turned back to get to camp. Shortly before leaving the jungle, and just at the foot of the hill, Topsie, who was following behind me, gave a bark, followed by an angry cry, which showed me that some animal had caught her. Turning back, I followed the retreating cries as fast as I could, through the bamboo jungle up the side of the hill, and on getting close they ceased, and the poor dog, released from the jaws of the



animal that was carrying her off, came running towards me, but dropped exhausted before she could reach me. Though I must have been within a few feet of the animal, I failed, owing to the undergrowth, to get sight of it. No doubt it was a leopard, and possibly it was the animal first pursued by the dogs, as a leopard will often fly before a small dog. If such were the case, he probably tracked us down the hill, and took a favourable opportunity for springing on the dog. His method of procedure was apparent from the wounds. A tear on the flank showed where he had struck her, in order to turn her into position for grasping her in his mouth by the neck. He had buried his four canines deeply in her neck; but thanks to her thick covering of fat, she had escaped receiving a fatal wound. Carrying her back to the bungalow in my arms, I then, with the aid of the native doctor, bathed and bandaged the wounds. For many days she was on the sick-list, and was unable to walk the marches for about six weeks. She proved on the whole a good patient, but began to hate the very sight of the native doctor when—owing to the too quick healing of the wounds, and suppuration setting in—it became necessary for him to use the lancet. Physically her recovery was complete, but I found that her spirits were affected, and she showed a marked disapproval of evening strolls in the jungle, particularly, it seemed to me, when she saw that I did not carry a gun. Poor dog! after this and other less stirring adventures and escapes, it was her fate to die miserably of distemper on my return to Calcutta. Those, and those only, who have had for the companion of their solitude an affectionate dog, with a good deal of character and intelligence (why call it otherwise), can appreciate the full measure of my loss.

The next march was to Barmul—thirteen miles. Close by is the famous Barmul Pass,* one of the great show places of Orissa.

* Figured in Hunter's "Orissa," Frontispiece, Vol. 1. In the year 1803, a battle was fought at the Barmul Pass between the British troops, which were sent to subjugate Orissa, and the Maharatta forces. This was the last stand made by the latter, who were completely routed; in consequence of which the Rajas of Bôd and Sonpur came in and tendered their submission.



Its distance from Cuttack, upwards of seventy miles, prevents its being often visited, and the book at the bungalow contained but few names of tourists. I made a halt here in order to give my men and beasts a rest and afford myself a better opportunity of examining the pass than was possible on the day of arrival. The Pass consists of the narrowed and much-deepened channel of the Mahanadi, which runs here due N.W. S.E. for about eight miles between two parallel sugar-loaf peaked ridges of garnetiferous gneiss. The bedding of the rock is steeply inclined, at angles of from 40° to 80° to N.E. The scenery possesses some resemblance to parts of the lower Danube, but lacks the bold and precipitous outlines of the more striking views on that river. The only boat available for going up the stream was an exceedingly lubberly craft, which I found to be quite unfit for the purpose. I soon got tired of the tedious poling, and landed on the northern bank to examine the rocks. The jungle there seemed a likely cover for large game. In such places a sort of instinctive perception of the presence of game often seems, in an indescribable way, to pervade one's consciousness. Not unfrequently I have found the correctness of such perceptions fully established by some subsequent discovery.

On return to camp I heard that while one of the mahout's assistants was on the previous evening climbing up into the lofty branches of a banyan-tree by its pendent roots, a leopard came and sat underneath the tree. The man called out to the mahout, who, from the cries, guessed what was the matter, and took with him the elephant, which at first refused to enter the strip of jungle in which the tree was situated, and did not do so till the leopard had bolted off. Hearing this, I thought the occasion might afford an opportunity for avenging Topsy's injuries. Accordingly, I had a village dog tied up as bait, and sat up in a *machan* over it. At one time the dog seemed to see something in the jungle, as he growled ominously; but at sunset he quietly lay down to sleep, after which I waited for about an hour, and then got down from the tree and returned to the bungalow.

Ten miles beyond Barmul there is a bungalow at a place called



Sonakhani or Sonakulli, but no village. The road is a pleasant one through well-wooded hills. Here and there it overhangs the Mahanadi, affording glimpses of beautiful little bits of scenery. Some bamboos of unusually large dimensions occur in this jungle; and I saw some of the largest cut down by carters to make into oil-bottles and water-vessels. The pleasure of travelling through this beautiful section of the road was much marred by the presence of long strings of carts laden with salt from the coast, which were always in the way at the river crossing; and by constantly causing a dust and noise they proved themselves in other respects disagreeable adjuncts.

The next stage of ten miles brought me to Horbunga, where I found the Superintendent of Police, who was just returning to Cuttack from a tour in the Khond Malias, or hills inhabited by the Khonds. He described the country as being very difficult to travel through, owing to the impossibility of using any other carriage than coolies; and the people, from his account, appear to be in an unusually wild and unsophisticated condition. The geologist to whose lot it may fall to explore the belt of hills known as the Eastern Ghâts will have a very difficult task indeed to perform. In Bôd, the country I was just about to enter, he was, he told me, on one occasion in charge of the supply arrangements for a regiment. On the day they entered the State a peacock was shot by an officer, and the Raja immediately sent to claim the bird as being one of his royal prerogatives. The reply he received was an invitation to come for it himself, which he declined to do.

The next stage was Ramgurh, twelve miles. The country is open and uninteresting, and nothing occurred during the day worthy of record. On the following day, instead of proceeding onwards at once, I first retraced my steps for two miles, and then crossed the Mahanadi in a dug-out to a village called Woodasing. The antiquated boatman would have afforded a capital model for Charon. He was not unskilful with the paddle, but, owing to the swiftness of the current in the successive channels we had to cross, the transit took a longer time than I had expected. At



Woodasing the Pujari or officiating priest shewed me the way to the hot springs, which were the object of my visit. I found that there were several distinct springs in the jungle about a mile to the north of the village. The hottest of these springs has a temperature of 134° F.; others, rising into basins of already-cooled water, gave temperatures of from 90° to 100° , that of the air being 75° F. In the immediate vicinity there are several temples to Devi and Mahadeo. The original idol of Devi is said to be kept at the Raja's palace in Athmalik. These temples resemble the smaller ones of the Mahendragiri series. They were of especial interest to me, as the material used in their construction were sandstones, which shewed recognisable characteristics of the formations known to occur in the area of the Talchir coal-basin. The rocks of the immediate vicinity were gneisses and granites, and since the repairs to the temples had been effected with these subjacent materials, it is probable that the ancient founders brought the sandstones from distant localities. This locality is regarded as being one of considerably sanctity, and is called Deoljhari. A large *mela* is held there annually.

In several of the springs there was a curious felty confervoid growth, which in one place was covered with a cobalt-bloom looking substance. This was possibly of the nature of a *protococcus* growth. Unfortunately I omitted to bring any away for further examination. On the edges of the hottest spring there was an encrustation of common salt (*sodium chloride*); but I failed to detect any distinct sapid taste in the water. Possibly this was owing to the strong flavour of sulphuretted hydrogen. The vegetation of the immediate vicinity of these springs was peculiar, and quite unlike anything to be found in the surrounding jungles. Among the plants I noted a *Pandanus* and a fern (*Acrostichum aureum*), which is very common at the Salt lakes and generally within the tidal region near Calcutta. The whole aspect of the place was so singular that it suggested to me a train of thought in connection with the fossil floras of tropical aspect which have been found in countries which have now a temperate or even a frigid climate. I do not for a moment propose to explain all such cases by the



existence of hot springs. What I mean is, rather to draw attention to the possibility of an abnormal activity of hot springs over a limited area producing locally a perennial hot-house climate, and thereby inducing the growth of plants other than those normal to the country and climate in which they are found. Not unfrequently it happens that fossil plants are found densely compacted in particular parts of particular beds, while the main mass of the same beds are totally devoid of fossils. It is conceivable that the places so abounding in fossils may have been in the immediate vicinity of hot springs.

I did not reach Bôd, where my camp had preceded me, till late in the afternoon. On arrival I soon found, from the dismal faces of my servants, that things had not been going smoothly. Bôd enjoys such an evil reputation for incivility among all those whom I had met who had travelled up the road, that I had hardly expected that my experience would be very different from theirs, though, to avoid any unpleasantness, I had applied to the Commissioner for special letters to be sent with and before me, and addressed to the Rajas respectively, requesting them to afford me all necessary supplies and assistance. On enquiry I found that my men had been treated with a very scant measure of civility, and that a flaunting yellow *nirik namah* or price-list had been affixed to a tree near the camp. As this price-list not only included articles—such as wood—which are usually supplied free of cost, but put down everything at rates higher than prevailed in the Bôd Bazaar, its object was only too apparent. Awaiting my arrival, my men had not attempted to cook their food, and refused to take anything on such terms. In this they were actuated by the belief, no doubt correct, that an acceptance of these terms would be an admission of inferiority. It may perhaps not be quite easy to the English reader who does not know India to understand why the conduct of the Raja's people should appear so objectionable; but the very different and most hospitable receptions I met with subsequently will perhaps serve to shew what, among the well-disposed Rajas, is considered to be the proper conduct on the occasion of a visit like this. It was

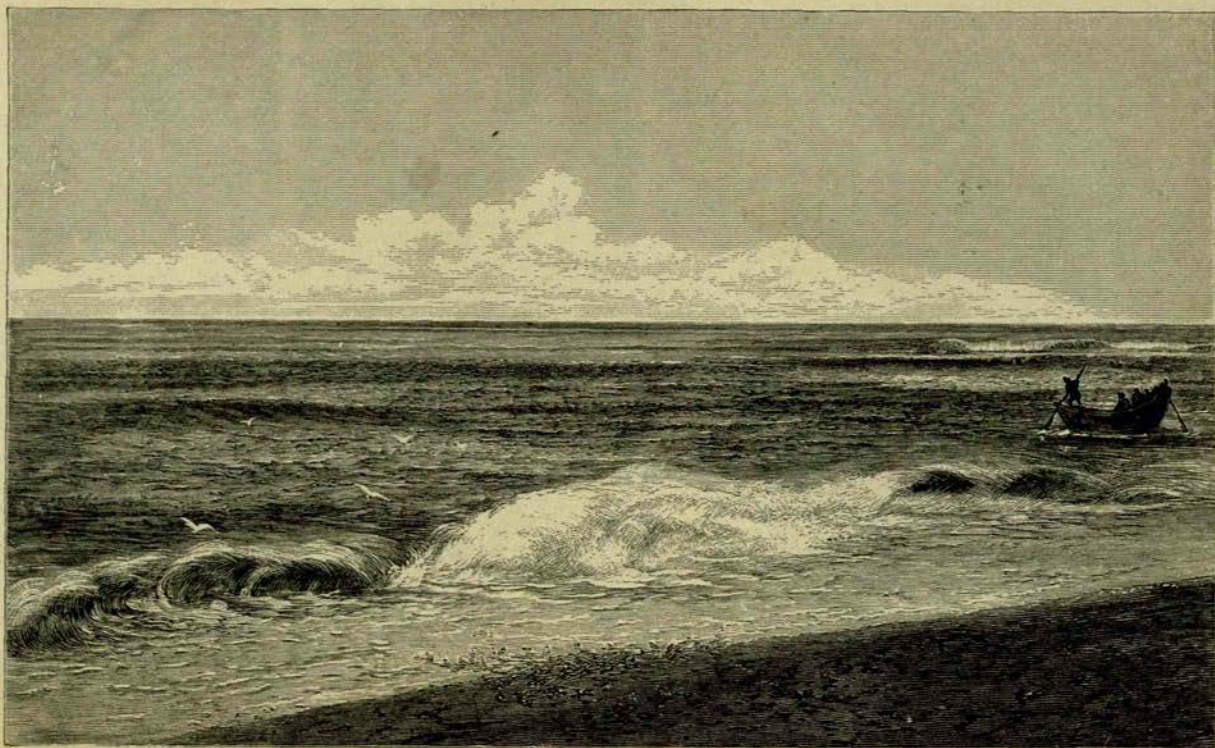


Plate VI.]

THE SURF AT GOPALPUR.

(From a Photograph by Capt. W. G. Murray.)



soon apparent to me that the object was simply to adhere to the bare letter of the Commissioner's parwana, while shewing a want of respect to me personally. After some little delay, the man appointed by the Raja to arrange for the supplies made his appearance. He was, I believe, the chief officer of the Raja's police, and he proved to be a worthy specimen of the knavish and insolent Uria. I asked him first to tear down the flaunting price-list, and enquired as to the various items, regarding which his answers were short and unsatisfactory. He would not tell me what the bazaar prices were; but they were certainly lower, as my men took their supplies from the shops. In reference to wood, he said that it was charged for because Bôd was a city. This was news for me, as, having just ridden through it, I had seen more jungle than houses, and not a single building of any size. Straw for my horses had indeed been graciously supplied by the Raja. This was, however, a concession, as the travellers I have before spoken of had told me that, when passing through Bôd, no money would purchase straw or anything else, the people distinctly saying that they had the Raja's orders not to render assistance of any kind. I then ordered a supply of wood sufficient for the camp, and paid for it, and took from this policeman a receipt for the amount in the Raja's name. This, with most Rajas, would have been felt as derogatory; but I was disappointed in supposing that it would have any such effect here. My action had the result of shewing that I would not submit to the studied insolence and indifference of these people, and was the cause, I believe, of my receiving a visit from the Raja's son—the Raja himself, I was told, never leaving his house. The son proved to be a fat, uninteresting lad of a limited degree of intelligence. When about to start on the following morning no coolies were forthcoming to carry the basket containing the sick dog Topsy, and among my men not one, save the sweeper, could be found who did not consider he would be defiled by touching it. This although they all professed to have the greatest affection for the dog when well. I then ordered my two Uria grasscutters, who were Ghasias by caste, to take up the basket; but they



refused, saying their caste would go if they did so. They admitted that their religious status would permit of their leading a dog by a chain, but not of carrying it. This was too preposterous, and savoured so much of insubordination that I inflicted a small fine, which I made a particular point of subtracting from their pay. Let those who would talk of respecting caste prejudices put themselves in my place, and then say what they would have done,—remembering, too, that had it been a sick child or a sick wife, instead of a sick dog, there would have been nearly the same difficulty had there been none of the regular bearer caste at hand. After some further delay in the village, two men were found willing to carry the basket.

I marched fourteen miles to Boira. The rocks, so far as they were seen, proved to be almost exclusively coarse porphyritic granites. In the tanks there were whistling, cotton, and common teal in some abundance; and on the uplands I saw parties of the graceful courier plover.* From Boira I sent back the Orissa Tributary Mehal chuprasi and constables, as the morrow's march would, I was thankful to feel, take me out of Orissa into the Sambalpur District of the Central Provinces, where, though the people are to a great extent Urias, and speak the Uria language, they are much less bigoted and more manly and civil than the deeply-religious, undefiled, but dirty and knavish, inhabitants of the Gurjat states of Orissa.

The next day's march brought me to Sonpur, ten miles distant. Sonpur is the chief town of the Gurjat state of the same name. On arrival I rode through the town, expecting to find a bungalow and preparations for my camp, but the only bungalow to be found was a small and not particularly clean one-roomed school-house, which I declined to occupy, and accordingly went off to a grove near the junction of the Tel and Mahanadi rivers. I then learnt that the Raja had, through some mistake, received no official intimation of my coming, and from what I heard, seemed to be

* *Cursorius Coromandelicus.*



rather offended that I had not written to him, instead of sending a verbal message ; but if he had this feeling, better thoughts soon led him to send me as ambassador an old half-caste, bearing a civil message to excuse preparations not having been made, and to convey his intention of visiting me in the evening, and to express his hope that I would spend several days as his guest. Soon there followed a procession, bearing the usual and time-honoured *dalli* of fruit, sweatmeats, and a fat kid, together with all the supplies required for the camp. On the arrival of the elephants I wrote him a letter explaining matters, and received in reply a well-written English letter, in his own hand. For some reason—the state of his health, it was said—he did not pay the promised visit, but the next morning wrote to say he would call upon me at seven o'clock, if I would wait so long. To this I replied that it would suit me better to call upon him, on my way through the town, as my tents had been taken down. Accordingly I visited him in his cutcherry, and found him to be a handsome, well-set-up man, with a pleasant manner and a good knowledge of English. He was in great trouble on the subject of the Delhi Durbar, the time for which was then quickly approaching. Having consented to go, he had got so far as to send his camp to the opposite bank of the Mahanadi, but then his heart began to fail him. Rheumatism and fever, he said, were the causes of his changing his mind ; but he added, significantly, that such assemblies were suited to men like Scindia, Holkar, Jaipur, and other chieftains of Rajputana, not to Rajas like himself. Had he gone, however, he would have found that the members of the group of feudatory chiefs to which he belonged were received with salutes of seven guns, and otherwise treated with a degree of honour they could scarcely—even important as they may think themselves—have aspired to. He asked me whether he would be likely to get into disgrace for not going. On this point I could give him no information ; but I assured him that his changing at the eleventh hour, when all preparations had been made, could not meet with approval. Ultimately, he did not go, and the district officials were, I believe, far from pleased. From



some of the natives I learned that it was their opinion that he had lost a great opportunity in not securing his right to the seven guns.

This day's march was a wearisome one of sixteen miles to Binka, which is situated at the point where the Mahanadi changes from its N. to S. direction to the steady N.W. to S.E. course which it pursues from hence eastwards to the sea. Here also there was no bungalow, and I had a particularly dreary wait for the elephants, which did not arrive till late in the afternoon. I arranged to stop here for a day, and then, leaving my camp behind, push on to the station of Sambalpur, where I had some final arrangements to make before starting for the native states to the south. The Mahanadi in the neighbourhood of Binka exhibits good sections of the rocks, and the day was spent in examining these, and in reading the pile of newspapers and letters which had just reached me. They were the first I had received for a fortnight. The next morning I started for Dama, about half-way to Sambalpur; but after walking five miles to Turam, I met the Assistant-Commissioner of Sambalpur, who had written to say that he was coming out to meet me. Finding from him that it would be possible for me to make the necessary arrangements about money, &c., without going into Sambalpur personally, we agreed to march across the Dakin-tir, or southern portion of Sambalpur, together.

On the following day, which we spent encamped at Turam, my camp, which I had sent for to Binka, came up. Our first march was ten miles to Behren, the residence of one of a group of semi-independent Zemindars occupying the Dakin-tir. Our camp at Behren—there being no regular grove—was pitched under a few trees in an unclean and noisy spot in the middle of the village; and, it being market-day, was soon surrounded by a shouting crowd.

In the evening we visited the school, which was one of those established under a system peculiar to Sambalpur, being supported by subscriptions, and unaided by Government grants, but supervised by the District Officials. In this and several



of the schools subsequently visited, I noticed that, taken at the same ages, the girls were vastly more quick and intelligent than the boys. One young damsel of nine or ten years old, who particularly distinguished herself in ciphering, we shortly after noticed seated in charge of a stall in the market, putting her school acquirements into practice. Indeed it seemed that they were taught when set questions in multiplication to give the answer in rupees and annas, and many of the questions were solved mentally in a most creditable manner.

The next day we moved ten miles further west to Burpali, the Zemindar meeting us on the boundary, and accompanying us to camp, which was pitched in one of a series of very extensive mango-groves. In the afternoon we visited the town and schools, and later on, after dinner, were entertained by the Raja with a *nach*, the performers being small boys. In addition to the dancing, one of the boys possessed an extraordinary snake-like flexibility of spine, which permitted the musicians and other attendants to do almost anything with him but tie him in a knot. Female dancers are seldom seen amongst the Urias.

The following day was a day of rest for the camp, and we devoted part of it to shooting, our bag including teal, quail, and snipe—of the latter we had daily come across some during the march. While we were shooting, the dog-boys in charge of my companion's pack, loosed two couples after a pair of jackals. Hearing the noise we rushed to the embankment of a tank, below which we had been shooting. We there found that two of the old dogs had gone away altogether, but that the pups had first driven into the water, and afterwards apparently "killed." On examining the *dead* jackal, I thought he winked at me, and turned round to say so, when lo! he bolted, and took refuge between two haystacks, but was soon dislodged, finding immediate refuge in a neighbouring field of sugar cane. Afterwards he was routed out of this; but the pups failed to get sight of him, and ultimately he got clean off and escaped. The other dogs, we found on our way back to camp, had accomplished the death of their jackal. The dog-boys,



of course, got into trouble for their misconduct in thus wildly loosing their charges without orders.

The next march was to Bijapur—eight miles. On several of the tanks near the road there were large flocks of duck, especially on one of them, where there appeared to be some thousands of pintail and gadwall. Owing to the difficulty of retrieving we carried away a smaller bag than we should otherwise have done. At Bijapur there is a remarkably fine sheet of water, formed by an unusually massive bund, faced with cut laterite, which has been thrown across a valley. We much enjoyed a swim in its deep clear waters in the evening.

The following day we turned southwards to a small village called Louamunda, nine miles distant, and on arrival we heard news of a tiger at a village about five miles off, which we set out for after breakfast. With the aid of the villagers we found the beast's lair, and some tolerably recent footprints. We then determined to try a small beat, and about a score of men were soon collected; but, save a few spotted deer, no other animals were turned out.

The next day we marched ten miles, still southwards, to Gainslot. When passing through some of the villages the people, more particularly the women, cheered us, wagging their tongues from side to side of their mouths, in the same manner as some of the African tribes are said to do. I have never elsewhere met with this custom in India.

At Gainslot we shot a number of quail—grey, black-breasted, and button—and saw one specimen of the florikin, an extremely rare bird in these parts. Our camping-ground proved to be on the first unaltered sedimentary rocks which I had met with since leaving the neighbourhood of Cuttack. The early part of the next day was devoted to their examination, and in the evening we had a beat for a bear, which my companion had tried to track up while I was at work. That bears were tolerably abundant was evident from the destruction caused by them among the sugar canes; but even here, as well as in the more open country we had come through, the people did not so much



complain of the injury done by the bears as of that of which jackals were the authors. By careful watching the bears might be kept off, but no amount of watching could save the crop from the insidious attacks of the jackals, who would bite across ten canes for one that they would eat. Our beat was unsuccessful, the only animal seen being a boar. As yet, therefore, I had had no chance of trying the effects of a new "Express" rifle I had bought before leaving Calcutta. Next morning the Assistant-Commissioner returned northwards to Sambalpur, where he had to go in order to make arrangements for the Imperial rejoicings on the 1st of January.

After another day devoted to the geology of the neighbourhood of Gainslot I marched to Jornapali, six miles. On the road a Madrassi servant I had recently engaged, and who was represented to me as being a model servant, was found by the rear-guard helplessly drunk. On my remonstrating with him he excused himself by saying it was his "first chance"—meaning, I presume, first offence. When crossing one of the streams on the road, some of the men reported having seen a bear taking a sand-bath.

At Kasm, the next halting-place, two days were spent examining the neighbourhood. I had a visit here from a Babu, a relative of the Patna Raja, who was then under suspension on account of misconduct and oppression of his ryots; his territory being administered by a Tehsildar under the Deputy-Commissioner of Sambalpur. On entering my tent the Babu flung a couple of rupees down on the table. This in itself was an indication that I was entering among a people with somewhat primitive habits, as the custom of making such offerings on ordinary occasions is now becoming obsolete in British India.

At the next halting-place—Simlia, on the Sokethel river, I was surprised to find a settler, an old Pathan, who had first come into this part of the country many years previously as a merchant. He related to me a long story of his vicissitudes of fortune. Just before the mutiny he had, he said, amassed a considerable fortune, but lost it all during those disturbed times. He had



many stories of ill-treatment by the Rajas. The land and village which he now occupied had been given him by the Patna Raja in acquital of a debt of long standing; but after he had spent money upon it, and made a tank, the Raja again resumed possession of it, and threw him into prison. After his release he appealed to the Deputy-Commissioner who satisfied himself that the deed granting the land was a genuine one, and reinstated him, though the Raja declared it to be a forgery. One of his ventures in his travelling days was a rhinoceros which he bought in Calcutta for a thousand rupees, and marched down at the rate of from six to eight miles a day, driving it, as he described it, like a cow, before him. Finally he disposed of it to the Raja of Jaipur for the fancy sum of sixteen thousand rupees, which sum, however, he declared he was never paid, though fed on promises for several years. The old man did not disguise his dislike to the Uria-speaking people among whom he lived. He said he would migrate to some other part of India if he could afford to do so. By his wife, a Benares woman, he had a number of children who were growing up uneducated, as he would not allow them to learn Uria—the only language taught in the neighbouring schools. On Kabul affairs he waxed eloquent, and insisted on the fortification of the Khyber Pass as the great point to which the Indian Government should address itself.* He expressed some disgust with the Amir for imprisoning his son Yakub Khan.

The next march was to Bolangir, six miles. I had a long day's work in the intervening country. At one village the people complained to me of the excessive damage caused to their rice crops by wild geese, ducks, and teal; and, indeed, I could see that whole fields of grain near a tank had been totally destroyed. I diminished the marauders by half-a-dozen, when they flew off to other pastures.

* Recent events have shewn what a good knowledge of the "situation" this old man possessed.



At a village called Santpur I saw some old temples which were rather elaborately carved; but I know nothing of their age or origin: probably they were only a few centuries old. Their chief interest to me consisted in the materials of which they were built—enquiries, subsequently made, led to the discovery of two localities whence the stones may have been brought.

At Bolangir I found a subdivisional station in process of formation, and a Tehsildar installed as dispenser of justice in place of the dethroned Patna Raja. This Tehsildar, a somewhat learned Pundit, whom I had previously seen in Sambalpur, proved to be very much more civilly disposed than are most of his race to those who are not in immediate authority over them. He had got together for my inspection a small collection of the mineral productions of the neighbourhood. This included some crystals of quartz, graphite, garnets, &c. Subsequently I visited the localities where these had been obtained and got better specimens. One of the quartz crystals I dug out was upwards of a foot long, and three inches in diameter. This had been one of the favourite shooting-grounds of a former Deputy-Commissioner, Major Bowie, whose large bags of tigers and other game were among the most considerable made in the Central Provinces. The Tehsildar having collected information, with a view to my visit, was prepared with news regarding several tigers and a herd of buffalo. Shikaris, trained beaters, and game, being all present, I thought I could not do better than spend my Christmas in endeavouring to get a shot at something. Accordingly, while I ranged the country geologizing for a couple of days, *garrahs*, or cattle for bait, were tied up in likely places. On the morning of Christmas Eve a kill was reported, and the beaters having been collected, we moved off to the spot, which was about two miles distant from camp. Markers were posted in the trees on either side of the one in which I was perched, and a pair of elephants on the flanks of the line. The beaters then entered at the opposite end of the jungle. After a short time it became apparent that the tigress—for it was a female well-known to the shikaris—was afoot. Soon



after there was a loud shouting by the beaters as they caught sight of her, and as she was crossing in my direction the man in the tree on my right, unmindful of all the instructions he had received, made such a hideous noise that she turned without my having seen her. The men were then again put round the jungle, and the beat recommenced; but the tigress had in the meantime managed to sneak off without being seen. Many were the invectives cast by the beaters and shikaris at "*Sali-gachia*," as he was called, for spoiling sport. For some little time I could not think what the term meant, but I at last remembered that the individual in question had been seated in a Sali (*Boswellia thurifera*) tree, and that its interpretation was, therefore, "He of the Sali tree."

For my part I was disgusted and depressed, as it seemed to be my destiny never to get a shot at a tiger. The shikaris then proposed we should beat a small rocky hill not far off, to which, therefore, we adjourned. My seat was a native charpoy or bedstead, lashed in the branches of a small tree; this I have found to be the most convenient way of keeping oneself and spare guns together whenever it is advisable to use a tree. As the beaters reached the crest of the hill, an ominous rustling in the bushes was followed by the appearance of a civet cat, which leisurely trotted under my tree. But it was evident that it was not the cause of the noise, as there was some animal still moving about. Presently the man in the tree next to me, notwithstanding what had been said to *Sali-gachia*, began to enquire in a stage whisper whether I saw the tiger; after he had called out half-a-dozen times I told him to be silent; but apparently he did not hear me, as he continued to call out until a tiger made its appearance on the path leading down to the foot of my tree. Keeping it steadily covered till it was within about five yards, I then gave it a ball in the neck as it turned its head on one side. The effect of the Express bullet was marvellous; the animal simply subsided without a struggle, and was only just able to grin at me as I called out to the beaters to be careful how they approached. In another moment it was dead, of which I