No. 24
R

Camp Paipur
6th January 1882.

From,

H. F. Nordmann Esqr
Executive Engineer
on Special Duty

To,

Colonel R. A. Sankey, C. B. R. E.
Secretary to Government P. W. D.
Madras.

Sir,

Submits Report & Reconnoissance from 6th to 30th Dec. with Sections

I have the honor herewith to submit the Report on the Reconnoissance from Bogor to Paipur (5th to 30th December 1881), together with an Extract from my notes + the Sections will follow in a few days, i.e., as soon as all the anerois observations, taken on the Coast up to date, have been received. I request that all the altitudes, entered in my previous Report, may now be corrected according to the figures given in the Sections which are final and accurate.

Altitudes corrected + note R. A. S. 15/2

March from Bogor to Ouki

2. The Party crossed the Tel Nadi near Bogor on the 6th December, and marched along the left bank of the Sunder River, via Bodrapador, Badkeng, Sukla, Kharial, Koleinga, Kumina to Torbor; thence across a low watershed

and through some very dense jungle via Kondamari, Sialjori and Jalbal, into the valley of the Jonk river, and along its right bank to Onsi.

From Jalbal to Raipur

3. Returning from Onsi to Jalbal, the Reconnoissance was continued via Narra, Sisarmal, Khopli, Patrapali, Selibanda, Semarda, Mahásamund, Kharóra and Belsóra to Ghorári, where the Mahánadi was crossed; thence to Arang where I halted a few days to give the people and cattle some rest; and then along the Sambalpúr Road to Raipur, the distance of which from Vizagapatam by this route is 372 miles.

Crossing of the Mahánadi

4. Ghorári is the best place to cross the Mahánadi about here, as the banks are well defined, and the River is not so wide as in the adjoining reaches above and below.

There is a still better crossing near Lound, some 50 miles N.E of Arang, but is too far away from this line.

General character of the line

5. The Ground traversed all the way from Bógor to Onsi, and from Jalbal to Raipur, has been practically almost level; that is to say the slopes have

been very easy, and the gradient need never exceed 1 in 100. Bógor is 628 feet and Raipur 922 feet above Sea level. The greatest elevation reached between the two places is at Bagbáhra, viz 1084 feet; while Onsi is 899 feet above mean sea level. The entire route is perfectly easy; there is no obstacle of any sort for either road or railway, and there are only three large rivers to be crossed, named the Sél Nadi, the Jonk and the Mahánadi.

Bridging Materials, labour, soil, wet & dry crops -

6. Building materials, such as stone, timber, clay and sand, lime stone and Iron are abundant; and labour is to be had to such an extent as the somewhat sparsely populated Jungles will admit.

The soil is rich throughout; rice and Sugar cane, besides the ordinary dry crops, are grown along the whole line; the Irrigation expedients for the wet crops being of the most primitive kind, yet quite efficient.

Recommends that the line via the Músa Ghaut and Bonderor be finally rejected

7. I have already recommended (in my letter No. 20/13 dated 4th December 1881, paras 4 to 6) that the line via Bonderor may be rejected for the purposes of the proposed railway, owing to the obstruction

offered by the Mása ghaut; likewise the Lonjigar line, on account of the high elevation attained (upwards of 1500 feet) at Tirmui. Hence, if the Railway is to be taken East of the Nowagarh Hills, the Ombadola line seems the best.

A line from Assurgor to Sonepur and Sambalpur

8. It is apt to strike any one looking at the Map that, having arrived at Assurgor, this line seems naturally to trend in a northerly direction to Sónepur and Sambalpur (crossing the Tél Nadi near Turla), rather than to Ondi or Raipur. Assurgor is about 125 miles from Sambalpur, nearly the same distance from Ondi, and 180 miles from Raipur; so that by joining the Chattisgarh line at Sambalpur or Ondi, instead of Raipur, a saving of 55 miles could be effected. But so long as it is not definitely settled whether the railway from Naudgaon (the present terminus of the Nagpur-Chattisgarh line) is to come to Raipur at all and cross the Maha Nadi twice, at Arang & Sambalpur, or to go to Belaspur without crossing the River; it seems premature to discuss the merits of a line from Assurgor to Ondi or to Sambalpur.

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The route recommended by the Commissioner of the Chattisgarh Division

9. As regards the route travelled over by the Commissioner, Colonel Lucie-Smith (alluded to in the papers which accompany G.O. No. 3025-W. dated 5th December 1887), that portion of it from Bondesor to Polsodar may now perhaps be left out of consideration, since the Railway is not intended, I think, to cross the Mása ghaut, and consequently will not touch Bondesor. From Polsodar to 5 miles north of Torbor, a distance of about 30 miles, the route traversed by the Commissioner coincides with my line; as does also that portion from Mahásamund to Raipur, another 30 miles.

The only part of the route, where his line deviates from mine, is that between Tarnot and Mahásamund, about 45 miles; his line going from Torbor via Limdi, Tarnot, Tarabong, Tendubarra, Sirgidi, Badrabanda, Kamaria and Kurté; while mine (which may be five miles longer than the former) proceeds via Kialpori, Jalbal, Nawa, Swarmal, Baghára, Patrapali, Telibanda and Umarda to Mahásamund.

Objections to the above route

10. Although the line travelled over by the Commissioner may be unobjectiona

for an ordinary Cart road, yet for the purposes of a Railway there are two obstructions in the way. These are: a small Ghaut two miles South of Tarnot between that place and Gobra; and a heavier Ghaut at Lirjidi where Colonel Lucie-Smith says that he had attained an altitude of 1500 feet. These two small Ghauts, I consider, offer sufficient grounds for rejecting that line for a Railway, when an easier line without any Ghaut is available by making a slight detour.

I was informed of the Tarnot and Lirjidi line by the Rajah of Kharial, (as ~~mentioned~~ mentioned in my Notes dated 9th December) but from the description I heard of it I did not consider it a suitable line for a Railway, and hence did not reconnoitre it.

Faulty Tappal arrangements at Rayagadda and delay in receipt of Telegram dated 1st Decbr.

11. If I had received G.O. No. 3025 W dated 5th December 1887 and your Telegram dated 1st December, in time, I should nevertheless have examined this line; but the Tappal arrangements made at Rayagadda were very faulty. No letters or Papers reached me for nearly six weeks, i.e. from 14th November to 23rd Decbr

on which date the printed G.O. alluded to, Containing your telegram, was delivered to me. This was the first intimation I had of the despatch of that telegram. A copy of the Telegram, posted at Madras on the 1st, which had been to Rayagadda and thence returned to Vizagapatam reached me only on the 26th December at Sirang. I had then left Bonosor 150 miles behind me; and, looking to the work still to be done between this and the hot weather, and the uncertain state of the health of my Establishment, I thought I should not be doing the right thing if I turned back, or sent Mr. Cormac back; the more so since I had already pronounced against the line in question.

Consultation with the Chief Commissioner, Central Provinces, and the Commissioner Chattisgarh Division

12. I went to see the Chief Commissioner of the Central Provinces, Mr. Morris, who was here on tour, and the Commissioner of the Chattisgarh Division Colonel Lucie-Smith, as soon as I reached Raipur on the 30th and explained my views with regard to the Musa Ghaut and the route via Tarnot and Lirjidi; and I believe both these Gentlemen agree with me that, although the latter route may be very suitable for

a road, it is objectionable for a Railway, on account of considerable ascents and descents and the high altitude attained, while there is an easier route running parallel to it, which is but very little longer.

13. I do not know who is to blame for the faulty toppal arrangements at Rayagudda. I believe the Sub. Magistrate there had orders from the Collector of Vizagapatam to forward the Post after me, and I instructed him to despatch a post twice a week; but he only did so until I reach Ombadola, not after that; although the Sát Rajah of Bissemcuttack and the Zamin at Ombadola were quite prepared and willing to send letters to follow me as far as Kharial, while the Bondesor Rání would have sent them on to Raipur, if necessary. A Bondesor Police man actually walked 120 miles through the jungle in 4 days and brought me a letter (Not Noted dated 20th December) which had been sent by the Commissioner of Chattisgarh Division via Sambalpur, and had been delayed en route.

Readiness of native chiefs to forward the post

14. On the whole I have not met much bullock traffic on the route traversed; but this may be owing to the season, just after the Monsoon, when the crops have only

Traffic along the route

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just been harvested. However, from my own recollection, the traffic from Raipur, Nagpur, and Bustar via Jeypore and Potangly, and down the several ghauts in that direction, is very much heavier than by this route.

15. I have to record my obligations to the Jeypore Rajah's Amins at Rayagudda and Ombadola, the Sát Rajah at Bissemcuttack and his Kotwál, the Police Inspector of Bissemcuttack, the headman of Bógor village, the Rání of Bhawanipatam (Bondesor), her Dewán and other officials, the Rajah of Patna, the Rajah of Kharial and his most obliging Police officers, and the Zamindars of Narra and Suarmal for their readiness to assist the reconnoitring party in every way with information, guides, coolies, Camp supplies &c. Without their willing aid it would have been very difficult indeed to traverse those wilds. Even so it was sometimes very trying work to push on, without unnecessary delay, through almost trackless Jungles, with such a large Camp, the Sick having to be

Acknowledgment of assistance rendered to the party

carried in impromised Dholies; but we managed to push through without losing a Man, and attended to our Survey. Mr Sub Engineer Cormac has given me most Valuable assistance during the whole journey, and the Hospital Assistant, P. V. Ramaswamy Naidu, has looked well after the Sick.

Another set of Ordnance maps asked for

16. I beg to request that another set of Ordnance Maps (scale 4 miles to the inch) comprising the sheets containing Raipur Sambalpur, Jeypur, Vizagapatam and the intermediate Country, may be mounted in one large Map on Rollers (Similarly as I have had the first set mounted), so that I may on my return mark thereon the lines traversed and the exact location of the proposed Railway by the several routes; since the Map with me is somewhat the worse for wear, and I have only been supplied with one set of Maps, but not with the duplicates as mentioned in Para 8 of G. O No. 2294 W, dated 16th September 1881.

Extract of para 16 taken. The request will be attended to.

R.S. 13-1-82

Two more aneroids wanted

17. I also request that two fresh aneroid Barometers may be sent to

Extract of para 17 taken with a view to this request being attended to.

R.S. 13-1-82

Nasrangpur, to await my arrival there; as two of my Aneroids have become unreliable.

Letters how to be addressed

18. Letters despatched after the 15th Instant should likewise be addressed to "Nasrangpur, care of the Post Master, to await arrival". I have made arrangements for letters to be sent after me from Raipur as far as Nowagarh.

Proposed Details of Reconnoissance from Raipur Southwards

19. The Reconnoitring party will leave Raipur in a few days, as soon as all the Office work that has to be done is disposed of. Mr Cormac's party will march via Dhamtari and Kánker through a corner of Bastar, via Bansbot to Omorkot, while I shall proceed via Rájim, Kopra, Paragáon and Nowagarh to Raigarh and Omorkot; thence we march together to Nasrangpur where I expect to be about the 8th February; reaching Korapat about the 14th Idem. At Korapat I propose to halt a week or 10 days to bring up arrears of Reports, Sections &c.

Extracts of paras 18 & 19 taken for guidance.

R.S. 13-1-82

The Revenue Subordinate not yet joined

20. A Revenue Subordinate (as provided for in Para 15 of G. O No. 2294 W dy. 16-9-81) has not yet joined the Reconnoitring party.

The Agent at Vizagapatam states, under date the 2nd December, that he has been unable to find a qualified Gomasta, and that he has telegraphed to the agent in Ganjam to send me a man who knows the necessary Languages.

Nothing further has been heard on the Subject.

Meanwhile I have had to Employ two inferior men, one from Parvatipur the other from Rajagudda, who between them share the pay intended for the qualified Gomasta; one of these men is attached to Mr. Cormac's Party and one to my own.

I have the honor to be
Sir
Your most obedient Servant

K. F. Nordmann
Executive Engineer
On Special Duty.

With 1 enclosure:
"Notes of Reconnoissance"

Enclosure to letter, No. 24 R, of Raipur

From the Executive Engineer on Special

To the Secretary to Government, C.

Madras.

Extract from

— Notes of Reconnoissance —

from 5th to 30th December 1881.

Bógor to Raipúr

Distance 166 miles.

1247 1

Extract from
Notes of Reconnoissance
from 5th December to 30th December 1881.
Bogor to Raipur

Bogor, 5th December 1881.

Thermometer 6. a. m 48 — 10·30, 65° — 4·P. M. 77°

Despatched one Camp ahead.

Received a letter from the officiating Dewán of Bondesor, saying that a Parwána from Sumbulpore, dated 14th Ultimo, to render assistance to the party, had reached him only on the 1st December, and that H. H. the Maharanee had directed him to send orders along the route to Kurial accordingly.

The Dewán sent a specimen of a metallic ore, found near Bondesor, containing Antimony and graphite; he also sent some rose-coloured stones (probably spinel rubies) found near Manjhs.

Among the fruit, Vegetables, pastry &c., politely sent by the Maharanee of Bondesor were some very delicate leafy cake of the finest texture, some sweet large Jellow

oranges with loose coats, besides tomatoes, radishes, knoll khol, Jam, spinage, and large brinjals the size of melons.—
The Dewán and the Young Rajah's tutor are the only English speaking persons in Bondesor.— The Ranee & her officers and Police men have been most attentive in providing Camp Supplies, guides & coolies.

From Bogor to Harial

Distance 3 8 miles 2 furlongs 208 yds

December 6th Bogor to Boddapados.

8 miles 7 furlongs 5 yards

Thermometer 6. a.m 50°
11. a.m 77°
4. P.m 78°

1. mile 4 furlongs 193. Bank of the Sel Nadi. We had to wade through the River, as the Land was too soft and Yielding for riding. The River from bank to bank is 1560 feet wide and 20 to 25 feet deep between the banks; but these are flooded in heavy monsoons to a further depth of 5 feet at least: so that the bridge would have to be quite 35 feet above the deep bed. On one hand there is rock visible which probably extends across the River not very deep below the sandy bed.

2. miles 7 furlongs 84 yds Village of Brohda.
Wet and dry cultivation.
Soil: heavy clay, with some sand & some gravel.
Crops: Cotton, grain, Gingelly, lamp oil, Castor oil, Raggi; mustard, tobacco, vegetables; paddy & Sugar cane.
Dungripara; some dry cultivation; Country open.
Goutaballi; like most of the Villages here, built upon a high & dry site. The ground is somewhat undulating; the open country with its scattered trees has a park-like appearance; there is a little light scrub Jungle; good grass land.
Serko. Fine open Country; high and dry ground; hard soil; many trees about.
6. miles 106 yds, a Stream, flowing into the Under River (This Stream is not marked on the map). It is 9' deep and 50 feet wide in flood; high banks & Sandy bed; no rock visible.
Open grass Country, with some trees & Shrubs, and some cultivation.
½ mile further, the large Village of Udepur.
There is a peculiar Temple here and another at Gurár, a little further on.

The Structure is built of Stone in the Shape of a flask with broad stopper, or a lime Kiln with a crown or Cap, about 20 feet high; with the greatest diameter 8' and a door 2'x5'. The top ornament, resembling the Stopper or Cap, is a Single flat Stone carved at the edges, about 5' in diam: and a foot thick.-

7 Miles 3 Furlongs Gurár, large Village; fine Tank; Sugar Cane, rice and dry crops; much garden cultivation by means of numerous wells, 3 feet in diameter, 15 to 20 feet deep, worked by a Kind of picota, the mouth of the well mostly unprotected. — Soil light.

8 Miles 7 Furlongs. Bodkapodor.

Good Camping ground. Light Sandy Soil.— A rich metallic ore crops out in masses above the Surface, containing much pyrites, mica, Iron, and to all appearances Copper, antimony, Bismuth, arsenic, traces of Silver and probably Gold. Specimens will be sent from Raipore.

Height of Bodkapodor above mean Sea level nearly the Same as Bogor Viz. 618 feet.

Distance of Bodkapodor from Vizagapatam 214 Miles; from Raipore about 151 Miles

The Country is better cultivated here, the Villages are larger and there is less Jungle about than I have met hitherto Since leaving Rayagooda; the People are more Civilized too, they stipulated for payment for labour, Supplies &c. beforehand, whereas further South they were Satisfied with what they received, and frequently did not ask for payment, Sometimes even refused it when proffered.

December 7th. Bodkapodor to Sorman.

Distance 11 Miles 6 Furlongs 200 Yds

Thermometer 6. a.m 53°— 11 a.m. 81°— 4. P.M. 79°

In the first mile a Stream, from which a Small Irrigation Channel is taken off. Bed Sandy, one bank high, the other low, alternately; no Rock visible; greatest width and depth in flood 110' and 9' respectively.

3 miles. Kulund, a large Village, with Extensive cultivated fields both wet and dry.

The Country open, no Jungle here; a Mango tope near the Village; also 2 Tanks, one large, the other Smaller. The Country here looks prosperous and the People (who are dressed to some extent) look well-to-do.

Almost all the Ground, Except the hill Sides, is cultivated; there is Scarcely any waste land to be seen in the Plain. —

After this the Ground rises and becomes undulating; there is less cultivation, and

some light scrub jungle. At 4 m. 2 f.
there is a sheet rock composed of a kind of
conglomerate with metallic lustre and
traces of Iron and Copper. —
Kunkur lime stone is found all over the
Country.

The Railway line from Bagor should
hug the northern bank of the Under River,
keeping an average distance of half a
mile or so from it, as the ground further
north rises rather rapidly towards the hills
and is undulating and in places somewhat
irregular.

Gondegura, village with a large tank;
rocky hillocks dotted about.

5 miles 2 Furlongs 144 Yards; a Stream
with perpendicular banks, 8' high, and
Sandy bed; no rock. Width and depth in
flood = 110' and 7', respectively.

Village of Diaiton, small; little cultivation;
some jungle; hilly and undulating ground;
Soil dark clay.

7 miles 4 Furlongs. Village of Itchegaon
Wet and dry fields; Soil: dark clay with
some Sand. — Open, flat Country. —
Then a Tank. — Then the Village of
Potasoora, with tanks and tope; light
Soil; Good Camping Ground. —

All the villages about here are built on
rising ground. — Ground slightly undulating
9 miles 3 Furlongs, Balheng, large village,
there are weavers here.

11 miles 7 Furlongs. Sorman, a small place
at the foot of a hill; Supplies Scanty.
Much wet cultivation in the lower Grounds
towards the River.

Height of Sorman above Mean Sea level
~~505 feet~~. 638 feet

Distance from Vizagapatam 226 miles
2 Furlongs; from Raipur about 139 miles.

A Police Man from Bisha patnam (on the
Map called Sindiola) 2 miles from here,
belonging to the ~~Canal~~ Patna Zamindar's
Establishment, came to see about Supplies
&c. — Much Fever in Camp; 10 to 12 people
more or less laid up with it; Some
Sane to be carried on the Elephants and in dhoolies

One of the large tents from Coimbatore,
(that had been blown down in the Rains
at Dissemuttaid, had one pole and the
ridge piece broken and was temporarily
repaired at Ombadola) got out of order
again and the ridge piece required further
repair before the tent could be pitched

8th December. Sorman to Tukla
Distance 10 miles 1 Furlong. — Thermometer
6. a. m. 52° — 11. a. m. 78° — 4 P. m. 77° —

1 Mile 6 Furlongs Bishapatnam; large Village belonging to the ~~Zamindar~~ Patna Zamindary. — Police station. Open country, well cultivated; dark clayey soil; rock cropping up in several places: gneiss, decayed near the ~~gneiss decayed near the~~ surface, and conglomerate.

4 miles Salelaurut; large Village with broad fields; a tope; good camping ground.

5½ miles Jholop; wet and dry fields; large gardens with wells; tank, tope and camping ground; soil gravelly. —

A remarkable hill of white quartz half a mile South of the Village; also quartz in large masses cropping out in several places; the Village stands on Quartz; the large Reef, of which these outcrops evidently form part, runs from North to South.

6 miles 7 Furlongs. Boslar; some cultivation, and some waste land with light scrub jungle.

8 miles 1 Furlong. The Bhasan Stream, with low banks and sandy bed; width between banks 145'; depth 6', which depth during high floods, when the banks are over-topped, increases to 13'; the width during such floods is not easily ascertainable, the country around is then flooded by water of the Andar River which is quite near.

10 miles 0 Furlong 120 yards. Tudla; large Village with tanks and topes; open flat Country; good Camping Ground for a small army; light soil; water from wells, tanks and River. Supplies procurable.

Two officials, sent by the Zamindar of Kharial, were here to attend to Camp Supplies.

Height of Tudla above mean Sea level 686 feet; Rise from last Camp ~~48~~ feet.

Distance of Tudla from Vizagapatam 236 miles 2 Furlongs; from Raipur about 129 miles.

The People here speak Marathi, Hindi and Uriya. —

There are many Weavers in Tudla and the neighbouring Village of Resja, making a Coarse Cotton cloth, as well as Tussa silk which sells here for about 6 annas a yard.

December 9. Tudla to Kharial.

Distance 7½ miles. Kharial is the largest Village met with since Parvatipur; it is said to have 400 houses and about 2000 Inhabitants.

The Zamindar or Rajah of a large Estate

resides here.

Thermometer 6. a. m 52°– 11. a. m 72°–4. P.m 77°–

1 Mile. Bisga, large Village where Tasar Silk is manufactured. — Open country; wet and dry fields; topes and trees; then some scrub jungle. — The Railway must continue to keep near the River bank, as far as San Doil; as the ground to the north of the River is high and irregular.

2½ Miles. Pohansor. Wet and dry cultivation, as before; black soil; — numerous Cattle.

3½ Miles. Boro Doil.

Soil, rich dark clay.

Then San Doil; some light Jungle. At 5 miles 3 Furlongs, a large Tank, near the Village of Ráipur, constructed by the Rajah of Kharial, upon Spring ground; the Drainage from the hills being excluded. The tank is for drinking water only; there is no irrigation from it.

It measures about 500 feet square and is 6' to 9' deep. — Here the Rajah's son, a fine young man of 24 years, richly dressed, with a Younger brother, and a retinue of a dozen armed men, some well mounted and in becoming native costume, and some on foot in red Coats of the 16th Regiment,

met us and escorted us into the town. — 7 miles 4 Furlongs Kharial.

Distance from Vizagapatam 243 miles, 6 Furlongs, 116 Yards; from Raipur about 122 miles.

In the afternoon we visited the Rajah, Padmanabha Ling, who is a polite and pleasant elderly gentleman, somewhat infirm. His son had come to Camp to invite and escort us. The Rajah has horses & Elephants and keeps 40 Sepoys; there is a small Menagerie, in which, besides other animals, a large tiger is kept. The Rajah's house is in the native style, not an imposing Edifice; near it is a small flower Garden after the English pattern. There is only one person here who speaks English: a Baboo from Calcutta who is Tutor, Secretary, interpreter, Gumashta &c.

The last European who has been here was the Deputy Commissioner from Raipur, 8 months ago; he is again expected in February. The Commissioner is said to be on his tour from Raipur via Sumbulpur to Bandesor where the Rání has received notice of his visit.

The Rajah Padmanabha Ling expressed himself pleased with the prospect of a Railway through his Country.

Trades and Manufactures.

There are Carpenters, Blacksmiths and

Weavers (both of Cloth and Silk) in Kharial; also Jewellers, Gold and Silver smiths, Tailors, Dhobies and Barbers; but no Shoemakers; Saddlery, Shoes, boots Sandals &c have to be procured from Raipur by those who use them.

There are good Sized donkeys here: the first I have seen for a long time; also Crows which are not found in the Small Villages in the Jungle I have passed through.

Cattle are numerous, and a good many Ponies are seen about here. There is a local Post Office belonging to the Rajah's Establishment. Letters are said to take 10 days to reach Raipur. One man takes the Post right through.

The ordinary traffic route to Raipur lies via Kúmúna, Lorbor, Sarnot (here called Khóla), Larabang, Sirgidi, Charbati, Kamaria, Karté (Police Station & Local Post Office) Mahasamund, ~~Baribanpur~~ Gorari and Arang. By this route it is reckoned an 8 days journey from here to Raipur at the rate of ~~15~~ 15 miles a day or about ~~116~~ 120 miles; by the proposed Railway line it will be but little (perhaps 5 miles) more.

The Railway cannot conveniently follow the ordinary traffic route, because the latter crosses two Ghauts: one 2 miles South of Sarnot and the other near Sirgidi.

Height of Kharial above mean Sea level 802'. — Rise from Sukla ~~12'~~ 116 feet.

Distance of Kharial from Vizagapatam 243 miles, 6 Furlongs from Raipur about 125 miles.

10th December - Kharial -

Thermometer 6. a. m. 52°
11. a. m. 68°
4. P. m. 78°

I despatched one Camp to Sikali, 12 miles ahead. In the afternoon the Rajah Padmanubhu Singh (who succeeded his Elder Brother on the Musnud some 16 years ago) and his Son came on an Elephant to visit me. We had some friendly Conversation the Rajah again Expressed himself pleased with the prospect of a Railway, and asked whether Kharial would be a Station; where the Station would be located? &c. His son asked questions about the fate of the unfortunate Rajah of Pooree who was tried and imprisoned last year, and who is a friend of this family. The Rajah ordered his officials to pay every attention to the wants of the Expedition.

The ridge pole of the large Coimbatore tent, which had been broken and repaired at Bissemcuttack and Sorman, and was again in want

of repair, was here renewed during the night by the Rajah's order.—

~~There are~~ 10 to 12 fever cases in the Camp.—

The large Vizianagaram Elephant has sore elbows from kneeling down on stony ground when being loaded and unloaded.—

Kharial is prettily situated and presents a fine oriental picture, especially when viewed from the west. The Rajah's modest ~~The Rajah's modest~~ Palace with its enclosure and small cupolas, the adjoining sheets of water with date and Cocoanut palms along their banks, surrounded by green fields, form a pleasing scene.

11th December. Kharial to Tikali.

Distance 11 miles 7 Furlongs

Thermometer 6. a.m 60°
12. noon 87°
4. P.M. 81°

Outside of Kharial the jungle begins again, chiefly low scrub jungle, with scarcely any cultivated fields for more than 2 miles. At 2½ miles the village of Chindagaura, with extensive garden cultivation: most Castor oil and tobacco; a few fields, both dry and wet. They have good Cattle here, especially fine black Buffaloes of large size. At the 3rd mile a stream, 25'×6'; soil

~~Soil~~ swampy, banks not well defined.

3 miles 4 Furlongs, Tondapalli; very little cultivation; some Margosa trees: the first seen for the last hundred miles or so. Then jungle again which in some parts is very heavy.

5 miles 5 Furlongs, Khodaj; much garden cultivation: Castor oil, Mustard, curry Vegetables, beans, pumpkins, Hybiscus, & gourds, tobacco; in the fields Indian corn, millet, cholum, cotton.— Iron is manufactured here.

Then some heavy Jungle.—

A small Nullah requiring a culvert, 5'×5'.—

7 miles 1 Furlong. Nowapára; a stream, 20'×6', close to the Village, is dammed up and utilized for Rice fields.—

Gardens and fields.—

Jungle again.——

Plenty of lime stone everywhere abundant.

8 miles. Borgáon. There is a small furnace at work here for smelting Iron ore; the ore used is a brown haematite; it is pulverized before being put into the furnace, and then smelted with charcoal. There are also 4 Potters making pots and chatties in this Village.

A quartz reef crops out near it; indeed

quartz is found in many places along the whole route travelled over; and much of it seems to be more or less auriferous. —

The soil here is light and contains much gravel. The Railway here should keep near the River bank, because the ground to the East is high and undulating. — Light scrub jungle and high grass. —

Some matti wood and stunted teak. — In the 9th mile three small streams averaging 12 feet in width and 5' in depth. — Light jungle.

Shardéra; light jungle; swampy ground; some rice fields; a field with hemp or nára.

10 Miles 5 Furlongs. Kolniga. The low Nowagurh Hills on the left are well wooded; so also are the Hills around this Village.

11 Miles 7 Furlongs — Tekali: a few huts in a jungle clearing. —

Half the Lascars are laid up with fever; also several Servants and some of the men belonging to the Pack Bullocks. —

The Rajah of Kharial sent me some flowers from his garden, the first garden flowers I have seen since Parvátipúr. —

Height of Tekali above mean Sea level 761' ~~740~~ Fall from Kharial ~~—'~~ 41 feet.

Distance of Tekali from Vizagapatam

255 Miles 5 Furlongs 153 Yards; from Raipur about 115 Miles.

Fair Camping ground; drinking water from the River: No wells; they have been very rare along the entire route, so far.

December 12th Tekali to Kumána.

Distance 10 Miles 3 Furlongs.

Thermometer 6. a.m. 60½°
11. a.m. 80°
4. P.m. 81°

Hilly Jungle; Stony Soil, with gravel; much quartz all about.

1 mile 6 Furlongs 112 Yards. Stream 20'x10'; high banks; rock for foundation.

Village of Lánipáni; a little cultivation. — Jungle with much stunted teak. —

3rd Mile; a stream 26'x6'; much rock in the bed: ledges of stratified gneiss, dipping at an angle of 45° with conglomerate and quartz, extend across the stream. —

Jungle; rock and stony soil. —

In the 4th mile, two small streams, one 6'x4', the other 10'x5'. —

Hilly Jungle. —

4 Miles 4 Furlongs 128 Yards. Village of Tallasoma.

The Railway here should keep close to the bank of the River. — Soil, dark and rich. —

A small stream, 15'×5', with a rocky bed.—
5 miles 7 furlongs 115 yards. Stream 36'×9';
rocky bed, high banks.—Jungle.
Here we join the Brinjarries track from Raipur
to Khariad, Dádpur &c.

6 miles 6 furlongs. Dumeibahal. Met
some 300 pack Bullocks, carrying gingelly
seed from Raipur to Parvátepur, Palcondu
and Nowpáda; whence they intend to bring
up salt.—

Less jungle, and some cultivation.—

7 miles 5 furlongs. Bilinjér.

Tope; gardens and fields; Tank; wet and
dry cultivation.—

Jungle again, on hilly ground; some very dense
jungle, through which a broad track, 20 to 30 yards
wide, has been cleared for some distance.

10 miles 3 furlongs. Khúmúna; a large village
with a stone temple. Khúmúna was formerly
the capital of the Khariad Estate, and the late
Rajah lived here. It was abandoned as a
residence in favor of Khariad owing to a severe
outbreak of Cholera, from the effects of which
the Rajah died.

Height of Khúmúna above Mean Sea Level

857'.— Rise from Tikali 96'

Distance of Khúmúna from Vizagapatam
266 miles from Raipur about 105 miles.

December 13th. Khúmúna to Torbor.

Thermometer 6. a.m 52'
12. Noon 83'
4. P.m. 80'

Distance 12 miles 2 furlongs 42 yards;
nearly all through jungle. The Khariad estate
on this side consists of little else than jungle,
with scarcely any inhabitants. The soil is
rich almost throughout: there are hundreds
of square miles that might be made to produce
fine crops of wheat, if the country were
colonized.

At the 7th furlong crossed the Gurmai stream,
60' wide, 15' deep, just below its junction
with a smaller stream; one bank high,
the other low, alternately. Bed sandy; no
rock.— Jungle, on rich dark soil.—

Site of the Village of Gursor, which has
been deserted (so it is said) on account of the
Brinjarries having troubled the inhabitants
too much for labour and supplies.—

Open country; grass land with some
light jungle.—

Village of Khisana; some dry & wet
cultivation.—

Site of the Village of Tókapáka; deserted. —
jungle + grass 5 to 7 feet high; no track.
Rich dark soil. Here I saw the first
partridge on this trip.
4 miles 6 Furlongs. Kurisor, a small Village;
some wet and dry cultivation. —
Soil: rich clay, nearly black.
5 miles 3 Furlongs. Stream, 36'×7'; high
banks, sandy bed, no rock. —
The ruins of an old tank. — The country
bears evidence of having been more thickly
populated in times past. — Grass Jungle,
the grass 6 to 8 feet high; track barely visible.
Ground full of holes owing to the cracking
and bursting of the dry black soil. —
Kóirbari. a few huts. — Some open ground,
with a little cultivation; then dense Jungle.
8th Mile. Joramurra; a deserted Village,
the people having left owing, it is said, to a
severe outbreak of Cholera, Eight months
ago; one or two small huts remain standing
and are inhabited. Fine Jungle all around.
9 miles 6 Furlongs, Manickpura; a few
huts in a small clearing in the Jungle.
Good Jungle around.
12 miles 2 Furlongs 42 yards. Torbor; a
good-sized Village, with a large tank and
ample fields and gardens; rich dark soil;

Jungle all round. A camp of Brinjarries
was here with 300 bullocks, carrying rice;
they have come from Raipur and are on their
way to Parvatipur (which they say it will
take them a month to reach); thence they go
to Nowpáda for Salt. —
Good Camping ground; Supplies available.
Drinking water from tank and River; no wells.
A Vaccinator (a Muasalman) has lately
arrived here from Raipur. He has experienced
some difficulty in procuring Supplies, as he
had orders, so he said, to obtain all he wanted
without payment.
Height of Torbor above mean Sea Level
949' — Rise from Kumuna 92'.
Distance from Vizagapatam 278 miles —
2 Furlongs 205 yards; from Raipur about
93 miles.

December 14th Torbor to Sialjori.

Thermometer 6. a.m. 52°
11. a.m. 82°
4. P.m 80°

Exposed to the Sun at noon 115°.
Distance: 11 miles, 5 Furlongs, 175 yards. —
1 mile 1 Furlong. Stream 26'×6'; low banks,
Sandy bed, no rock. —
Tree and Scrub Jungle, with a few fields
here and there. Soil hard + gravelly. —
Then some heavy and dense Jungle. —

a track, 20 to 30 yards wide, has been cleared through the densest parts of the jungle, and leads evenly over hard and high ~~jungle~~ ground, without much change of gradient. —
another small stream 12' x 3'; low banks, gravelly bed. — Some rice fields about. —
The Railway should be kept on the lower ground to the west. — Jungle light; soil dry and hard. —
Two small streams, close together; each 6' x 3'. —
4 miles 183 yds. A stream 50' x 10'; crossed below the junction with a smaller stream; one bank high the other low; bed sandy; some rock for foundations. — Some Sál trees about here. Much Quartz. — Light scrub jungle with a few patches of cultivation. —
Small Nullah 6' x 3'. —
5 miles 2 Furlongs; a large pool in the fields; near a small village, Daldalli. —
Some cotton grown here, and a good deal of rice. High ground; dark soil.
6th mile. Nowapara, in a large clearing. High ground; dark soil; wet and dry fields. —
Thin scrub jungle. —
Village of Kandamura. —
The custom of the Villagers in these parts is to bring tobacco to approaching strangers (everybody smokes here); sometimes they bring buttermilk besides. —
8 miles 4 Furlongs 113 yards. Sámbursinghi.

From here leads a track to Zarnot (Khola). — There are three Tombs here on the road-side where the headmen of the Village are buried; the graves are marked by heaps of stones. The common people ~~The Common People~~ are buried in the jungles, or else burnt. — Iron is manufactured at Sámbursinghi. The place was probably named after the Sámbur which seem to be plentiful here, to judge from the traces they leave. — Open country; then light jungle. —
A small Stream, 10' x 4'. —
9 miles 6 Furlongs. Kajurbasa; undulating ground; the line of rail should keep a mile further to the east. — Soil; dark rich clay. —
A fine hill ridge, the Gyanda-mardan Hills, 3000 feet high, 6 to 8 miles long, with a plateau on top a mile broad, larger than Pánchadroog, lies 15 to 20 miles to the east. —
2 small streams, close together; each 12' x 4'; no rock.
There is some game in these jungles, and in the low hills to the west. The traces of Bear, Sámbur and Bison are frequently seen. A small Cheetah was brought

in, that been killed in a fight with a larger one near the Village, where both were hovering about the Cattle.—
11 miles 5 Furlongs 175 Yds. Sialjori.
The line of rail should run about a mile to the east of this.
Height of Sialjori above mean Sea level 1047'. Rise from Loabar 98'.—
Distance from Vizagapatam 290 miles. ~~Hoyards~~; from Raipur about 76 miles.
December 15th Sialjori to Birumal, on the line to Ouki.
Thermometer 6. a.m 50°
" 11. a.m 78°
" 4. P.m 80°.—
" exposed to the Sun at 4 P.m. 86°
Distance 10 miles 7 Furlongs 100 yards.—
In the first mile a small Nullah 8'x3'.—
Some thin jungle, then open country.—
1 Mile 4 Furlongs 140 Yds. Parashal, a good sized Village, which seems to have moved a mile eastwards since the Map was made. Villages here sometimes shift their site. Some Brinjaries, belonging to these parts, were buying Gingelly seed in order to take it to Parnateipur, via Junágarh and the Músa Ghaut.—
High ground, hard Soil; jungle.—

Summit level

P.P. 25

The Railway should be Two miles to the East of the straight line from Sialjori to Jalbal; the ground to the East is not so high, and more even; but the jungle is very dense.—
Many traces of Sámbur and some of Bison.—
Soil hard.— a long stretch of treeless ~~jungle~~ jungle; near Jalbal it becomes lighter.—
Stream, 10'x5'; no road visible.—
Emerging from the jungle, we come upon the Village of Jalbal, 5 miles 2 Furlongs.
Here the Rail to Raipur will turn north-westwards to Nara; but we now continue our northerly march towards Ontri, to explore the ground in case the rail should be taken there.
Open ground round Jalbal; some wet & dry fields; in the gardens are chillies, beans, pumpkins, hybiscus, castor oil and tobacco.
South of the Village the Soil is chiefly light, to the north mostly heavy and black. The higher ground is generally of light Soil, the lower parts are Swampy; but the undulation of the ground is very slight.—
A small Tank, breached; a stream 9'x3', comes used for Irrigation, through the breach; muddy bed and banks.—
Gúchapali, the site of a deserted Village; the inhabitants are said to have left 20 years ago on account of cholera; there is no trace

of the Village left, except the fields, which are still partly cultivated.

Kodumúra, a mile to the left. Light soil; open country; good camping ground.—

Small Nullah, 12′ × 5′.—

Dáripali; small Village; some Iron furnaces here; the ore worked is of two kinds: Haematite and bog ore.

There is also a Weaver's loom.— Country somewhat open. Sál trees are found in the surrounding jungle.— Light soil, brown clayey Land.— Thin dense jungle of shrubs and small trees.— Level ground.

10 miles 7 Furlongs 100 yards. Birumal; in a jungle clearing, a mile in diameter. Soil hard; good camping ground, Except ~~that~~ the only drinking water available, viz: from the tanks or dammed-up stream, is inferior, but wells could easily be dug in the fields, the water being not far below the surface. There are no wells in these Villages.— The line of rail should be half a mile to the East of this, where the ground is more even.

Height of Birumal above Mean Sea level 1013′ ~~feet~~. Fall from Sealpore ~~Ft~~. 34′.

Distance of Birumal from Vizagapatam 301 miles.

December 16. Birumal to Amúndi.

Thermometer 6. a. m. 47°
11. 4. m. 80°
4. p. m. 77°—

Exposed to the sun at 3. p. m. 102′—

Distance from Birumal to Amúndi, 12 miles 3 Furlongs 133 yds.

Height of Amúndi above Mean Sea level 918′ ~~feet~~.— Fall from Birumal ~~Ft~~— 95′.

Distance from Vizagapatam: 313 miles. 3 Furlongs ~~133 yards~~

In the first mile a Nullah, 15′ × 5′, dammed up in several places so as to make it spread over the adjoining fields on both banks which are cultivated with Rice; hence the ground on both sides is very swampy and difficult to get across, even at this season when the rice crops have been harvested.— Thin jungle.—

Pára, a Brinjari Village which has been here for the last three years only; the people of Gyram would not allow the Brinjaries to live in their Village, from fear that Cholera might be introduced by that wandering tribe; so the Brinjaries had to build a Village of their own.

1 mile 5 Furlongs. Gyram; a large Village in the midst of an extensive jungle clearing.

Further on the jungle is light; soil, dark stiff clay.

2 miles 4 Furlongs. Sándebatta; a mean village, only six years old; not marked in the map.— Rich, dark soil. There are some Weavers here. — Then jungle again, not very dense. Ground gently undulating. Large clearings alternating with ~~stretches~~ stretches of jungle. Soil, lighter on rising ground, and heavier in the hollows which are mostly swampy.

3 miles 4 Furlongs. Bavanskéla. Black soil; Extensive rice fields.

small Nullah, 10 x 4; converted into wet fields. — Then some undulating ground. with light jungle.

Stream, 20 x 5, used for irrigation; muddy bed and banks. —

5 miles 6 Furlongs, Village of Bissora.— another Stream, dammed up in several places, in the manner in vogue here, and converted into swamps for rice cultivation.—

Then jungle of trees and scrub, on light sandy soil; the jungle soon becomes dense and contains numerous Sál trees; after a mile of this the bush becomes thinner again.— The soil continues chiefly light (with black patches here and there) and the ground slightly undulating till past the 8½ mile. At the beginning of the 9½ mile

a small muddy stream, 10 x 4', used for irrigation

9 miles 1 Furlong. Village of Beltibri.

Open country around; the jungle clearing measuring about a mile in diameter.

A mile beyond Beltibri a Nullah, 20 x 8', with swampy bed and steep banks.

11½ mile. Balisar, an ordinary small village, with gardens and fields. Then Sál jungle.

12 miles 3 Furlongs 133 yards. Amvandi; surrounded by jungle; containing numerous Sál trees which abound in this part. — Country open; Good Camping ground; — drinking water from the Sonk River. Supplies available. Soil, dark clay. Quartz and Kunkur limestone found along the whole route. Gneiss continues to be the prevailing rock formation.

Iron ore (haematite) is smelted at Amvandi.

The Villagers have a number of cruse carts with Solid wooden wheels, drawn by black buffaloes. Cattle numerous.

The greater part of the country, traversed from Kharial up to this (mostly jungle and much of ~~which~~ it Virgin soil) would, I believe, produce good wheat crops with very little cultivation.

No difficulties exist with regard to the Railway; the Country being practically flat,

well watered and wooded, though sparsely peopled.

December 17. Ammindi to Onki + back to Ammindi

Thermometer 6.a.m. 43½°
12.30 P.M. 86½°
4.P.M. 78½°

Distance 6 miles 7 furlongs ~~17 furs~~.

Height of Onki above mean Sea level ~~about~~ 899'. Fall from Ammindi ~~to~~ 19 feet.—

Explored both banks of the Jonk River; crossed over to Cherenda on the left bank, thence went to Nilasar (the "Cherenda" marked on the Map on the right bank, a mile north of Ammindi, does not exist, and the people say there never was such a place on the right bank). — Fine Jungle; Soil black, full of cracks, fissures and holes. — Then scrub jungle and high grass. — Some people have come here all the way from Rajim to cut grass and take it away for thatching &c.

The grass is very long and strong, and is used for making mats, fences, Verandah screens and for thatching roofs.

Nilasar is a small collection of mud huts in the midst of Sál Jungle. Thence I went to Belanga on the right side of the River. — Jungle of scrub and grass. — Soil dark and rich. A kind of Hemp is grown here,

called "Son" in Hindi and "Janam nara" in Telugu.

The Nullah near Belanga is 50' wide and 15' deep; one bank is 15' high, the other low and subject to inundation during floods. There is rock for foundations. — A stretch of coarse grass jungle, the grass 10' high and upwards. Then some Sál Jungle, and irregular ground. — A small Nullah 6' x 3'. — Light Soil, hard and stony. —

Two small streams each 15' x 5'; beds and banks muddy. — Then good tree jungle, with Ippa, Sál and Matti. — Ground flat again. Soil light. —

Marched over some very holy ground: black Soil with wide and deep cracks and fissures and deep holes where the ground has subsided from the rain. These holes occur every few yards, and covered with grass as they are it is difficult to avoid putting one's foot into a hole. It is impossible to ride over this ground.

6. miles 7 furlongs. Onki; a small collection of miserable houels in a howling wilderness; Jungle all round. Soil, stiff dark clay. — The People of the Village at sight of us ran away, but returned again by and bye.

Returned to Ammindi, on the right bank, via Belanga and Polsadar (the latter two

miles north of Amúndi). Crossed two small streams, 20 x 5 each, dammed up and connected into swamps for rice cultivation; and a larger stream, 45 x 8, a mile north of Amúndi, with high banks, sandy bed and no rock.

Reached Amúndi at 12.30 P.M., having travelled 14 miles 3 furlongs since 6.a.m, taking observations, making notes &c; the temperature during this time having varied between 43° and 90°. —

Straw about here is plentiful and cheap; it is left in the rice fields to rot and manure the ground; only the ears of the paddy with a short length of straw being cut off in harvesting.

There is a remarkable scarcity of mosquitos in these jungles. I have only seen one small snake since leaving Parvatipur, and met no scorpions or centipedes; white-ants are not plentiful. I have seen no hares or rabbits, no wild pig nor deer, except a tame one in a village; very few jungle fowl; no peafowl; no bustard. Pigeons are numerous; partridges, quails and snipe scarce. There are ducks, teal and other water fowl on some ~~pools~~ of the tanks; also cranes, storks, plovers, and

white gulls or paddy birds; some Java sparrows, minas, parrogeets, a few swallows. Crows are scarce in the small villages in the jungles; jackals everywhere plentiful. — Gum, dyes and resin (sál) are to be obtained from several jungle trees. —

There is a pretty orchid growing on some young Ippa trees, with a red flower like honeysuckle. —

Distance of Amúndi from Vizagapatam 320 m. 2. f.
—— do —— from Raipur about 70 miles
—— do —— from Sambalpur about 100 miles

December 18th Returned from Amúndi to Birumal. Distance 12½ miles

Thermometer 6.a.m 43½°
11.a.m 74°
4.P.m. 78°

The sick, whom I had left behind in the camp at Birumal, had improved during their two days halt there.

December 19 Returned from Birumal to Jalbal; thence to Nawa.

Distance travelled 14 miles 6 furlongs 91 yds; namely, Birumal to Jalbal 5 miles 6 furlongs 33 yds; Jalbal to Nawa 9 miles -0- 58 y.

Thermometer 6.a.m 40°
11.30 a.m 91°
4.P.m. 80°

There was some hoar frost on the ground in the morning, between Birumal and Jalbal. —

Resumed march to Nawa where we left off on

the 15th. After leaving Julbai, some light jungle was passed through, on light clayey soil.

1 mile 2 Furlongs. Village of Lábia; Country rather open, very little jungle about.— Wet and dry fields, and garden cultivation.— Some laterite was seen cropping out.

2 miles 2 Furlongs. Chanaheda; a tank, gardens and fields.— Plantains in the gardens: the first seen since Bissen Nullah.— Country open, trees and shrubs about.

2 miles 6 Furlongs, Stream 35' x 10'; sandy bed; banks low and flooded.

Then a swamp, at this season dry, except in the lowest part.

3 miles 2 Furlongs. another swamp, with a stream running through it, about 30'x8'; the bed is muddy and irregular and has several branches. Swamp extends close up to Amsen.

3 miles 4 Furlongs. The Village of Amsen on high ground, with a tank and wet and dry fields. Near the Village is a small hill with through which a Quartz reef runs.—

Then light jungle, with some swampy patches. Then high ground with light jungle on hard soil; followed by a gentle descent, with another stretch of swamp partly cultivated.

5 miles. 4 Furlongs. Kopathora; gardens and fields.— Tame pigeons are kept in many of these villages; and on the trees are found large blue, green and gray pigeons in a wild state.

No Bustard seen; very few partridges; scarcely any snipe.

6 miles 6 Furlongs. Mograpali; with a tank and the usual cultivation.— Met a large herd of Brinjari bullocks carrying Wheat to Parvatipur.

Village of Kurumurra; small, not marked on the Map.

8 miles 2 Furlongs. the Jonk stream, 600 wide, depth in flood 16'. Irregular, sandy bed with small islands; low banks subject to floods; no rock visible. This River is the boundary of the Kharial Estate.

9th mile, Narra; large Village, the head quarters of a Zamindar who owns 12 villages. The old Zamindar is 84 years of age and infirm; his sons and his Dewán came to the Camp and attended to our wants. Guides, coolies and supplies were promptly furnished.— There is a good encamping ground at Narra; good water to be had from

tanks and the River; there are also some wells in the gardens.

In the Village are Weavers and Iron-smelters; no carpenters.

The Police Officers of the Kharial Rajah, who had accompanied the camp up to this and been very useful, returned from here.

Height of Sarra above mean sea level 1010' ~~Fall~~ Fall from 8 Diurnal 3 feet; from Sialpori ~~3~~ 37'.

Distance of Sarra from Vizagapatam 304 miles 3 furlongs; from Raipur about 62 miles.

December 20. Sarra to Bagbahra.

Distance 10 miles 5 furlongs.

Thermometer 6. a. m 41½°
11. a. m 80°
4. P m 80°

Passed through some paddy fields and uncultivated swamps; crossed two small streamlets requiring culverts; then a fine tank near the Village of Bendrárun,

1 Mile 4 furlongs. No jungle here; all cultivation, both wet and dry.

2 Miles 4 furlongs. Village of Udra. Much wet cultivation.

Then thin scrub jungle. —

a small Village, named Láné. —

jungle again with a few isolated patches of fields.

4 miles 1 furlong. Kandajori stream, 250' wide, 16 feet deep; Sandy bed with some rock; banks low, and flooded in the rains.

The rock is Gneiss, with Quartz and felspar in veins and patches.

The Railway need not cross this Nullah, if the Jonk River is bridged a mile below Sarra.

4 miles. 6 furlongs. Khimakan, a large village; the Zamindar of Sárangal lives here who owns 80 villages. This village has two tanks and a large swampy place in a shed; a new building is being constructed of stone.

Beyond the Village a Nullah, 20 × 4'.

5 miles 7 furlongs. Khúlá, with extensive fields; black soil, then some high ground, with thin jungle on light soil. —

A Tank. — Jungle again. —

Small Nullah 6 × 3.

8 miles 2 furlongs. Phulmari; a few huts in a small jungle clearing; Soil, dusty clay with Sand.

9 mile. Kopli, a large village where a new tank is being constructed by the Zamindar of Sárangal, Umrá Singh, who met me outside the Village with his two little sons and a large following, and accompanied me to Bagbahra.

He was most attentive to the wants of the party, and asked that the Government might be informed of this fact.
He seemed very energetic and intelligent, and was pleased with the prospect of a railway through these parts.—.
A Letter from the Commissioner of Raipur, dated the 9th November and addressed to me at Bondesor, was brought to me only to-day by a Policeman from Bondesor who had walked ~~upwards of~~ 120 miles in 4 days.

Height of Bagbahra above mean sea level 1084. Rise from Narra 374.

Distance of Bagbahra from Vizagapatam 315 miles; from Raipur about 55 miles.

December 21. Bagbahra to Telibanda.

Distance 12 miles 6 Furlongs 204 yards.

Thermometer 6. a.m. 52°
11. a.m. 87°
4. p.m. 89°

Some rice fields in the lower grounds; then Jungle.—
A small streamlet with rocky bed.—
Irregular ground, slightly hilly.—
Jungle of brushwood and trees for nearly 4 miles, on varying soil, mostly rich dark clay. On the Jungle (3rd mile) Pendri, the site of a deserted village which the people are said to have left on account of want of

good water. Dense jungle.— At the end of the 3½ mile a Nullah, 25 × 5; sandy bed, low banks, no rock. Further on, two small Nullahs, 10 × 4 each; a third, 8 × 3.— undulating ground.

5 miles 5 Furlongs. Patrapali, with fine garden cultivation, and wells; maize, hemp, onions, garlic, spinage, beans, pumpkins, chillies, Brinjals, plantains, Castor oil, mustard, Sugar cane, tobacco &c are grown here.
Met 200 Brinjaries bullocks carrying ginglly seed and wheat to Parvatipur.—

6 miles 6 Furlongs. A shallow Nallah 100 × 6; low banks, sandy bed.— All Jungle again.— Another Nallah close to the former, 50 × 4, with low banks and sandy bed.— Some paddy swamps; then the Village of Kasibara at 7 miles 5 Furlongs.— Wet and dry fields, and gardens with wells.— Jungle again.— A small Nullah 8 × 3.

9 miles 3 Furlongs. A stream 60 × 5, with sandy bed & low banks; near the site of Koraidabri, a deserted Village.— Black soil full of cracks, fissures and holes. Scrub jungle with swamps, uncultivated.—
Two small swampy streamlets 5 × 2.— More swampy ground; then another Kasibara, a large Village at the end of the 12th mile.— Gardens with wells, and extensive fields.

The water in the wells is 6 to 10 feet below the surface. Laterite is found here.

A Superintendent of Vaccination from Raipur, and a Vaccinator were in the Village.

12 miles 7 Furlongs. Jelibanda, small Village. — A Head Constable from Kharia, which has a Police station and Post Office, came here to assist the Camp. A Munshi sent on the 12th November by the Deputy Commissioner of Raipur to meet the party at Kharial, turned up here only to-day (having been to Kharial and missed me) and made himself useful in procuring supplies &c.

Height of Jelibanda above Mean Sea Level.
1022' ~~Ft~~. Fall from Baghahra 62'.

Distance of Jelibanda from Vizagapatam 327 miles 7 Furlongs 1117 Jds; from Raipur about 46 miles.

December 22. Jelibanda to Mahasamund.

Distance 11 miles 6 Furlongs 1246 Yards —

Thermometer 6. a.m. 47°
11. a.m. 80°
4. P.m. 80°

Passed over extensive rice fields, now nearly dry, the crop having been gathered. Then Jungle on slightly undulating ground.

2 miles 6 Furlongs. Mamabatcha, a large Village with much cultivation around.

Then an uncultivated swamp, with a small stream, 10'×4', running through the deepest part; muddy bed and banks.

3 miles 7 Furlongs. The site of Pathrapali Village, now deserted; no sign of former cultivation; Jungle all round. The People are said to have been engaged in illicit dealings with timber and Spirits; hence they were driven from the Village. — All Jungle. — Some Laterite is seen cropping out.

4 miles — 0 — 170 Yards. Sikli Nullah 25'×8'; Sandy bed, good banks, no rock. — Then some clearing with cultivation. Soil black, full of holes. Small Nullah 6'×3'.

5 miles 1 Furlong. Arand, a considerable Village, with fields and Gardens. Wells in the Laterite; Water about 10 feet below the Surface, and said to be good.

6 miles 3 Furlongs. Umarda, a small Village with a tank.

7 miles 1 Furlong; a Stream 15'×6', with laterite rock for foundations. Light clayey soil. — Jungle.

7 miles 6 Furlongs 120 Yds. Stream, 10'×4'; laterite gravel in the bed. Jungle on both sides. Then a Swamp; beyond that two small Villages, Murmar and Kamari. Then two small Nullahs 9'×3'. —

There is much laterite about here; the prevailing rock formation is still gneissic, which ceases at the Mahanadi. —

9 miles 1 Furlong. the Village of Pathrapali,

where a black Smith is at work with rude implements and contrivances. —
a small stream, 4 × 3; then a larger one 12 × 4.
10 miles 4 Furlongs. Pitanjér, small village.
11 Miles 6 Furlongs 124 yds Mahásamund;
a large place, said to contain 400 houses and
over 1000 inhabitants. Carpenters and black Smiths
here. A Survey station and a temple are
prominent objects. The soil consists chiefly
of laterite; Water is good. Encamping ground
high and extensive. — Tanks; Topes and Trees about.
— Here is the beginning of a cart road, marked out
by side drains, leading to Arang; and here
also the track from Sarnat (via Sendubara,
the Sirgidi Ghaut, Kamaria and Kurta)
joins our line.
Height of Mahásamund above Mean Sea Level
915 ~~6~~'. Fall from Telibanda ~~79~~ 107'.
Distance of Mahásamund from Vizagapatam
339 miles 6 Furlongs; from Raipur 34 miles.

December 23. Mahásamund to Arang.

Distance 10 miles 2 Furlongs 100 yards.

Thermometer 6. a. m. 44°
11. a. m. 79°
4. P. m. 75.

Marched along a cart track partly lined out,
and roughly made. All fields, no Jungle.
1 mile 3 Furlongs. Kaxóra, a large village
with much neat cultivation; Good topes; a tank.

3 miles 5 Furlongs. Belsóra, a large Village
like the former. Country level and open,
well cultivated; no Jungle.
At the 6th mile, near the banks of the Mahánadi
the Village of Gorári. Here is some solid Kunkur
rock, also stratified lime stone rock, similar
to that at Cuddapah and Kurnool.
Then cross the Mahánadi River, 2040' wide,
and 25 feet deep during great floods which
spread close up to the village of Gorári, covering
the ordinary banks near the river's edge to a
depth of 10 feet.
The ordinary floods, contained between the
banks, and not overflowing them, run about
15' deep.
The bridge will require to be 30' to 35' above
the deep bed. The low water at present
is 260 feet wide and little more than 2 feet
in depth. The bed is Sandy; on the Eastern bank
and in the bed is lime stone rock; on the West
bank more is visible, but it will probably
be found not far below the bed.
1/4 mile from the West bank is an irrigation canal
taken off from the River.
7 miles 6 Furlongs. Paragáon, with a Suburb
occupied by Potters. Soil clay and laterite,
mostly cultivated; little waste land; no jungle.
Here we join the main road from Raipur

to Sambalpúr; a new road is being made to Gorárí.

9th mile a Nullah, 20 x 6; high banks, stony bed (Lime Stone).

10 miles 2 Furlongs 100 yards; Atrang. Good encamping ground.

Fine tope, good water from wells and Tanks. Post office, Police station, and school here; also a Travellers Bungalow, and a Dispensary, and a fine Temple.

(Distance of Atrang from Vizagapatam 350 miles; from Raipur 23 miles.

Height of Atrang above mean Sea level 942 902'. × Rise from Mahánaddi 13 27 ××

December 29th Atrang to Hasaud.

Distance 13 miles 4 Furlongs.

Thermometer 6. a. m. 55°
11. ½ a. m. 75°
4. P. m. 78°

1st Mile. Village of Bihiar.

Open, flat Country, well cultivated; black Soil.

2 miles 6 Furlongs. Rasni, an ordinary village, with tope and tanks; Sugar cane and Rice fields.

5 miles 2 Furlongs. Tappal hut.

The ground here is gently undulating; Soil laterite; the whole of the country so far as the eye can reach is cultivated; little waste land; no jungle. Fire-wood is scarce; no hills.

Trees are few and far between, but

×× subject to correction when the aneroid readings at the coast are received

WH.

each village has one or more topes and tanks; some have wells.

7 miles 2 Furlongs. Kalhán stream, 50' wide and 10' deep in flood; high perpendicular banks; bed gravelly, no rock visible.

10 miles 2 Furlongs. Naogáon; a small village with a Police station, temple, tope and tanks; Soil in some parts red, in others black; ample fields, dry and wet. Here I met the first Wheat fields along this route; there were none east of this.

13 miles 4 Furlongs. Hasaud, a large village with tanks and topes, wells and extensive cultivation. Soil, light brown clay. — Good encamping ground.

Distance of Hasaud from Vizagapatam 363 miles 4 Furlongs; from Raipur (last end) 8¼ miles.

Height of Hasaud above mean Sea level 922 969 × feet; Rise from Atrang 20 27 × feet.

×× subject to correction, as above

December 30. Hasaud to Raipur.

The country is flat and well cultivated, with both wet and dry crops.

2 miles 1 Furlong. Sarikheri, Village with tope and tank.

3 miles 6 Furlongs. Jora, similar to the last, with much wet cultivation; black soil.

5 miles. Labhandih, similar to the last two Villages; black Soil. — A Stream 40' x 8', with high banks, and lime stone

VII

rocks in the bed.—

Half a mile further a smaller streamy 15'x6'; banks and bed of black soil.—

Much Wheat and Linseed are grown about here.

6 Miles 6 Furlongs 130 yds. Village of Selibunda or Kurwatoli, with a pucca tank, and topes of Mhowa trees.

8 Mile 1 Furlong 80 yds. East end of Raipur Cantonment, near the Deputy Commissioner's Court.

The Distance of Raipur from Vizagapatam, by the route marched over is 371 Miles 5 Furlongs 211 yards.

~~Fall from Ground feet.~~

Altitude of Raipur above Mean Sea level 922 feet. 762

× Subject to correction, as above

I went at once to see the Chief Commissioner of the Central Provinces, Mr. Morris, B. C. S., who was here on tour; and the Commissioner of the Chattisgarh Division, Colonel Lucie-Smith; both officers are going into Camp to-morrow, en route to Belaspur.

G.O. No 763 dt 31/12/82

Raipur
6th January 1882

K. J. Nordmann
Executive Engineer
on Special Duty

No 27
R

Camp, Raipur.
14th January. 188

From

K. J. Nordmann. Esq.
Executive Engineer
On Special Duty

To

Colonel R. H. Sankey. C. B., R. E.
Secretary to Government, P. W. D.
Madras.

Sir

In continuation of my letter No dated 6th instant, I have the honor to from you that I have this day po to your address a tin case, containing longitudinal section of the country travers by the Reconnoitring party, from Sarangpur Raipur, and the cross sections of all thos exceeding 30 feet in width.

2. I have despatched one camp thi day, and leave Raipur to-morrow for Ka whence I march up the valley of the Pairi and then up the Sondor river, pas Koagarh; then up to Kajgarh, Omarkot Narangpur, and Koraput.

3. W. Comac follows via Dhamt Kanker, and Bauskot to Omarkot,

we expect to meet about the 1st of February; reaching Koraput about the 14th idem.

4. From all the information I have been able to collect, I see no necessity for examining a line leading from Dhamtery up the valley of the Silari & Sukúa and Borái, which was travelled over and reported on, in 1876, by Colonel Francis, then Executive Engineer at Raipur. This line goes over some very high, rough and uneven ground, and seems in every respect inferior, for the purpose of a railway, to either the line up the Sondur river, passing near Nowagarh, or the line via Dhamtery, Kanker, and Bansket.

5. I beg that letters may be addressed to "Narangpur, via Koraput, to await arrival"

I have the honor to be, Sir,
Your most obedient servant,

R. J. Nordmann
Executive Engineer
On Special Duty.

Acknowledged
Note R.S. 23-1
Noted R.

Camp. Raipur.
14th January. 1882.

P. W. C. No 390

F. Nordmann, Esq
Executive Engineer
On Special Duty

Encl 1 Book of sections

Rec'd 21 Jany 82

el R. H. Sankey, C.B., R.E.
retary to Government P.W.D.
Madras.

Reports the despatch of
ngitudnal and cross sections
the route learned from
wraipur to Raipur, and
made
arrangements for
march to Koraput.

Rs. 3294 W . 16.9.81
3025 W 5.12.81
3193 W - 29.12.81.

Cir 26/1/82

No 2611

PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 31st January 1882

Read the following:—

Letter from K. F. Nordmann Esqre
Executive Engineer on Special duty } { P.E. No 24 R dated 6th January 1882

Do do (" " 27 R " 14th " ")

Recorded.

26. 1. 82

10/5/99

27-1-31 Bill

Mis

Be No 260 Wed 31st January

R. 26-1-82 R. 30-1-82