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623/1

No 38/K

Camp Koraput

25th February 1882

From

K. F. Nordmann, Esquire

Executive Engineer

On Special Duty.

To

Colonel R. H. Sankey, C.B., R.E.,

Secretary to Government, P.W.D.,

Madras

Sir

1. In continuation of my letter No 27/K, dated Raipur the 14th ultimo, I have the honor to submit herewith my Notes of Reconnoissance of the country between Raipur and Koraput, via Rájim, Kópra, Bourka, Nawagarh, up the Pairi and Sondor Rivers then via Náttgáon, Raigarh, Omerkót and Kowrangpur to Koraput;

List of Enclosures.

1. Executive Engineer's Notes of Reconnoissance from Raipur via Rajim to the Sondor River to Kowrangpur

2. Do Do from Kowrangpur to Koraput via the Madoopattie Ghaut

3. W. Cowan's diary from Raipur via Chanteer & Kankeir to Omerkote

4. Do Do from Bhogaon to Koraput via Jeypore

5. Do Do Report No I/0 dt 1st Feby/82

6. Reports by Colonel Frances on routes from Raipur via Chanteer & Sihawa towards Raigarh

7. Total

a total distance, by the straightest and easiest route, of 217½ miles.

2. I left Raipur on the 15th ultimo and marched through a well cultivated country, via Khandwa, to Rajim where I crossed the Mahánaddi River which is there 1900 feet wide between the banks, and 20 feet deep when in flood. From Rajim I marched up the right bank of the Pairi River. The ground is on the whole very favourable for the construction of a railway. The country is fully cultivated as far as Kopra, and some miles beyond; and the gradients are generally light.

3. Near Bourka there will be some hill-side cutting required, for upwards of a mile, along the steep and stony bands of the Pairi

Pairi River. This part of the work, although insignificant in itself, may be reckoned among the heaviest that will have to be done on this line, which is a remarkable easy one throughout.

4. Near Kárte I crossed the Pairi River, here 1500 feet wide and 15 feet deep and then passed over some high ground, culminating at the head of the Urtúle ghaut, to Nandgark. The Urtúle ghaut is a steep ascent of about 120 feet, over which the present track passes, but which would be circumvented by a regular road or a railway line. Thence I marched up the right bank of the London River, via Baltóna and Jumaribáhál to Kerkú, and, crossing the Bag River, to Rigáon,

Gourgáon and Háthgáon.

5. There is no need for taking the road over the Virtúti ghaut to Namazark, which is a very small place although the head quarters of a Zemindar as the line can be taken entirely up the right bank of the Sonder River, from Karté via Benkúra and Karka to Battéma. At Rivgáon I fell in with the Bunjara traffic from Jeypore and Koraput, the trade route leading from Raigark via Háthgáon, Gourgáon and Rivgáon to Sikáma and thence to Dhamtari.

6. The sections, which will be submitted in a few days, show that the ascent up to Háthgáon (1870 feet above Mean Sea Level) is a very gradual one. From Háthgáon

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begins the final ascent onto the Jeypore Plateau. There is a total height of 220 feet to be overcome which, distributed over 5 miles, gives a gradual rise of 44 feet per mile, or 1 in 120. This route is quite practicable for a railway throughout; no regular ghaut or steeper gradient than 1 in 100 being required, while the line passes through many miles of magnificent forest over virgin soil in a country full of promise, containing all the elements of future prosperity; where hundreds of square miles of the most fertile ground are waiting for the plough.

7. The Goldáriah Nullah, a mile to the East of Háthgáon, offers the greatest facility for taking a road up to the Jeypore plateau by a light

gradient. The work will be quite easy; the jungle is dense but there is only a small amount of hill-side cutting or g.band work required, very little heavy embanking and bridging, and so little rock blasting

8. The whole country passed through from Baurka to Hathgáon is covered with forest and jungle. Villages are few and far between, especially in the upper Course of the Sondor River; but, the soil being good and well drained, the agricultural Capabilities of the Country are unlimited and only wait for development.

9. The highest elevation reached on the Jeypore Plateau, near its edge, was 2100 ft. above Mean Sea Level, at

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Koliapodor; the distance traversed from Raipur to Omerkote 137 miles

10. At Omerkote I met Mr Cormac on the 9th January, who had marched from Raipur through the rich grain Country of Dhamteri via Dargahan to Kankeir, then up the valley of the Hatkul River to Bandol in Bastar, thence via Paorbel, Jurginga and Bakúda to Omerkote; total distance 150 miles. This line is 13 miles longer than the route I traversed, i.e., via Rájim and up the Pairi and London Rivers; but the former also proved easy, as shewn by Mr Cormac's Report (hereto appended) and his sections

(which will follow); except in that part of the Hatkhul valley between Chiprail and Siduwan where for four miles a regular ghaut road will have to be constructed along the hill side at an average gradient of 1 in 40. The highest level reached by Mr Cormack ~~may~~ near the edge of the plateau road 2140 feet, near Siduwan

11. Having carefully compared the two lines above described I am of opinion that, for the railway, the shorter line up the London River should be chosen; while the route marched over by Mr Cormac should be laid out as a road, i.e., from Dhamtri via Kankeir

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to Raigarh; and other feeders should be constructed to connect Dhamtri, Kankeir and Sihawa with the line of rail.

12. From Raigarh via Emerkote and Naorangpur to Ránigar, at the foot of the Máderahatti ghaut, a distance of 90 miles, the line lies through a rich and beautiful upland country with fertile soil and fine forest and jungle, at an average elevation of 1900 feet; the surface in most parts level, in others diversified by hillocks and swamp, much of the latter cultivated with rice; the whole offering no obstacles but every facility for the construction of a line of rail.

13. Whether this line west

west of the Nawagurh Hills or the Eastern line via Rayagadda and Bobadola is chosen for the railway, I would recommend a specially important feeder that should be made in either case, namely a road between Naorangpur and Rayagadda, leading from the former place up the Indrawatty River to Jagannadhapur and Khurmeli, then up the valley of the Golagad River to Maribata and down the Valley of the Rayagadda River to Rayagadda; a distance of 65 miles. This is an easy and natural line of ghaut and the summit level near Maribata is not more than 2700 feet above the sea.

14. And whichever of the two lines is selected for the railway,

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whether that East or West of the Nawagarh Hills, I consider that the other line should be made into a good cart road with bridges &c complete, to be passable at all seasons.

15. The following lines would seem to be foremost among those required to be constructed as railway feeders, in case the line of rail is taken from Raipur via Rájim, Kopra, Kharté, Balténa and Hathgáon to Raigarh, Sherkote &c.

I. Raipur via Dhamteri and Dargahan to Kankeir

II. Kankeir via Salabat, Siduma and Banoskot to Raigarh

III. Kankeir to Jagdalpur in Bastar

IV. Kankeir via Sihánna and

Sankra to the nearest Railway Station, i.e. say Tumaribahal

V Sihawa via Borai to Banoskot (on the Kankeis-Raigarh line)

VI Sihawa to Dhamtari

VII Dhamtari via Achota to Kopra or Pandaka (to be continued to Chura and Narra)

VIII Nawagarh to the nearest Railway Station

IX Jeypore to Malkangiri

X Jeypore to Jagdalpur

XI Jagdalpur, Kotepad, Naorangpur

XII From Bherkote (Vizagapatam) via Kurati and Bamini to the Bhaordig River

XIII Naorangpur via Jagannathpur, Khumeli and Maribata to Rayagada (vide para 13 above).

16. In case

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16. In case of the Railways is constructed East of the Amarkantak Hills, i.e. via Parvatipur, Ambadola, Bogar, Kharial, Narra &c, the lines of road chiefly required to be constructed as feeders would appear to be the following:

I Jorlear, Jarnot, Jendubara, Kamaria, Karti, Madasamund

II Sankra (on the road from Raipur to Sambalpore) via Suki to Narra

III Narra, Chura, Pandaka, Dhamtari

IV Kharial to the Teak Forest on the Indet River

V Patna to Jorbar

VI Patna to Bogar

VII Assurgar to Sompur on the Mahanadi, via Jurla and

Bámtin.

VIII Rayagadda via Singapur and the Mussa ghaut to Bondesar, Dádpur and Bygar

IX Bondesor via Nandol, Dasipur and Manjhér to Kharial

X Dasipur to Débbog, and up the valley of the Ib Riv

XI Singapore to Imbodola via Lonjigar

XII Balijuda via Jamriband to Imbadola

XIII Parvatipur to Kurpám, Buttly and Jeypur

XIV Godairy to Bissumkuttak

XV Rayagadda to Nowrangpur via Lodda, Marebeta, Kurmeli and Jagannáthapur (vide para 19 above)

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17- When the Madras Government in 1875 proposed to make a road from the head of the Polángby ghaut through the Jeypore Country via Nowrangpur, Bmerkote and Raigarh to the Central Provinces, the then Executive Engineer, Colonel Francis at Raipur placed himself in Communication with me at Polangby and, under orders from the Nagpur Government, that officer explored the Country within his charge with a view to finding the best line of road to Connect Raipur with our proposed road through the Jeypore Country. I have obtained through the Executive Engineer at Raipur a Copy of Colonel Francis' Report which I beg to append to these papers. From this report it will be seen, that the several routes explored by Colonel Francis are unsuitable, on account of the hilly nature of the country, for the purposes of a railway; but one of the routes, viz: that from Raipur via Dhamtari, Kokrel, Dokal, Gatasil

Bargudi and Borái will do very well for an ordinary road to act as a feeder to the railway.

18. From Pupagáon, 17 miles South of Naorangpur, I sent Mr Cormac to Jeypore and thence up to Koraput by the new Road, to report on the lay of the country and take a section of the Ghaut leading up to Koraput; while I marched via Chekpamb and Kanigar in which direction, i.e., up the Kuvadi Nullah the easiest line for a railway to the Koraput Plateau is to be found;— the gradients on this line will not exceed 1 in 75. The Railway Station for Koraput would in this case be near a village called Dengagura, about 2½ miles East by North of Koraput, and nearly 500 feet lower than the latter place. Koraput itself, being near the edge of the higher plateau, is not easily accessible for a railway from below, except by means of

* Report and section appended.

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steep gradients. From Dengagura the line would gradually ascend to Dumriput, and thence go on via Chikapár towards Sálur.— This section of the road will form the subject of a separate report when the Reconnoissance of that part of the country and of the Ghaut portion of the line has been completed. I leave Koraput in a few days to undertake this the last section of the reconnoissance.

19. As regards the general question of the location of the proposed line of railway, i.e., whether it should go East or West of the Nawagarh Hills, it seems too early to discuss the subject until the most difficult part of line now being explored, namely the ghaut leading from the 3000 feet-plateau to Salur, has been carefully considered by the light of figures and otherwise. But

I may perhaps even at this stage of the investigation be permitted to make a few observations bearing on the question; and I therefore submit the following points for consideration.

I. The economical importance of the country to be developed is probably equal on both sides of the Ramagarh Hills; except perhaps that, looking to the rich rice and wheat producing country of Dhamtari, the balance would appear to incline in favour of the Western line which taps that great grain country.

II. The development likewise of the natural resources of the Jeypore State in the direction of the Western route may be considered a pressing necessity; and the railway on this line would lead all through ~~Madras~~

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~~through~~ Madras territory to within 100 miles of Raipur.— Of the present grain and salt traffic between Chattisgarh and the Coast, the major portion passes undoubtedly along the Western Route, as cannot fail to be observed by any one who travels over both routes.

III. For military and political reasons the Western line also may be thought the more important of the two, bearing in mind the desirability of bringing the railway near Jeypore and Bastar where there have been from time to time outbreaks of rebellion which may occur again in future.

IV. The Engineering difficulties on both lines are much the same; but the cost of the Western line would

would be somewhat enhanced on account of the Ghauts which have to be surmounted at an altitude of 3000 feet, while on the Eastern line the greatest elevation reached is only 1346 feet. The item of Bridging would probably be more costly on the Eastern than on the Western line; the former crossing a greater number of formidable streams than the latter.

V. As regards length, the Western line will be from 20 to 30 miles shorter than the Eastern; the saving in distance varying between the two figures named according to the gradient that may be accepted for the Ghaut portion of this route—

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With a gradient of 1 in 57 the saving in distance would amount to about 24 miles. But the shorter line would not be on that account much less expensive than the longer one; since the 25 or 30 miles of Ghaut work would cause extra outlay on the shorter line and so nearly assimilate its cost to that of the longer one.

The relative cost of the two lines would stand about thus:—

Cost of Eastern line, 372 miles at £5000 per mile		£1,860,000
Western line	320 miles at £5000	£1,600,000
	30 miles at £8000	£240000
		£1,840,000

VI. Finally, if Vizagapatam is to be improved as a Port, it will be

a very advantageous in many respects to be able to send indigenous Coal to the Port; and for this purpose a railway from the Godavery Coal fields to Vizagapatam would eventually have to be constructed. Now, if the Raipur Railway at present under discussion is taken West of the Amagark Hills, it will answer for a certain distance the purposes of the Coal traffic from Chanda to Vizagapatam, as well as the grain traffic from Raipur to Vizagapatam.
In fact, part of the line from the Port of Vizagapatam to the Coal fields will virtually be made by taking the Raipur railway West of the

the Amagark Hills. This Western line will therefore save so much future outlay on a separate railway which would have to be constructed from the Port to the Coal fields; and it will answer the combined purposes of the Chanda-Vizagapatam Coal traffic and the Raipur-Dhamtari-Vizagapatam grain traffic.
Taking the whole distance from Vizagapatam to Chanda to be 450 miles, then about 1/3 of this distance, i.e., nearly 150 miles would actually be made by taking the Raipur railway West of the Amagark Hills. — And possibly we may not have to go as far

~~as~~ far as Chanda ~~and~~ or Wurora for coal, since there is every likelihood of coal being ere long discovered in the valley of the Kolab River between Jeypore and Bustar; and in the Malkangiri Taluk of Jeypore. This will constitute a strong argument in favor of the Railway being brought near these parts.

20. Observations regarding natural resources, produce, labor, soil, climate, seasons, manufactures, trade, population &c, along the routes explored, have been recorded from time to time in my Notes of Reconnoissance, as directed

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in para 12 of Government Order No 2294 W., dated 18th September 1881; the following is a summary of the observations recorded under these heads:-

I. Building material procurable-

Materials, such as timbers, building stones, clay for bricks, sand, lime stone, iron &c are equally available on both lines. The rock formation is chiefly gneissic, except west of the Mahánaddi, where sand stone and limestone rock prevail. Nodular Kunker lime stone and different iron ores abound along both routes, except that Kunkur is scarce on the Jeypore plateau. Quartz veins and reefs were found

also some rubies and garnets.
in many places; Traces of lead,
graphite, antimony, arsenic, copper,
silver and gold were met in ~~the~~
several localities indicated in
the Notes.— The soil is more or less
fertile throughout on both lines,
and varies from black cotton
to light sandy loam, — I scarcely
saw any very poor soil anywhere.

II. Charactor and Amount of
labor available.

Local labour will, on the
whole, be not found sufficient for
the work on the railway, especially
in the more sparsely populated parts
where both skilled and unskilled labor
must be imported from other parts.
The unskilled labour available will
as

as a rule be found of a superior
description, quite equal to the best in the
Madras Presidency.

III. Rates of skilled and unskilled labor.

The rates for unskilled labour
are at present low along both routes,
averaging 1½ to 2 annas per man per
diem, paid mostly in grain, not coin;
but these rates will in time — with large
works going on, and a great demand
for labour — very likely increase to 3 or
4 annas per diem.—

Skilled labour will have to be brought
from a distance to most parts of the
work. The indigenous skilled labourers
available, such as Carpenters, blacksmiths,
iron smelters, masons &c, are of inferior
quality and very scarce besides, on both
lines. The rates of wages for such —
(inferior) skilled labour as there is at

present, are naturally low, say 2 to 4 annas per diem, paid generally in grain. When skilled labour is hereafter brought to the works from other parts, the rates to be paid in coin will be rather in advance of those prevailing in the more settled parts of the Southern country

IV. Camping grounds, drinking waters &c-

The country may be said to be equally salubrious on both sides of the Nawagark Hills, and good camping grounds are to be found near most of the principal villages; while wholesome drinking water can generally be obtained from the numerous streams and rivulets encountered on both lines. But where the only water is available is from swamps or

Tanks, as is the case in many places, it is of course of inferior quality, and, especially when beginning to dry up, undoubtedly dangerous if used for drinking purposes. Wells, however, could easily be dug along both routes; the water being almost everywhere found close to the surface.-

The forests contain a fair number of wild animals and game, such as tigers, cheetas, bear, bisons, buffalo, nilgai, pig, sámbhur and deer. There are no elephants. Pea fowl, jungle fowl, partridge &c are met.

V. Climate and working seasons.

The climate along the several routes naturally varies in some measure; the lines explored between Vizagapatam and Raipur passing through 3 1/2 degrees

of latitude, while the elevation varies from sea level up to 1300 feet on one line, and to 3000 feet on the other. But allowing for the change of temperature due to an elevation of 3000 feet on the upper Jeypore plateau, the climate may be said to be much the same on both lines; and on the whole it is a very favourable climate for carrying out large works during the greater part of the year.

The working seasons are also nearly alike on the rival lines, both being but lightly affected by the two monsoons; practically there is nothing to prevent work being carried on throughout the year, save for a

month or so during the first violent burst of the North East monsoon and for some time afterwards, when the jungles are very unhealthy: say from the end of October to the beginning of December. The hot weather is rather favourable for ordinary outdoor labour here as elsewhere in Northern India.

The indigenous labour available will not suffer from fever, dysentery &c to the same extent as imported labour would.

VI. Cultivation and Manufactures -

Detailed Notes on the prevailing cultivation in different parts along the several routes explored have been given in my Reports submitted from time to time. About one fifteenth of all the country marched through, South and East of the Mahanadi, may be said

to be under cultivation, the rest is chiefly jungle and forest with some pasturage and waste land; but there is not much of the last.

West of the Mahánaddi, however, and for some distance eastwards from its right bank, between Goári to Achóta, and in the whole of the Dhamtari Taluk the country is both cultivated, and there is little or no jungle.

The finest forests in the Eastern lines were found between Bissamcuttak and Assurgor, then along the Sunder or Under River in the Kharial Estate, and between Khúmúna and Jelibanda; while there is an extensive teak forest, 15 to 20 miles South West of Kharial.

On the Western Route I marched

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through some magnificent forests, along the course of the Lorul or Sondor River, from Karte up to Raigarh. There is fine and uninterrupted forest (not merely jungle) from Paraga to Nawagarh, a distance of 16 miles; with not a village along the whole line.

From Nawagarh to Raorangpur, and further South, is beautiful forest all the way, sometimes primeval forest, on rich virgin soil. Now and then the tall forest is relieved by common jungle, or small clearings for cultivation, and divided by occasional belts of swampy ground, partly cultivated, through which the drainage of the country passes. The number of villages is small and the population sparse. Hundreds of square miles of the most fertile soil are waiting for the plough. This description

of country continues up to the foot of the Madeaputti ghaut leading to the upper Jeypore plateau (Koraput).

The useful timber trees chiefly found in the forests are Sal and Matta, but there are also blackwood, Gégi and some other kinds. Teak is rather scarce in these jungles, except in special localities, such as the teak forest near Kharial, noted above. Of fruit and other useful trees, jack, fig, gooseberry, tamarind, mango, tamarind, margosa and a variety of acacias are everywhere found. The Mhowa or Ippa tree abounds in all the country travelled through, North of Rayagadda and West of Potingby; but its wood is not useful for timber.

The sheep and cattle met with were on the whole not numerous, and

of a very ordinary breed. County ponies are to be had at Kasipur, Kájim and Sonpore, where cattle fairs are periodically held.

The crops which are much the same East and West of the Nanagadd Hills, consist of several kinds of rice, sugar cane, raggi, two or three kinds of gram, millets, oilseeds, wheat (this last chiefly West of the Mahanaddi), tobacco, chillies, mustard, garden vegetables &c. The quantity of rice grown along both lines, sometimes by means of primitive and inexpensive methods of irrigation, and sometimes dependent upon a few seasonable showers of rain only, is very large, and shews what

Could be done in this direction by a more numerous and civilized agricultural population. Irrigation is carried on partly by small river and spring channels, or under rudely constructed tanks; and partly along the sides of nullahs where the banks are cut down, the ground levelled and small flat valleys created; as well as in swamps which are to some extent drained and then converted into rice fields.

The average price of rice at Raipur and Dhamtari in December and January was one Rupee for 60 seers, and of wheat one Rupee for 45 seers.

Several kinds of oil, coarse sugar, ghee, and alcoholic liquor

distilled from the flower of the Ippa or Mhowa tree, are largely manufactured.

Tassa silk and coarse cotton cloths are made at Kosga near Jukla in the Kharial State; also near Dhamtari, and in some other places. The Tassa silk worm feeds upon the leaves of Sal and Matti trees.

Glass bangles and some rough lacquered ware are manufactured at Sarangpur.

Skilled workers in leather and iron, as well as gun makers, brass workers, goldsmiths and jewellers are rare.

VII. Trade and Trade routes.

The chief products carried from Chattisgarh, Jeypore and Bastar to the Coast are rice, wheat, gingelly seed, linseed, Bengal-gram, horse gram, turmeric, ginger, dammer, arrowroot, soap nuts, mark nuts, myrabolams or gall nuts, hides, bees wax, honey, horns hoofs, iron, [illegible] and Lac (the product of an insect). The chief imports carried from the Coast to the Interior are salt, salt-fish, cloths, opium, spices, glass bangles &c.

Trade is almost exclusively carried on by means of pack bullocks belonging to the wandering tribe of the Brinjaries; and the chief routes frequented by them are the

 623/20 820

following:—

(1) From the several salt pans on the coast to Salur and Parvatipur.

(2) Parvatipur via Rayagadda, Bissumkuttack and Bubadola to Santpur, Dádpur, and up the Jél Nadi and Mahánadi to Sónpur and Sambalpur.

(3) Parvatipur via ~~the~~ Narsinpatnam ~~and~~ Letchimpuram, Dasmathur, Girlegunda to Naorangpur.

(4) Rayagadda via Singapur and the Musa ghaut to Bondesor.

(5) Musa ghaut via Junágher and Dhébong to Kaiwagarh and Kájim

(6) Bondesor via Dasper, Manjhór Kharíal, Torbor, Tarnot, Sirgidi, Kartí to Areng and Raipur.

(7) Sálúr, Kóraput, Naoragpur, Bmerkote to Kánkeir and Dhamtari.

(8) Bmerkote, Raigarh, Pingáon, Maohka, Sikáma to Dhamtari.

(9) Kánkeir to Bustár.

(10) Bustár to Jeypore

(11) Jeypore, Sogaru, Padawa, down the Calikonda ghaut to Kásipuram.

(12) Jeypore to Malkangiri and ~~Nowrangpur~~. Moet-

VIII. Population and land available for immigrants.

The people in the jungles are almost wild and live in a semi-barbarous state, partly by the chase. They are mostly miserably poor and dwell in small huts built of sticks

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and thatch. The small garden plots and spaces round their huts are fenced in with stakes, as a protection against wild animals. Their agricultural operations are of the most primitive kind, and they have barely enough to subsist on. In the more central parts, in the large villages and towns, and in the well cultivated tracts such as the Dhamtari Taluk for instance, the people are comparatively well-to-do; they live in better houses and have enough to live on, and to spare for export.

There are large tracts of the best soil, now covered by jungle and forest, which offer a very promising field for immigrants. Such tracts are to be found in the Zemindaries of Khariál, Patna, Bodoaman, Narra, and Saarmalá, in the Nawagarh and

Kankeir estates as well as in Kalahandi, Jeypore and Bastar.

21- I have much pleasure in recording my obligation to the authorities of the Central Provinces and to the Manager of the Bindra-Nawagarh Estate, as well as to the Rajahs of Kankeir, Bastar and Jeypore, for the ready assistance rendered to the Reconnoitring party in the matter of guides, Coolies, Camp supplies &c.

22- As the expedition is drawing to a close, I request your authority to hand over all Goverment tents, tools, stores, instruments &c, belonging to my party, to the charge of the Executive Engineer at Waltair. Unless I receive other orders, I propose to embark at Vizagapatam for Madras by the

Ordered to Store them at Vizagapatam 7.3.

Secretary to Govt

first Steamer in April. Till then I beg that all communications may be addressed to me at Waltair.

I have the honor to be

Sir

Your most obedient servant

K.F. Nordmann

Executive Engineer

on Special duty.

Note. I must ask your indulgence for the inferior calligraphy of this letter, and for all corrections, erasures &c.; as my writer is not very efficient.

K.F.N.

623/23

No 38
K
Dated 25th February 1882

From H. Executive Engineer
on special Duty
Vizagapatam & Raipur
Railway Survey

To the Secretary to Govt.
P.W.D.
Madras

Rec'd 1st March

Encl: 6

Subject

Report on Reconnoissance
from Raipur to
Koraput

with order

Recorded.

A

Extract from Exec: Engineer's

Notes of Reconnoissance

from Raipur to Nowrangpur

via Rajim, Bindra-Nowagarh, Hathgaon and Owarkote

179 miles 4 furlongs. — January 15th to February 5th 1882

Thermometer and aneroid Readings

January 15th 1882.

Raipur to Khandwa en-route to Nowgarh.

55°
29-34

Distance 14 Miles 2 Furlongs 137 yards

Thermometer 6. a.m. 55°.7
11. a.m. 79°
4. P.m. 79°

Just outside the Cantonment limits

60°
29.34

Lime stone rock is seen cropping out on the surface; an irrigation channel crosses the road.

58°
29.38

At the 3rd Mile is the Village of Lálgáon with a Tank; then Déopúri.

The Soil is laterite.

60°
29.38

5 miles 0 F. 187 yds. Dumartalái, Village with tank and topes.

Soil laterite, covered with brown clay.

Extensive wet and dry cultivation; but most of the crops have been harvested, except wheat & linseed.

There is some waste land about here,

but little compared to the extent of cultivation. The laterite soil is occasionally varied by black clay, full of cracks and fissures in its present dry state.

63° 29·37 7th Mile. 2 Culverts required, each with one vent 3 to 4' square.

The General drainage is of an ordinary description: besides the bridges noted as required in the report, about 4 to 5 culverts with vents each 2 to 3' square are wanted per mile.

68° 29·35 8th Mile 2 Furlongs 4 yards. Village of Dráná; with tank and tope, gardens and wells; soil, light brown clay.

72° 29·32 10th Mile. The Village of Neubhóra half a mile to the right; a fine tank by the road side. There is much Iron stone gravel about; also some red sand stone, and a bed of coarse clay slate.

76° 29·36 11 Miles 6 Furlongs 170 yards. Ve parmára, Village with tope, tank, gardens & wells. a Stream (Jaisar nullah) 2c x 7, with clay and gravel in the bed, and well defined banks; Road good & metalled. —

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Fields of rice (harvested) and Wheat (growing). — Then a gentle rise in the ground; half a mile further a Swamp, with a Stream, 6'x4'. — Laterite soil —

13 miles, 5 Furlongs, 17 yards; a Stream called Ghátariah, 15'x5', with perpendicular banks; bed laterite gravel.

78° 29·34

14 miles, 2 Furlongs, 137 yards. Khandwa, Village with tank, tope, gardens and Extensive fields. Soil Laterite.

80° 29·29

Approximate height above mean Sea Level 910. — Tall from Raipur about 53 feet.

A good made road runs from Raipur to this, and further too; but it becomes gradually more and more neglected the further it goes. Avenue trees have been planted by the road side, but they are not prospering owning to the manner in which they are protected, i.e. — about a cubic yard of earth is being heaped round the base; whereby the tree is deprived of the necessary moisture, and the roots grow above ground in the earth heaped round the tree.

January 16. Khandwa to Rajim

Distance 11 Miles. 2 Furlongs. 118 yards.

Thermometer 6. a.m. 57°
11. a.m. 75°
4. P.m. 80°

In the first mile occurs a small stream (Chittár nulla) 10×5, in black soil, with muddy bed & high banks; a road bridge is about to be built here, for which red sand stone is being collected. — The country is nearly all cultivated, there is very little waste land; the soil is mostly black; the chief crops are rice, wheat (Ghowm), linseed (alsi) and Bengal gram (chenna).

2 miles 4 Furlongs 160 yards; Kolhán nullah, 20×10; banks well defined; bed sandy with gravel. The Village of Thanand lies half a mile to the right, there is large tope near it. Most of the Villages here have fine topes; otherwise there are few trees about.

3. Miles. 4 Furlongs 95 yards, on the Summit of some gently rising ground; a cross road running North and South. —

Topes and trees begin to occur more frequently than before, and there is some waste land about. Two small tanks by the road side, and a young Mango tope; Extensive rice fields.

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5 Miles 3. Furlongs 154 yards. Sunderwára, a large Village with topes and tanks and extensive wet and dry fields.

Soil: Chocolate Coloured, with small stones and gravel (red sand stone); numerous Mhowa trees about.

The minor Drainage required for the Road is of an ordinary description: 4 to 5 culverts per mile, each 2 to 3 feet square, would suffice.

7 Miles 1 Furlong. 38 yards. Porsáda, a large village, with a tope. Babúl trees plentiful, especially by the Road side. Near the Village is a Nullah, 35 wide and 8 deep with steep banks; No rock visible; soil black. A little further on, two small tanks by the Road side. Linseed (alsi) is largely grown about here.

8 Miles. 5 Furlongs. 180 yards. Village of Ghoál; a nullah 15 wide × 10 deep, with steep banks, and soft bed, in black soil.

10 Miles. 1 Furlong. 175 yards. Parsádon, a large Village, with extensive Groves of Mango and Tamarind trees and several tanks. Laterite rock is seen cropping out. Here the Mahá Nadi is crossed, about a mile above Noapára.

The Pairi River is 1908 feet wide between the banks; but infloods the Northern or left bank which is low (about 15 high) is inundated; the Southern or right bank is 25 630 feet high. The low water in the deep bed at present is 16 1/2 feet deep and 200 wide, the bed is sandy but there is laterite rock on both banks. There is an Island with a temple, just below the junction with the Pairi River.

The temple is dedicated to Kolesa Mahadeb. 11 miles 2 Furlongs 110 yards; Camp on Southern bank of Maha Nadi in a fine tope, near a town on the outskirts of the Town of Rajim where a Zamindar lives. There is an Imperial Post-Office, a Police station and Vernacular school here. The temple is considered a very holy one. The Priests have in their possession 3 Copper plates, joined by a Copper ring with a seal; the plates are rectangular, measuring 12 x 9 inches, 1/8 of an inch thick, and bear an inscription in the Pali language; they are said to be very ancient and to contain the title deeds of the temple property.

General Cunningham of the Archaeological

Survey has seen them, and I believe taken a copy of the inscription.

Rajim is about 880 feet above Mean Sea Level. Fall from Kalamia 50 feet.

Distance from Chaupen 25 miles and 6 Furlongs.

I halted two days at Rajim, to dispose of some Office work; as this is the last Post office I shall meet until I get to Jaraingpur.

January 19. Rajim to Hopra.

Distance 10 miles 2 Furlongs.

Thermometer 6. a. m. 49°
11. a. m. 75°
4. p. m. 79°

Mean aneroid reading at Hopra 29·23.—

Passed through the town of Rajim and its fine topes; then over some waste land with black soil, the ground full of cracks & fissures.

The country is open: topes, fields and villages are seen in all directions.

The crops are chiefly wheat, Linseed & Gram.

2 miles 2 Furlongs. Village of Chokebandha with gardens, wells, topes and fields; the cattle mostly red.—

The Village of Sindhoro was left half a mile to the right.— Black soil.

4 miles 2 Furlongs. Bohunda, on high

ground, with light soil and some red gravel.
Fields, gardens, tanks and topes.—
The Castor oil plant, sugar cane, tobacco
and garden vegetables are grown.
A Spring Channel (called Dama fúa Nullah)
beyond the Village requires a small bridge, 10'×5'.
There are numerous wells about here,
near the banks of the Pairi River, by means
of which vegetables are cultivated.
The water in the wells is about 8 feet below
the surface.
The Village of Chichond, with a Mango tope
was left a quarter of a mile to the East.
The River Pairi here is very broad and shallow,
has a very gentle fall and inundates the
Country on its right & eastern banks.
In the 6th Mile is a shallow sandy nullah
which is subject to floods from the River,
and requires a waterway of 45'×4'.
6. Miles 2 Furlongs. Khanderá, with
several Mango topes and Extensive Gardens.
In the latter are found chillies, brinjals,
Castor, onions, Garlic, beans, pumkins,
mustard, tobacco, and sundry vegetables.

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soil light loam.
8th mile, Surra, a small Village, with
Gardens, topes and several small tanks.
The soil continues of a light description.
Half a mile beyond the Village a young Mango
tope is being reared.
In the 9th Mile is another and larger
plantation of young Mango trees, which
are protected by basket work fences and
seem well attended to.
10 Miles 2 Furlongs. Kopra, a large
Village with Extensive fields, gardens
and topes, on high ground and light soil.
The Nowgaon Hills and jungles are seen
looming in the distance.
Kopra is nearly the same height as Rajpur
above mean Sea Level.
Distance of Kopra from Raipur 35
miles 7 Furlongs.

January 20. Kopra to Bárua.

Distance 12 miles.
Thermometer 6. a. m. 49°
11. a. m. 82°
4. p. m. 78°
The soil south of Kopra is alternately
black and light; there are large rice fields;

wheat is becoming scarcer; some waste land is seen, and some land lately reclaimed from the Jungle.

At 1½ mile a stream is crossed, called Khós nullah, 10 x 5, with high banks and soft bed.

The route lay along the bank of the Pairi River, which is here broad and shallow, and has very little fall.

At 2½ miles the village of Sursunda with a tope, gardens and wells and numerous Cattle. Sugar cane and plantains are grown.

Here begins Jungle, as yet of a light description; a bank is passed; the Village of Pandukka, where there is a Police station, is left to the East.

I did not go by the handy track to Pandukka, as I wished to keep along the line where the Railway should be made; the handy track crosses a small Khaul near Bárka.

The soil is mostly black and much cut up by cracks, fissures and holes.

Traffic - Several large gangs of Brinjarie bullocks were met, carrying Rice & Wheat Southwards.

In the fourth mile a Tank.

Then the Village of Kaulna (4 Miles 1 Furlong). Some light Jungle about here, and sand stone Rock is seen cropping out.

In the 5th mile begins the regular Jungle again, and gradually becomes denser.

A small stream is crossed, 9 x 4, with good banks & hard bed, a tributary of the Pairi River. — Soil light.

At 5½ miles occurs a large plantation of Sugar cane, on the river's bank. Near this a stream, flowing into the Pairi, 25' wide and 8' deep in flood, with steep banks and a good hard crossing.

Here the Gneiss formation begins again; no more lime stone rock or sand stone; much Gneiss rock is seen cropping out; Kunkur nodules lying on the Surface; there are some patches of cultivation in the Jungle.

At the 6th mile are large rice fields on rather high ground in the Jungle, tolerably cultivated without visible means of Irrigation; by rain water most likely, as the wet weather; they are now dry.

6. miles 4 Furlongs; the Village of Rágda.

Some rice fields. Thin scrub jungle all round. Light clayey soil with sand. Some laterite is seen cropping out; but the prevailing rock is gneiss.

In the 8th mile much rock occurs along the bank of the River, and the jungle becomes very dense.

A few patches of swampy soil are met with, roughly cultivated. The route continues along the river's bank; the soil is alternately stony and swampy; some high rocky ground to the left. Jungle dense.

9th mile; a nullah, 12 x 5, with steep banks and soft crossings; close by 2 smaller nullahs 7 x 4 each; another 9 x 4, and a fifth 12 x 5; the last four with stony crossings.

9 miles 3 furlongs, Pákpúr, the site of a deserted village, belonging to Bárha; a few huts are left standing; there are very few signs of cultivation about; the place looks an unmitigated wilderness.

10th 9½ miles, two small nullahs close together, each 9 x 4; the ground here is broken, and the soil stony and rocky, the jungle dense, the grass high.

The rocky hill side rises from the bed of the river, and some hill side cutting for about a mile would here be required for the road.

11th Mile, a nullah, in a swamp, 25 x 6. Banks ill defined; bed sandy.

12th Mile. Bárha; a small village in a jungle clearing: a swamp partly cultivated, surrounded by rocky hills well wooded.

Mean aneroid reading at Bárha 29·21. — approximate height above mean sea level 900 feet. — Rise from Hapra about 40 feet. — Distance of Bárha from Gaulpur 10 miles 7 furlongs.

January 21. Bárha to Dongsiga.

Distance 9½ miles

Thermometer 6 a.m. 43°
11 a.m. 80°
4 p.m. 80°

The rough hilly track, such as it is, leads from here over some gently rising flat ground, with hilly jungle on both sides, which offers no obstacles to road or railway.

Some rude hill cultivation and a swamp on sloping ground is met.

The low hill ridges accompanying the track on either side are well wooded; the

~~the~~ Soil is hard and gravelly; much nodular Kunkur lime stone lies about on the surface. A little further on the track ~~The track~~ leads for some distance along the slope of the ridge on the left, from which much drainage descends, that crosses the road and will require a culvert, 3' to 4' square, per furlong. There is not much rock here; what there is is Gneiss decomposed on the surface, and conglomerate.

Near the end of the 2nd mile the line runs close to the bank of the Paisi River which is here shallow and broad, with but little fall, and even flows its banks.

2 miles 1 Furlong. Stream 10'×4' low banks and sandy bed. The track is cleared of jungle to a width of 15 to 20 yards, and the surface has been roughly improved for Cart traffic in the dry weather.

At 2½ miles, two streams, not far apart, each 10'×4'.

At 3½ miles a large clearing in the jungle with some cultivation. Not far from this is the village of Kanta, on the other side of the River.

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Kadobatar lies to the left, with a Tank and extensive rice fields.

4 miles 5 Furlongs. Village of Dralga, situated on the hill side somewhat above the general level of the Country.

5½ mile; cross the Paisi River, here 1530 feet wide. The bed is sandy and there is no rock visible. The northern bank is not well defined, low and subject to inundation during floods; the Southern bank is steep and rises 12' above the bed.

The high floods are said in some years to rise 6 to 8 feet above this bank and to submerge the Country up to the Village of Majerkatta which is at 6 miles 1 Furlong. On the Southern bank of the River the jungle is largely cleared, some apparently quite lately, and the ground is well cultivated. The Village of Chikli is left on the right.

Rice, Sugarcane, Bengal Gram, linseed, Castor oil and tobacco, besides vegetables, are grown; Wheat is no longer met.

The soil is mostly black. A small tank (Bhandhar Bula) is near the track.

Some sheet rock (gneiss) appears above the surface.

7 miles 1 furlong. Village of Amdi, with some cultivated fields; then jungle again; the country here is quite flat.

At 7½ miles a small nullah, 12'x 5'.

7 miles 6 furlongs 142 yards; a larger nullah 55 feet wide, with low perpendicular banks, 4' high, which are said to be covered by extraordinary floods to a further depth of 3 feet. The water may required to be provided to pass such floods is more than twice that contained between the banks.

8th mile. The Village of Paraga, where the Manager of the Nowgarh Estate lives; the young Rajah, a minor, being in school at Raipur. There is a Police station at Paraga. Some good gardens are here; an avenue of young mango trees has been planted and is taken care of.

From Paraga to Nowgarh, a distance of 15 miles, there is uninterrupted Jungle, without a single village. The villages that once existed have been deserted.

A swamp is met near Paraga; then the Jungle begins, through which a track has been

cleared 15 to 20 yards wide, and the surface has been improved for cart traffic.

There is much chert rock about (gneiss) and some conglomerate, called kharri in Hindustani.

8 miles 5 furlongs. A shallow nullah, 20'x 4', with low banks and sandy bed.

9 miles 3 furlongs 105 yards; Dongriga, the site of a deserted village, near the Bámni Déwi Rock (which looks like a ruined castle). There are no traces of cultivation left, the jungle grows all round the place which is said to have been deserted by the villagers on account of the numerous wild animals about here.

The mean Aneroid reading at Dongriga is 29·04'.

Approximate height above mean sea Level. 1060' 1130'

Rise from Barka 160 feet.

Distance of Dongriga from Raipur 57 miles 3 furlongs

January 22. Dongriga to Nawagarh.

Distance 13 miles 1 furlong.

Thermometer 6. a. m. 46°7
11. a. m. 86°
4. P. m. 80°

On the first furlong the Dongiya Nullah is crossed, 35' wide and 7' deep in flood; with a sandy bed, but rock for foundations near; the banks are about 5 feet high and well defined; they are flooded in the rains.

The track through the jungle continues to be cleared to a width of from 15 to 20 yards, and is made passable for Carts. The soil is alternately swampy and stony, and embankments will be required in several places. The **ground** level is slightly undulating; the drainage ordinary, mostly from left to right. The jungle is small but dense; there is no large timber on the first mile.

1st Mile; a shallow stream, 12 x 3.

at 1 m. 3 f. 146 y. Pirnai nallah; a Stream 35 wide at bottom and 5 deep, with low banks, sloping at 1 in 20, and sandy bed; no rock. There are some tall forest trees here in the jungle, matti (Sája) and Sál (Sarái) predominating. Some rock is seen near the surface, chiefly gneiss; much quartz is lying about in fragments.

The soil is, alternately, hard and gravelly, then sandy or clayey loam.

Much tall young timber, chiefly Sál: fine straight poles.

1 Mile 7 Furlongs; a stream 9 x 3.

Ground undulating.

2 miles 6 Furlongs 56 yards. Bagai nalla, a stream 35 feet wide with irregular, sloping banks and sandy bed; Rock for foundation near at hand; the rock is a kind of decayed gneiss called "Dorra pathar"

Then some rising ground and stony soil.

3 Miles 1 Furlong. a small drainage channel 6 x 4, flowing to the left.

In the same mile there are several more small drainages like the above, all leading from right to left.

There is no cultivation here; all jungle and tall grass, upon a hard but fertile soil. Ample space for agricultural operations.

4 miles 1 Furlong 60 yards; Aneroid reading 29.86. Kórókardi Nullah, a shallow stream with low irregular banks and sandy bed;

Probable section in flood 25×3.

There was a village of Kórohardi here, some twenty years ago, which, the people say, has been deserted on account of the depredations of wild animals.

The ground continues to rise gently; the jungle is tall, with little underwood, but high grass; the soil is hard and gravelly.— Further on the ground undulates again, and some hill-side cutting will be required for the road; but not much. Good matti timber is abundant.

In the 5th mile is the Mogai nullah, draining to the right, and measuring 16×4.

The jungle here is hilly and stony, and the ground irregular. The track leads over the Vettali ghaut a small ascent, about 120 feet in perpendicular height.

The track is taken straight up the hillside, while the new road or railway should keep lower either to the right or left where there is enough room for a gradient of 1 in 100.

Much Quartz is lying about the surface; reefs of it, and large veins in the Gneiss rock occur in several places about here.

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5 miles 5 Furlongs 187 yards. Head of the Vettali ghaut.

Aneroid reading 28·93. From here the track descends again; but, as before stated, the Railway need not be taken up so high as this.

Further on the ground becomes flat again, only now and then gently undulating.

Some grassy plots — pretty glades — are seen here and there in the Jungle; they are swampy in the rains, I suspect.

7 miles 4 Furlongs 92 yards. Near the deserted village site of Jóba; many patches of grassy swamp, now dry.

Aneroid 28·97.

8th mile; a Nullah draining to the right, 5×3; black soil. — Then some gently rising ground.

8 miles 4 Furlongs; a Nullah, 6×4 in stony soil.

9 miles 1 Furlong 172 yards. Summit of low rise. Descent very gradual from here; the cleared track through the Jungle continues, but only 10 yards wide; the surface improvements become poorer. —

Some broken and irregular ground; stony; a small drainage culvert required 3' square; another 7×3.

Aneroid 29·03 Thermometer 72°

10 miles 1 Furlong 152 yards. Forest Nullah,

15 miles 4 furlongs deep, in a soft soil, with steep banks; no rock. Much young sál wood grows here: Good straight poles, 50 high and 1 in diameter

The Jungle consists largely of sál; there are also many Matti trees. No Bamboo is seen about here.

Aneroid 29·01
Thermometer 80°

11 miles 2 furlongs 170 yards. Kósani Nullah 20 x 4; sandy bed; but rock for foundations at hand.

11 miles 5 furlongs a Nullah 12 x 5, in a swamp. Then again good, hard soil. Some undulating ground, involving cuttings and embankments, and occasional hill-side cutting; but only on a small scale.

Aneroid 28·97
Thermometer 84°

12 miles 5 furlongs 110 yards. Halpalli Nullah, 25 x 7; sandy bed; steep banks; rock for foundations.

Here the track to Khusmi branches off to the South West. — Much sheet rock (Gneiss) cropping out between this and Nawagarh.

11·30 a.m.
Aneroid 28·96
Thermometer 83°

13 miles 1 furlong 28 yards. Nawagarh, a small village containing about 40 mud huts, besides the Zamindar's buildings (which are also of mud, timber and thatch) situated at the foot of a rocky hill which has a

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temple. The Village and its fields are placed in a confined, ill ventilated space, on irregular ground, with rocks and swamps about, and 3 or 4 stagnant tanks. —

There is no need for bringing the Railway to Nawagarh; it can be taken over lower and better ground between this and the Sandur, some 4 or 5 miles West of Nawagarh; or better still, entirely along the River, i.e.; within half a mile or so, of the bank.

January 23. Halted at Nawagarh, and despatched my camp ahead to Baltema which is on the Sandur River.

The mean reading of the aneroid Battery at Nawagarh is 28·82; approximate height above mean sea Level, 1335'.

Rise from Dongriga 275 feet.

Distance of Nawagarh from Raipur, 70 miles 4 Furlongs.

January 24. Nawagarh to Baltema.

Distance 10 miles 6 Furlongs 131 Yards.

Thermometer 6 a.m. - 57°
4 a.m. - 78°
4 p.m. - 82°

Returned to the Halpalli Nullah, where

the track to Kusmi branches off.

From here the ground becomes somewhat irregular, and the jungle is pretty dense; the soil as a rule is light and sandy, rather stony, occasionally rocky; the drainage is of an ordinary description and runs from left to right. The track leads up and down, but mostly up-hill at easy gradients. Some hill-side cutting would be required, but not much.

detached sheet 28/9/94

At 1 mile 2 furlongs 165 yards, the Summit level of the rise is reached.

1 mile 4 furlongs; Murgi Nullah, 15'x4'. Much young sal wood and high grass.

2 miles 1 furlong 160 yards, Sirgi Nullah, 15'x7'; the same that was crossed on the 22nd at a lower part of its course.

Here is an abundance of Quartz, white, purple and black, scattered about the surface. The soil is hard and gravelly.

Both the Murgi and Sirgi Nullahs flow from left to right, have steep banks, a rapid fall and sandy beds and pebble stones.

2 miles 6 furlongs 80 yards; a clear spot in

the jungle, somewhat swampy; the site of the deserted village of Bardul, said to have been left by the people 10 years ago, on account of the numerous wild animals about. But this is scarcely a satisfactory Explanation: there must be some other Cause for this and other villages in these parts being deserted. Not a vestige of a house remains at Bardul, and scarcely any sign of cultivation, except the jungle clearing. The ground here is no longer hilly, but flat.

3 miles 5 furlongs 120 yards, Sirgi Nullah 60 wide at bottom, 8' deep; bed sandy, with gravel and loose stones. Banks high, and sloping at an angle of about 45°. The soil here is light sandy loam, on which grows the ordinary jungle and some tall grass. The track has been cleared of trees and bushes, 5 to 6 yards wide, and is passable for carts.

In the 4th mile is a large area of deserted fields in the jungle which have apparently not been cultivated for some years: this belongs to the Village of Kusmi.

4 miles 2 furlongs 190 yards. Kusmi Nullah

6' x 8'; of the same size and nature as the Sattagat Nullah in the 4th mile.

4 miles 4 furlongs, a small drainage channel, 6' x 2'.

A Temple of Máta Déwi, i.e., a mud and thatch hut, surrounded by wooden palisades as a protection against intruders, both men and animals.

Then another small streamlet, 6' x 2'.

5th Mile. Village of Kusmi, consisting of about 25 huts, containing 60 people; in a large Jungle clearing, with extensive wet fields on rich soil; a small tope and a good herd of Cattle.

Then Jungle again, at first light scrub, then dense with young Sál and some Matti trees.

Soil, light sandy loam; a few masses of gneiss rock showing above the surface.

On the left, about a mile off, is a hill, marked on the Map 2366 feet high, or about a thousand feet above this village.

Between this and the 7th mile 4 larger culverts are required, averaging 5' x 3'.

7 miles 6 furlongs, Village of Bonga;

6 huts in a small jungle clearing, enclosed by palisades as a protection against wild animals.

Very little cultivation, although the soil is good. There are signs of Sámbhur, Bison and wild pig about.—

Next to the Village is a swampy glade: a grass plot in the Jungle, on black soil which will be difficult to pass in the Rains.

2 Furlongs further a track, i.e., a foot path branches off to the right, leading to a massive of young Sál forest 10 to 15 years old with tall grass.

The path we follow is very slender, sometimes scarcely visible; but the grass and brushwood along it have been cleared a little by the party sent on yesterday.

9 miles 2 furlongs. Kalbára Nullah; 15' wide at bottom, 4' deep; banks sloping at an angle of 20°; sandy bed, but rock for foundations at site.

The rock is gneiss (in Hindi Gaunha

All jungle; no cultivation. Ground slightly undulating.

9 miles 6 furlongs 20 yards, Budra Nullah

35 mod, 6' deep; steep banks;
sandy bed; no rock.—
Tall grass, 7 to 10 feet high.—
A swampy glade; then again jungle of
young Sal trees, with scrub & brushwood.
Indeed, for the last 40 miles of this march
the Country has been one uninterrupted jungle,
except at the few miserable villages met.
10 miles 4 furlongs 40 yards. Amrajhori nullah;
25 mod, greatest depth 5'.
One bank high, the other low and flooded; bed
sandy. No rock visible.
10 miles 6 furlongs 131 yards, Baltema;
a wilderness with 8 miserable huts, built
of sticks and thatch, inhabited by about
20 people all told; most of whom had run
away last night at the approach of the advance
Camp; no signs of cultivation to be seen.
Mean of readings of Aneroid Battery at
Baltema, 28·83; nearly the same level as
Nowagarh but little higher say +350'.
Distance of Baltema from Raipur, via Nowagarh,
80 miles 2 furlongs (deducting 1 mile for the
distance, from Sal Balli Nullah to
Nowagarh, travelled over twice). But along

the Sondor River — where the railway should
go instead via Nawagarh — the distance is only
75 miles and 2 furlongs.—
Baltema has a reputation for tigers.
The Manager of the Bindra-Nawagarh
Estate, who was most solicitous for our
welfare, furnished each tent in Camp
and each horse with a Guard of two Jungle
men, to keep the tigers off. Fire-wood was
plentiful, and the Guards slept peacefully,
roasting themselves within a few inches
of the blazing fires — No tiger came.

January 25. Baltema to Tumaribahal.

Distance 12 miles.
Thermometer 6 a.m. 50°
11 a.m. 84°
4 p.m. 84°

Passed through low scrub jungle, with
young Sal trees and tall, thick grass;
over rich, dark soil that must be swampy
in the rains.
In the first half-mile crossed two small
drainage channels, 6' × 3';— the ground in
parts uneven.
1 mile 2 furlongs, Pendra; a village
partly deserted and re-built on another site.

soil: reddish sandy loam with gravel.

Then 3 small nullahs, 5'x3'; the ground still uneven.—

1 mile 6 Furlongs; a small stream, 10'x4', with clear water running in it.

2 miles 2 Furlongs; the present Village of Pendra, in a new clearing.—

2 miles 4 Furlongs; Maria nullah, 10'x3'— uneven and broken ground.—

2 miles 6 Furlongs. Parasá páni nullah, 15'x4'.— Mixed Quartz about here.—

3 miles. —— 70 yards. Sámia nullah, 9'x3'. A little further on, a 3 feet culvert is required.

3 miles 5 Furlongs 42 yards. Pulbhari nullah 25'x4'; perpendicular banks, sandy bed; some rock for foundations near.

3 miles 7 Furlongs. Sarái nullah, 12'x4'— Sal jungle and tall grass.—

Traces of bison, Sámbhur, pig and bear.

4 miles 2 Furlongs 60 yards. Sarr nullah— 20'x5', quite steep banks and rocky bed.—

The track (which is barely visible) here crosses a number of spurs running out from the hills on the left.

4 miles 3 Furlongs, a small drainage channel 4'x2'.— Ground uneven: a succession of spurs; soil hard and stony.

The Railway should keep close to the river's bank.—

A hill covered with fragments of Quartz, near the right bank of the Sandor, about opposite the Village of Dounra which is on the left bank.

4 miles 5 Furlongs 68 yards, small nullah 4'x2'.— The soil is quartz gravel.—

4 miles 7 Furlongs. Chicklá hi nullah 15'x3'; rocky bed. The rock is gneiss, with pebbles and veins of pink quartz, alternating with Conglomerate.

5th mile, small nullah, 8'x3'.

5 miles 2 Furlongs. Gobra, a deserted village; the 10 huts, built of sticks and thatch, remain standing, (The walls are made of sal wood poles placed perpendicularly in the ground; they are 4' high at the sides and 8' up to the ridge pole; sometimes the spaces between the sticks are closed with mud but not always. There is only one opening:

a doorway 7 × 2·) — The people are said to have left about 4 months ago, on account of sickness. No clearing or traces of cultivation near 6 miles 3 furlongs — a 3 feet culvert required. Soil stony: Greatly gneiss and conglomerate

5 miles 7 furlongs 205 yards. Gógar nullah — 8' deep, 60' wide; steep banks; level, sandy bed, with some rocks; a good bridge site is available 2 furlongs higher up the stream which there flows over solid rock between steep, rocky banks.

The jungle about here is dense and looks very wild; there is, besides the trees and bushes, tall coarse grass of two kinds, some with thick round stems, some with long flat leaves; the slender path is barely visible.

6 miles 5 furlongs. Idátipára; site of a deserted village, said to have been left 3 years ago. — Good, fertile soil. —

Here is the boundary of the Nawagarh Estate; we now pass into the Sikúra ilága of the Dhanitola Tahseel. —

The country is flat again, and the

ground even.

At the 7th mile a marshy glade in the Sál jungle. — A little further on the soil is sandy clay with fine gravel. —

Some uneven ground again. —

7 miles 4 furlongs. Two culverts required, 4 × 3. —

Then some sheet rock (gneiss). —

Fine young forest, chiefly Sál. —

8 miles 3 furlongs 110 yards. Barrpára nullah, 10 × 4. — Wild jungle and tall grass. —

In the 9th mile 2 small nullahs, 6 × 3. — Ground flat, sometimes swampy.

9th mile. Múra córa nullah, 10 × 4. — Grand old forest, chiefly of Sál & Matti; but little brush and undergrowth.

10 miles 3 furlongs 170 yards. Junction of Dhour and Londor Rivers.

Cross the Dhour, 100 yards above the junction 65' wide, 9' deep in flood; steep banks; sandy bed; no rock.

10 miles 6 furlongs: Serai: 3 or 4 small huts of sticks and thatch, in a jungle clearing. There are signs that the place has been better inhabited formerly. —

A 4-feet culvert required.

11th mile; Signs of former rice fields in a clearing; soil dark and swampy.

12th mile, Sumaribahal, a small village of a dozen huts, with some gardens and a few rice fields. Castor, pumpkins, beans, hybiscus, chillies, brinjals and tobacco are grown near the huts. Young mango trees have been planted and are fenced in by upright Sal poles, 6" thick and 6' high, being let into the ground and forming a circle round the tree 3' in diameter. This is a very effective protection and gives the young trees enough light, air and moisture.

The village is near the right bank of the Sondor River which is here 150 wide and 16 deep in flood, and has regular and steep banks, and a sandy bed with rock here and there.

A very good encamping ground on the river bank, in an old clearing planted with young mango trees.—

The mean reading of the aneroid

Battery at Sumaribahal is 2866.—
Approximate height above mean sea level 1500 feet.—

Rise from Baltema 150 feet.—

Distance of Sumaribahal from Raipur: 87 miles and 2 furlongs.

January 26. Sumaribahal to Risgaon.

Distance 10 miles 5 furlongs 170 yards.

Thermometer 6. a.m. 48°
11. a.m. 87°
4. P.m. 84°

The track leads along the bank of the Sondor, through stately jungle.

In the 6th furlong, Muidibahal, a deserted village; a few sticks left standing; the people are said to have moved their village to another site.—

1st mile; a few solitary ploughed fields in the jungle. Ground flat; soil light and soft: sandy clay; jungle thin with some clearings and natural grass plots.

A Water Course, 5'x3', in a small swamp, just outside the village of Kasrot.

2 miles 4 Furlongs 152 yards. Kashot; 4 huts containing about 20 inhabitants; a few fields, no gardens.

A blacksmith is in the village.

The people here still speak Chattisgarhi, a dialect of Hindi. — High hills to the left; a peak is marked 2445 on the map.

3 miles. — 100 yards. Kámunkór Nallah, 15' × 4; steep banks, soft bed. — Tall harsh grass; thin forest of Sál. — Ground slightly undulating.

3 miles 2 Furlongs 70 yards. Kanibahár Nallah - 15' × 5. — Soil light sandy clay.

4 miles. — 194 yards. Téldhárigi Nallah, 20' × 5; steep banks; bed hard soil and gravel.

4 miles 4 Furlongs 160 yards. Boropodor Village; 15 huts with 60 inhabitants; rice fields and gardens; some date palms. South of the village the Kalasaree Nallah, 25' × 5, partly dammed up and converted into rice fields. —

5 miles 2 Furlongs 62 yards. Dumnár Nallah, ~~15' × 4, steep banks, soft bed.~~

20' × 5, with clear running water; rocky bed; banks sloping at an angle of 45°. —

Then some undulating ground with young Sál jungle.

5 miles 7 Furlongs. Thurra Nallah - 15' × 5. — Underwood and grass, very thick; no track; some people have to go ahead to clear a path; slow progress. —

Small drainage channel, 6' × 3. —

6 miles 5 Furlongs 210 yards, Dáur Nallah, 12' × 4 — a stony water course, with rocky bed. Somewhat undulating; a high hillock to the left half a mile distant.

7th mile Lúrai Nallah, 8' × 3. — Undulating and stony ground.

7 miles 3 Furlongs 146 yards. Lafúi Nallah, 18' × 5 — with a rocky bed. —

Much Quartz in small fragments about the surface.

7 miles 7 Furlongs. Kissir Nullah, 15' × 4. —

8th mile; a small ploughed field, quite solitary in the jungle.

8 miles 3 Furlongs 100 yards. Kanha,

a small village containing 6 huts with 25 people; some fields and gardens.— The people here speak Ghóndi besides Chattisgurhi. A man addressed me as "Máphábu, instead of Jíhó or Máháraj, as hitherto.

8 miles 6 furlongs 48 yards; cross the Baj Nallah (near its confluence with the Sondor) 50 wide, 9 deep; steep banks, sandy bed, no rock.— Bunjarris with ginzelly seed going to Parvatipur, others with salt coming from Sálúr. The latter said they had been 25 days from Sálúr and would take 10 or 12 days more to reach Dhamtari. (Kisgaon is in the regular trade route from Salur and Parvatipur to Dhumtari & Raipur).

~~The latter said they had been 25 days from Sálúr and would take 10 or 12 days more to reach Dhamtari.~~

~~10 miles 4 furlongs 170 yards. Kisgaon 15 huts with 60 people. Fields, gardens, and a tamarind grove.~~

They go from Kisgaon via Málgáo, Sambra, Dáingúni, Mallari, Sersita, Sipáwa, Sémra, Bisgúsi, Gattegaon, Gutásili, Dádal, Bandaghat, Kodarel, Bonia, Nehsla and Kolari to Dhumtari. But this route is not suitable for a Railway, on account of the irregular ground it passes over.—

10 m 5 f - 170 y. Kisgáon; 15 huts with 60 people. Fields, gardens and a tamarind grove.

~~But this route is not suitable for a Railway on account of the irregular ground it passes over.~~

The camping ground is small and too near the village, also near a swamp; but the headman (or Malcúzar) said the place was healthy.

Mean Reading of Aneroid Battery at Kisgaon 28·53.

~~Approximate~~ height above mean Sea Level 1630.

Rise from Sumaribahal 130.—

Distance of Kisgáon from Raipur 98 miles.

January 27. Kisgaon to Nathgaon.

Distance 8 miles 7 furlongs.

Detached aneroid 28·63.

Thermometer 6 a.m. 44°
11 a.m. 77°
4 P.M. 82°

There had been heavy dew at night, and it was a crisp, cold morning. This day we had to ascend some of the last steps to the Jeypore plateau to which the valley of the Sondor River has been gradually leading up.

The track in the 1st furlong lay through a swamp drained by a nullah, 20×5.

The jungle at starting was light, with some swampy ground in places.

Aneroid 28·61.

At the 1st furlong is the site of the deserted village of Khurandé, said to have been abandoned on account of depredations and exactions committed by the Banjaris.

The sál jungle around is pretty, with occasional grassy glades; there are some young teak trees in the jungle; the soil is light sandy loam, except in the swamps & glades where it is stark, stiff clay. —

2 miles 3 furlongs 205 yards — a small drainage, 6'×3'.

Half a mile further, three more nullahs like the last. The ground is slightly undulating and steadily rising, but gently. — Aneroid 28·57.

3 miles 5 furlongs 117 yards. Pandripáni Nullah, 10'×4'. — Fine tall jungle and forest trees. — Aneroid 28·56.

3 miles 6 furlongs 150 yards. The track crosses the Soroá River, 65' mud & sand-bottom, 10 deep in flood; sandy bed with some rock; one bank low and flooded, the other high and steep.

This River must be crossed by the Railway.

~~Dubong~~ which should keep on the right bank.

4 miles 1 furlong. The site of Gourgáon, a deserted village; the people are said to have left on account of Banjaris, and settled in another place away from the beaten track. — A number of young Mango trees are planted on the site and fenced in by upright sál wood poles, 5 to 6 feet high. The soil is rich clay. — Aneroid 28·57. —

The country here is flat; hills are seen in front & to the right. There are some rice fields belonging to Gourgáon, which have not apparently been cultivated for some time.

4 miles 4 furlongs 145 yards; a deep nullah, 15'×5' — in clayey soil. — Thin low scrub jungle and coarse long grass.

At 5 miles 1 furlong 20 yards, the track crosses the Soroá river again; but the railway would remain on the right bank, as explained supra. Along this right bank the railway should be taken up to Sanrattdé and Dindandi towards Kolápador and Puriyarh. —

Here is fine old forest, with large Matti and sál trees, also some teak. —

The ground is undulating and irregular for some distance; then it becomes flat again. The soil is rich. — Sál jungle continues. At the 7th mile we leave the Central Provinces and enter Jeypore territory. —

Aneroid 28·47. —

A drove of pack bullocks, from Sálúr to Dhanteri, with salt. —

7 miles 4 furlongs; a small drainage to the left, 8'×3'. — Then some undulating ground.

Detached Aneroid 28·39.

8 miles 6 furlongs. a Swamp with Plantain and water and sál. —

8 miles 7 furlongs. Háttgáon, a small village containing 5 huts and about 25 people who are not so miserably poor as in some of the villages met along the route for several days past. There is ~~I hope~~ quite flock of small children, and the headman is building himself and new and roomy hut. — The people here speak Oriya and Ghóndi, the latter a dialect of Chattisgarh Hindi; but they understand Hindustani well enough. — No arrangements had been made here by the Jeypore agency for supplies &c. for the party; and the Manager of the Bindra-Nowagarh

Estate continued to afford his assistance. —

No ghaut, except the Ustule ghaut (on the 22nd) which can be circumvented, has been encountered on this route so far, and no sudden changes of level; the ascents have been gradual and easy, the undulations of the ground but slight: — nothing to constitute an obstacle to the Railway. The gradient need nowhere exceed 1 in 100. — The jungles are magnificent, the soil is good; but villages are few and far between, and the population is exceedingly sparse. There are hundreds of square miles of good forest land in the Bindra-Nowagarh Estate that might be colonized, with advantage alike to the colonists and to the administration. —

The mean Reading of Aneroid Battery at Hattgaon was 28·22. —

Approximate height above mean sea level 1570 1940 feet. —

Rise from Raigaon, 310 feet in 9 miles; or about 1 in 153. 301 150

Distance of Hattgaon from Raipur 107 miles.

January 28. Hattgaon to Raigarh —

Distance 11 Miles —

Detached aneroid at 6·a·m. 28·38

Thermometer at 6·a·m·50°
11·a·m·86°
4·p·m·81°

On leaving the village, the track crosses a swamp and some rice fields; then through light grass and jungle — chiefly sál.
There is a steady ascent which can be eased by keeping along the Golárcia Nullah to the left.

In the first mile we rise about 40 feet, the aneroid at the end of it reading 28·34.
Then come repeated ascents and descents (but not very steep or high) which constitute the Brinjaries call the Paramári ghaut.

At 1 mile 4 furlongs 109 yards, the aneroid reads 28·24; then we descend again; then another rise; then down & up again.
On the last summit (at 2 miles 0 furlongs 57 yards) the aneroid reads 28·23. After ~~After~~ that we go down once more and cross the Kurundádodi Nullah, 10×3, at 2 miles 1 furlong 165 yards. — Then ascend again. —

From here a track branches off to the right to Kodumpúr; there is some rock about. —

At 3 miles 2 furlongs 28 yards, another

summit is reached where the aneroid reads 28·19, shewing a total rise from Kathgaon of 200 feet; from here the track leads steadily downwards. The jungle consists of tall Mattie and sál trees.

At 3 miles 6 furlongs 40 yards, the Mongosarial (or Golárcia) Nullah is met (25'×5') where the aneroid reads 28·27, shewing a rise from Kathgaon of only 100 feet in 3½ miles. This is the Nullah along the banks of which the trace should be taken down to the Jorá River (vide notes on the 27th at 5 miles 1 furlong 20 yards). —

From here begins another gentle ascent, and then come a few slight undulations with two swampy glades draining to the left into the Golárcia; until at 5 miles 6 furlongs we ~~we~~ arrive finally on the Jeypore plateau, and the flat country stretches far away to the South. —

Met 300 pack bullocks, taking salt from Salur to Raipur. —

At the edge of the plateau (aneroid 28·16) there is some denal, young sál jungle,

with a thick undergrowth of stunted dates and other bushes and tall grass, the whole forming a tangle almost impenetrable.— Then begins a long swampy glade, partly cultivated, about half a mile wide, and extending southwards for miles, bordered with sal jungle East and West; the Poragora Hills looming in the distance, where there is said to be good blackwood timber and Iron stone.

6½ mile. Village of Kúrubeera.

Aneroid 28·16— Soil damp—

We are now in the Champaign Country of Jeypore.

7 miles 3 furlongs. Idoliapador, with 20 houses and about 100 inhabitants. The homesteads have large compounds enclosed by fences of upright stakes; these are some vegetable gardens.

The people here speak Uriya.—

The track leads along the Eastern edge of the great swampy glade, through low scrub jungle and young sal.

At 8 miles 6 furlongs 80 yards where the aneroid reads 28·18, the swamp is crossed; the Country Continues flat, while swamps and jungle occur alternately along the track.

The soil gradually becomes lighter and sandier, as we get away from the large swamp.

At the 11½ mile Raigark, with a fine mango tope, good encamping ground and the remains of an old mud fort.

Here are about 40 houses containing 150 people: all Hindús, no Mussulmáns or Gónds.—

The detached aneroid reads 28·16; while the mean reading of the Battery is 27·98.

Approximate height above mean Sea Level 2175. Rise from Kathgaon 235 feet.

Distance of Raigark from Raipur 118 miles.

The Manager of the Bindra-Nowagarh Estate, who had accompanied the party up to this and made himself very useful, returned from here.

The Admin of Omarkot was here to look after supplies &c.—

Halted at Raigark on the 29th.

January 30. Raigark to Bóira.

Distance 11 miles 4 furlongs.

Thermometer 6. a. m. 55° F
11. a. m. 81°
4. P. m. 83°

Near the village a tank bund is crossed or rather a dammed up swamp; then begins the jungle again. There is a well trodden track; the soil is hard brown loam, with laterite cropping out in places; also some gneiss rock. — Then jungle and swamp, the latter cultivated in places, alternate. The jungle is chiefly sál; some of the swamps must be nearly impassable in the rainy season.

At 3 miles 2 furlongs, the site of Kúmli, now deserted. The villagers are stated to have moved to another spot on account of the Bhíl jungli trouble along the track troubling them. Here is a tank which is said to be never dry, and a temple to the Goddess Máta. There is a large swamp near, which has been cultivated. — Then jungle again: young sál and scrub. —

In the 5th mile we pass into a fine forest of old and young trees, chiefly matti and sál, with some black-wood

and ségi, and very little underwood.

The forest continues for miles, interrupted here and there by grassy glades, which are swampy in the rains.

The soil is fertile and the lay of the ground easy for a road. The track leads for several miles through beautiful forest over level ground, on a water shed, and encounters very little drainage.

Here is some of the finest forest I have seen on this expedition; it has apparently never been touched by the hand of man, and might be called primeval.

In the 7th mile the ground is slightly undulating: the soil in the lower parts is rich dark clay, on the higher ground light brown and sandy.

In the 10th mile the ground descends gently towards Béra; the soil is sandy loam.

At 10 miles 4 furlongs, we emerge from the great forest and enter small jungle.

At 10 miles 6 furlongs. is a large clearing where the village of Béra formerly was.

The people are said to have shifted to another site, not far from this, some

years ago, when the Police was first introduced here. There are extensive rice fields; a ledge of gneiss rocks shews above the surface in two places.

11 miles 4 Furlongs; Béra has about 15 huts and 50 inhabitants. It is situated near the Tél Nadi which is here 40 wide and 8' deep between the steep and soft banks; subject to floods which inundate the swamps on both sides.

The drainage encountered on this days march was very little, as the track led for the most part along the ridge of a low water shed, from which the country falls away in scarcely perceptible slopes to the right and left.—

All glades and swamps, along which the drainage runs, will of course require embankments, with culverts or small bridges.—

There is a good encamping ground on the old site of Béra, and a smaller one on the bank of the Tél Nadi, in a loop formed by the River by the side of the track.—

The Mean reading of the aneroid Battery

at Béra is 28·15.—

Approximate height above Mean Sea Level 1968 feet.—Fall from Raipur 165. 12.

Distance of Béra from Raipur 129 miles 4 F.

January 31. Béra to Omarkote.

Distance 7 miles 4 Furlongs.

Thermometer 6. a.m. 48°
11. a.m. 77°
4. p.m. 81°

In the 1st Furlong the Tél Nadi is crossed, 40'×8' between the banks, which are subject to floods for some distance, to a further depth of about 3 feet.

Then jungle and high grass; some rising ground; a drainage channel flowing to the left, about 4'×2'.—

At the 5th Furlong is the Summit of the rising ground, about 12 feet above the starting point; then two small nullahs, 5'×3'.—

Stately primeval forest of grand old trees; dead trunks are lying about where they fell years ago, some quite decayed, apparently never touched by man.

Ground slightly undulating.—

At 2 miles 2 Furlongs, a glade draining

to the left. Embankment required, with a culvert, 6'x 3'.—

3 miles 1 furlong; Búrja: two small villages containing together about 50 houses and 150 people. The large farm yards are fenced in with palisades as a protection.

South of the village, Common Jungle as this no longer the fine old forest.—

At 3 miles 5 furlongs, a large swamp, more than a square mile in area; partly bunded up and converted into a tank, with extensive fields under it belonging to Búrja.

The tank might be improved and Irrigation extended.— From this swamp flows a nullah called Bascelí.—

Then thin scrub Jungle, on light sandy loam.—

At the 4th mile another swamp and a clearing in the Jungle; then low scrub Jungle again.—

5 miles 3 furlongs, a clearing and swamp; then light Jungle with some fields;

then a ploughed swamp.—

It is mostly good, rich soil between Béra and Omarkote, classed as No. 1 by the Revenue Surveyors.

7 miles 3 furlongs. Baskel Nullah; steep banks; hard bed; No rock; 40' wide between the banks, which are 8' high and covered during great floods to a further depth of 3 feet, for some distance.

7 miles 4 furlongs. Omarkót; a considerable village with a Police station, and the headquarters of an Amín.— Here I met Mr Cormac who had marched from Raipur via Dhamteri and Kánker.

His own report on his reconnoissance accompanies these notes.—

Mean Reading of Aneroid Battery 28·12.—

Approximate height above mean sea level 2040.—

Rise from Béra 30—

Distance of Omarkót from Raipur via Rájim and Sáttgáon 137 miles; via Dhamteri and Kánker 150 miles.—

Good camping ground in tope; good water from the Baskel Nullah.—

Halted at Ómorkót on the 1st February.—

February 2. Ómorkót to Bíjapúr

Distance 12 miles 4 Furlongs.

Thermometer 6. a. m. 52°
11 a. m. 86°
4. P. m. 79°

The track enters the jungle at once; there is some rock; the soil is light sandy loam.—

In the 2nd mile the village of Dongéigura; meets a small irrigation channel, called Jhóra pani.—

At the 3rd mile a swamp, with some cultivation; rich dark soil all around.

4 Miles 1 Furlong the village of Sána Borundi; then across a swamp, past a newly planted Mango tope.—

Then a tank near the village of Bóro Borundi—

5 Miles 1 Furlong Bóro Borundi, with some vegetable gardens, and a wooden temple (i.e. merely a rude frame work) to the Goddess Bhíma (Kali?)

There is also a sacred Swing, with numerous sharp nails driven through

the seat from below; on these nails good and holy persons are said to be able to sit without injury, and some do so at great festivals. But none of my people would try it.

6 miles 3 Furlongs 124 yards. Nági River; steep banks and gravelly bed; no rock; 80 wide and 15' deep. This River should be bridged a mile to the East of the present track, to avoid crossing twice as the track does.

Some laterite cropping out here.

7th mile, Dodra village. Fine tope and 2 tanks. Extensive rice fields.

Numerous Cattle.—

Then light jungle and clearings alternately.—

9 miles 4 Furlongs, Village of Selargáon.—

Then a swamp.

Further on the ground is gently undulating.—

10th mile; the village of Bolkera to the right.—

Scrub jungle.— another swamp.—

Then small soil Jungle.—

11 miles 6 Furlongs, Chattagura village.—

Then some low swampy ground.—

11 miles 3 Furlongs; cross the Chittrangi River, 45'x12'; in soft sandy soil. — Then a swamp again.

12 miles 4 Furlongs; Bijapúr, with a splendid old tope of different kinds of trees, but chiefly Mango and Fig.

The village is very insignificant now, but Bijapúr is said to have been once a great place and the residence of a Rajah. —

Mean Reading of Aneroid Battery 28.14. —

Approximate height above Mean Sea Level 2020

Fall from Omerkot 26.

Distance of Bijapur from Roopur 149 miles 7.

February 3. Bijapur to Dabgáon

Distance 10 miles 6 Furlongs.

Thermometer 6. A.M. 52°
11. A.M. 76°
4. P.M. 77°

We enter sál Jungle; at 1 mile 4 Furlongs cross a swamp; then sál Jungle again, with occasional glades, each glade or swamp requiring an embankment and one or more culverts. The soil varies from dark, stiff clay to light, sandy loam, with red soil

and gravel here and there.

In the 4th mile a large swamp, partly banded up for cultivation.

4 miles 2 Furlongs; passed the Village of Nakjor.

At 5 miles 2 Furlongs, a swamp, with a drainage requiring a culvert 9'x6'. —

All small sál Jungle. —

6 miles 3 Furlongs, Bel Giri Nullah, 35'x15'. Steep soft banks; sandy bed; no rock.

7 miles 4 Furlongs, a swamp about 100 yards. From here a path is cleared through the Jungle, 8 to 10 yards wide, the surface has been smoothed, and side drains cut. —

Fine sál forest again. —

Then some undulating ground, where cuttings and embankments will be wanted; but nothing on a large scale. —

A Nullah, 9'x3'. —

8 miles 3 Furlongs, a swamp with soft black mud. —

Then jungle again. Soil sandy loam. —

9 miles 4 Furlongs, a deep swamp, where a considerable embankment and bridge,

20 x 10, will be wanted to let the drainage pass through.

10 miles 6 furlongs, Dabgaon; with 30 houses and 100 inhabitants; a Police station good encamping ground in a mango tope. Water fair.—

Mean reading of aneroid Battery, 28·12.—
Approximate height above mean sea level 2040'.— Rise from Bijapur about 20 feet.—

Distance of Dabgáon from Pujpur 160 miles 3 furlongs.—

February 4. Dabgáon to Páperhandi.

Distance 11 miles

Thermometer 6. a.m. 51°
11. a.m. 75°
4. P.m. 77°

3 furlongs 106 yards. Ongi nullah, 60' x 14'- both banks subject to flooding; sandy sides and bed; no rock.

A rude foot bridge, well above high water, has been provided for this and some other large nullahs.—

All jungle.—

2nd Mile. Village of Moindiri, on somewhat irregular ground; large rice fields

Other crops: Gram, ragi, mustard, Castor, tobacco, and garden vegetables.

Then a swamp requiring an embankment with a culvert 10' x 4'.—

Sal forest again.—

3½ Mile, a drain 5' x 3, required.

4th Mile, some undulating ground.

5 miles 2 furlongs. Bárigunda village.—

Then Jungle again.—

6 miles 6 furlongs. Settabahal village.—

Then a swamp.—

7 miles 1 furlong 43 yards. Básini Nullah, 90 wide and 12 deep; sandy bed; low defined, soft banks; no rock.

A temporary foot bridge is laid from bank to bank.—

In the 8th Mile, a swamp; drain 10' x 5' required.—

Then some rising ground.—

All sal jungle.— Good medium sail, classed as No 2 by the Revenue surveyors.

10 miles 6 furlongs. Siri Nullah, 90 wide, 12' deep. Sandy bed; low, soft banks, flooded; no rock.—

Then cross a swamp, 400 yards wide.

11th Mile - Paparhandi; about 100 houses and 400 people. —

Fine tope for Camping; good water from Siri Nullah. Magnificent old banyan trees with far spreading branches supported by numerous root pillars.

An old fort, overgrown with jungle. —

A fine Temple of Siva, built of stone resembling chunar sand stone. —

a fair is held here weekly. —

There are some sugar mills at work. —

The Sub-Magistrate of Nowrungpur came here to meet the party. —

Mean reading of Aneroid Battery 28·21. —

Approximate Height above Mean Sea Level 1950. — Fall from Dabgaon 90. —

Distance of Paperhandi from Raipur, 171 Miles 3 Furlongs.

February 5. Paperhandi to Nowrungpur

Distance 8 miles 1 Furlong.

Thermometer 6. a. m. 52°
11. a. m. 72°
4. p. m. 78°

From Paperhandi I detached a small

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party this morning, to go up the valley of the Indrawatty and then up the Golagad River to Maribata; to ascertain by the aneroid the height of the saddle between the sources of the Galahad and Rayagada Rivers; as this valley would seem to offer a favorable line for connecting Rayagada with Paperhandy and for ascending the Jeypore plateau from the poorest place, by an easy ~~practicable~~ ~~without a regular~~ ghaut. —

The long promised Revenue subordinate, in the person of N. Pani Grahi, Head clerk, special assistant agent's office, Kharaput, joined the party here at last. —

The track leads through fine tall jungle, and then crosses a swamp where a masonry drain, 10 ft + 5 ft is required. After that the ground rises slightly and the soil becomes red. —

1 mile 4 Furlongs, another swamp; drain 10 ft + 5 required. —

Another stretch of jungle on rising ground, and then a swamp again. —

Then a long gentle rise, and descent

6 Swamps. —

2 miles 6 Furlongs; a long winding swamp, cultivated. Scrub jungle all round.

3d mile; Giuntát Rias, 60 x 14.
Soft bed and banks.
In the 4th mile a swamp, with rising ground and Jungle on both sides;
a similar one in the 5th, and another in the 6th mile.

7th mile; Village of Magiguda, with a good many tope. —
Some Cultivation. —

From here a fine avenue, consisting of a treble row of Mango trees, about 50 years old, leads to Nowrungpúr.

8 miles 1 Furlong; Nowrungpúr, with a Sub Magistrate's office Court, a Mulkhi Post office and a Police station; the Jeypore Rajah's Amin also lives here, who politely came out on an Elephant some miles, to meet me.
Nowrungpúr Contains some 650 houses,

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with from 3 to 4000 inhabitants.
It has 4 tanks and some fine topes.
There are Carpenters, blacksmiths and Weavers here. Tasar Silk is made, also lacquered ware and glass bangles.
The mean aneroid reading is 28·24. —
Approximate height above mean sea level, about 1900 feet. —
Fall from Paperhandy 50 feet. —
Distance of Nowrungpur from Raipur, Raipur and Kattagáon, 179 miles 6 Furlongs.
The Jeypore Rajah's Dewan at Nowrungpur was very obliging, and afforded all necessary assistance to the party.

Camp Nowrungpur
10th February 1882

R. F. Nordmann
Executive Engineer
on special Duty

Encls: A

Extract from Secr: Engineers

Notes of Reconnoissance

from Raipur to Naorangpur

viâ Rajim and

Kathgáon

B

Extract from Secr: Engineer's

Notes of Reconnoissance

from Naorangpur to Koraput –

viâ Borigumma and the old Mádeopulli Ghaut –

38 miles. – February 13th to 16th 1882.

Mas –

February 13. – Naorangpúr to Porli

Distance 8 miles 6 furlongs

Thermom^r 6 a.m. 61°

11 a.m. 83°

4 p.m. 86°

After passing Southwards through the town of Naorangpur, extensive rice fields were crossed; then some jungle consisting chiefly of mango trees; then another expanse of paddy flats.

In the 1st mile is Barabankeri, a small village.

At 1 mile 4 furlongs a nullah, 25' × 8'; with muddy banks and bed. The prevailing soil is red dish loam, and there is some laterite showing above the surface. At 1 mile 6 furlongs the north

Northern bank of the Irawaddi is reached; the bank is soft and steep, the bed sandy. There was from 2 to 3 feet of water in the River which has a lively current. The water to be crossed was 220' wide, while the river in flood is 465' wide and 24' deep in the deepest part; the highest floods, which overtop the banks, are said to add 4 feet more to that depth. A ferry is here, Consisting of a platform resting on three canoes.

Then follows some light jungle with patches of dry cultivation, Bengal gram, dholl, tobacco &c; then more rice fields — Soil sandy loam. — A Nullah, 10'×6'; then paddy fields. The soil on the higher ground is brown clay.

In the 3d mile jungle again; the ground rises; prevailing soil Laterite

gravel.

At 3 miles 6 furlongs, the summit of the rising ground is reached; after that there is a gentle slope down to a rice flat at the 4th mile. From here the ground continues level for some distance; another swamp is crossed at 4 miles 6 furlongs then comes a short rise; the jungle continues.

At 5 miles 3 furlongs we are again on a summit, about 50 feet above the last swamp. The jungle is here Consists of small scrub; soil red gravel.

At the 6th mile a small water course, 7'×3', is crossed.

Then a descent to a narrow swamp and rising ground again on the other side jungle continues.

At 6 miles 6 furlongs the track once more reaches a summit, this time on the shoulder of a small hill. The soil here is brown clay, the jungle light.

Then begins a descent.

Near the 8th mile the track crosses a paddy flat.

At 8 miles 5 furlongs, the village of Porlé is reached, containing about 30 houses and 120 people. Paddy and several kinds of gram, besides garden produce, are cultivated here. There is a good encamping site, well shaded, on the high ground north of the swamp adjoining the village; but the drinking water is of indifferent quality. —

Mean Reading of Aneroid Battery at Porlé 28.18. — Approximate height above M. S. L. 1850'. — Fall from Sarangpur about 60' —

Distance of Porlé from Raipur, 188 miles 2 furlongs. —

February 14. Porlé to Pupagaon

Distance 8 miles 6 furlongs

Thermom. 6 a.m. 62°

11 a.m. 84°

Thermom. 4 p.m. 87°

Marched over a cultivated swamp through which a stream flows, 30 × 10', with steep soft banks; then over rising ground; after which jungle and and swamp occur alternately. The soil on the higher grounds is sandy loam, in the swamps stiff dark clay. —

In the 2nd mile some undulating ground a long glade to the left, extending North and South and indicating the direction of the future railway.

2 miles 2 furlongs; village of Kondra, with a fine mango tope and wet fields.

3 miles 1 furlong; Dekmitla, with a tope.

4th mile Bórigúma, with upwards of 100 houses; a travellers bungalow, built of mud walls, with a thatched roof. —

There is a temple with some old tanks about a mile West of Borigúma near Gondagunda. The temple is dedicated to Pátálesworo (Síva) and contains some very ancient carvings, amongst them a fine

figure of Bhoiraman, the husband of Kali. It is said that a large town stood here in remote times.

4 miles 6 furlongs, village of Dullagunta. Beyond, swamp and jungle. Soil heavy clay.

Then a small ascent, followed by a fall of the ground, and a narrow swamp. At 5 miles 6 furlongs 130 yards the foot of another gentle ascent; then some undulating ground.

7 miles 1 furlong, on the summit of the sloping ground near Chattola village; a tope.

Then down to a swamp, and up rising ground again, beyond. — This is the general character of the country about here: low ridges with easy slopes clad with jungle and forest, alternating with swampy flats partly cultivated.

8 miles 6 furlongs Pupagaon, a middle-sized village. There is much quartz about here. Fine encamping ground on a high site west of the road, but the water obtained from the tanks is indifferent. Wells could easily be dug in the lower ground where the water is not far below the surface.

Mean Reading of Aneroid Battery 28.09. Height above M. S. L. 1900 — Rise from Poole 100 — Distance of Pupagaon from Raipur 197 miles.

February 15. Pupagaon to Ramgarh.

Distance 7 miles

Thermos 8 a.m. 65°

11 a.m. 80°

4 p.m. 86°

The road leads through light jungle, over stiff brown clay; ground slightly rising.

At 1 mile, the summit of the ascent is reached, about 40 feet above the starting point. There are patches of dry cultivation, chiefly red and black gram, in the jungle.

Then comes a downward slope (and at the foot of it a small swamp converted into fields. Thence rise again.

In the 2d mile is the village of Kumhárput, with some wet and dry fields, and many Mhowa trees around it.

The Kendu tree (= Telugu Tumica) is found here, on the fruit of which mixed with honey and a kind of white clay the poorer Poroja people live to a great extent in the hot season when they have nothing else to eat.—

Further on, the village of Kebberty with gardens containing dhall, the castor plant, cholum, tobacco, brinjals, plantains &c.

From here the road descends to the Telingiri River, at 2 miles 6 furlongs. The water up present is from a foot to 18 inches in depth, and 90 wide; but during floods it is 180' wide and 12 feet deep. The banks are of soft clay, alternately high and low; the bed is

sandy, but firm.

Near this is Chept-Amb, an old village site, where a weekly fair is held, although there is no village now.

South of the River are rice fields on high sloping ground, not irrigated except by the rain fall direct. Mhowa trees abound in this part.

At 4 miles 3 furlongs, Báripat, with some date palms and fields of gram, dholl, ragi, paddy, wheat and flax.

Iron is made at Nawa Báripat not far from here; but no limestone has yet been found. Soil, dark brown clay—hills on both sides of the road.

Traffic. In two hours this morning I met upwards of a thousand pack bullocks, some carrying salt from Salur to Khattingark, others rice, wheat and Bengal gram from the latter to the former place; again others going empty to Kotpád to buy rice there and sell it at Salur. One gang was returning empty via Kúnkur to Raipur; they had

been engaged in taking recce from Kotepad to Salúp.—

The ground now becomes irregular and in parts rocky; the road is cut out of the hill side; and I saw coolies at road repairs: the first thing of the kind since leaving Kaipur.

At 6 miles 1 furlong, a nullah, 15'x6', is crossed, which flows into the Jelingiri River. There is hilly jungle all around.—

At the 7th mile Ranigar, a small village of 5 or 6 huts, on the high northern bank of the Jelingiri River. Soil red clay.—

Mean Reading of Aneroid Battery, 28.04.—Height above M. S. L. 2200 feet.—Rise from Pupagáon 80 feet.—Distance of Ránigar from Kaipur 204 miles.—

From Pupagáon I despatched Mr Cormac's party to Jeypore, to examine the intervening country and the ghaut leading from Jeypore to Koraput; his report accompanies these papers.

I marched to Ránigar and thence up the old Mádesputti ghaut, which seems to offer fewer obstacles and easier gradients for a railway than other lines. But the railway should not follow the old ghaut too closely, especially in its lower course; the line should rather be taken entirely along the adjoining valley of the Kuradi nullah which offers the most gradual ascent of all available lines.

February 16. Ránigar via Mádesputti to Koraput

Distance 13 miles 4 furlongs

Thermom: 6 a.m. 63°
11 a.m. 87°
4 p.m. 80°

The road crosses the Jelingiri River again, which is here 150' wide and 12' deep in flood, with soft high banks and hard sandy bed. There is rock 200 yards higher up. The low water at present is only a foot in depth and 70' wide. The

railway would not cross here, but keep on the right bank and go up to Palkam, cross the Telingiri above its junction with the Kuradi, and thence up the latter to Kendra, Gelipat and Madeopatti. —

The old ghaut is sometimes cut into the hill side, sometimes it goes along a piece of flat ground on the high river bank, in other places straight up a steep incline. There is jungle the greater part of the way. A number of small hill streams cross the road.

At 1 mile from Kanigar, the road bifurcates, the new one on the right going to Koraput, the old track on the left to Madeopat. A good deal of traffic still passes by this Ghaut, although the greater part goes up the new road to Koraput. —

Near the village of Dagera the track crosses the Telingiri River again. The ground is uneven, the hill side stony; there is good jungle with fine sal and matti trees.

In the first 2½ miles the ascent is 80 feet.

The village of Musapur is passed, and then the Telingiri is crossed again at 2 miles 6 furlongs. The hill sides are partly cultivated, chiefly with castor.

The Bandóra tree grows here, with fine purple flowers. The wood which is very tough is used for ploughs, yokes and buildings.

4 miles 2 furlongs, village of Bandocotra; 10 houses with gardens containing mango and jack trees, plantains &c; in the fields are gram, dry paddy, gingelly, tobacco, flax and castor. The total ascent up to this is 130 feet, i.e., at the rate of 30 feet per mile.

After passing Bandocotra the track leaves the valley of the Telingiri and, leading up a steep ascent, crosses over into the Kuradi valley.

At 5 miles 4 furlongs the total

ascent amounts to 270 feet; i.e., at the rate of about 50 feet per mile from Ránigar.

5th miles 7 furlongs; village of Panasput. The total ascent up to this is 330 feet.—

At the 6th mile is a tank for drinking water, about 150 feet feet square.

Soil red sandy loam, with gravel here and there.— At 6 miles 6 furlongs, a mango grove.

7 miles 4 furlongs; Máderaputta, with 30 houses; tamarind and mango topes. The rise from Ránigar to this is 400 feet, or about 53 feet per mile. We are now on the plateau; there is no jungle, but much dry cultivation.

8 miles 6 furlongs, Muchara village, near the Kuradi stream. A mango tope.— Rise from Máderaputta 20 feet.

9 miles 8 furlongs village of Mastiput, on the bank of the Kuradi. Rise from Muchara, 40 feet.— 623/63

From here the railway should continue to follow up the course of the Kuradi nullah towards Dumriput. The Railway Station for Koraput should be near to Pengagura, 2½ miles East by North of Koraput, which latter is nearly 500 feet above Pengagura.

The Mean Reading of the Aneroid Battery at Mastiput is 27·61.— Height above M.S.L. 2500 – 2450.— Rise from Ránigar 430 feet, or 44 feet per mile. Distance of Mastiput from Raipur, 214 miles.

From Mastiput I went across country, via Chinder to Koraput, a distance of 3½ miles.— Total distance of Koraput from Raipur 217½ miles.— Height above M.S.L. 2900 feet.— The Aneroids in the Battery being graduated only up to 27·50, do not show heights above 2500 feet.

Camp Koraput
18th February 1882

K. F. Nordmann
Executive Engineer
on Special Duty

Route: B

Sketch Engineer's
Notes of
Reconnoissance
from Naoraugpur
to Koraput
via Modeopatta

C

623/64

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Mr Cormac's

Diary of Reconnoissance

From Raipur to Amerkote in Soypore,
via Dhanteri and Kánker.

16th to 31st January 1882.

Distance 150 miles.

Raipur 16th January. 1882.

Left camp at Raipur at 6 a.m. passing through the town along the main road, and emerged from it at a distance of 1 mile 0 fur. 180 yards from camp.

At 1 mile 5 fur. 166 yards the Rajim road branches off to the east.

Passed the rifle range of the native infantry regement stationed at Raipur and the village of Batagaon at 2 miles 5 fur. 166 yards and crossed a stream (20' x 6') with sandy bed, and well defined banks of clay; stream is bridged

At 3 miles 4 fur. 130 yards passed the village of Boreea Khond; here there is a fine tank, surrounded by two rows of large tamarind trees; cultivation now commences, there being a large area here under linseed and wheat.

At 5 miles 3 fur. 200 yards crossed a stream (24' x 8') with clayey bed, and ill defined banks; the country all along is fully cultivated; soil, black clay, full of holes and

At 7 miles 1 fur. 20 yards crossed a stream (60' x 8') with sandy bed, and well defined banks; up to this, all streams are bridged.

At 8 miles 5 fur. 96 yards passed the village of Amdul, the land near which is all under kinsed cultivation.

At 10 miles 2 fur. 200 yards there is a large well, and a good camping ground, but no shade of any sort.

At 11 miles 6 fur. 170 yards crossed an unbridged nullah (50' x 9') with sandy bed, and well defined banks; reaching camp near the village of Kolar at a distance of 11 miles 7 fur. 71 yards from Raipur, good drinking water procurable, but no good spot for camping.

Kolar: 17th January. 1882: Distance from Raipur 11 miles 7 fur. 71 yards.

Left Kolar at 6 a.m., passing through country fully cultivated, and crossed a stream (48' x 8') at 1 mile 1 fur. 140 yards from camp.

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Passed the village of Korpa at 1 mile 5 fur. 40 yards, Batagaon at 2 miles 3 fur. 200 yards, Rukkee at 3 miles 7 fur. 190 yards and Kachenna at 6 miles 2 fur. 170 yards; country slightly undulating, and cultivated to the fullest extent; good topes near each village, and tanks in very good repair.

At 7 miles 4 fur. 50 yards crossed a stream with sandy bed and well defined banks (79' x 14') and passed the village of Kanamikka, reaching camp at Silluwa at 9.30 a.m.; distance from Kolar 9 miles 2 fur. 6 yards.

Camping ground not good: there are a few stunted acacia trees which give no shade; good water not procurable.

Silluwa: 18th January. 1882: Distance from Raipur 21 miles 1 fur. 77 yards.

Left Silluwa at 6 a.m., passing through well cultivated country.

At 1 mile 3 fur. 80 yards passed the villages of Singdey on the east, and Sopela

on the west; country nearly flat, and studded with small acacia trees.

At 2 miles 7 fur. 0 yards, crossed a stream with sandy bed, and well defined banks (33'x7'); some castor oil tree cultivation on right bank.

At 4 miles 0 fur. 50 yards passed the village of Rokhara, with about 300 huts; a school house and police station here; laterite rock surface of about two acres; on leaving, passed a string of forty one camels going to Dhumtere for lac.

Passed the village of Coachmara at 7 miles 4 fur. 110 yards and reached camp at Gujra at 9.40 a.m.; distance from Silhara 8 miles 4 fur. 156 yards.

Gujra is a small village of about 80 huts, and has four large tanks of water unfit, however, for drinking purposes; there is a small tope of recently planted mango trees; no good site for camping.

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Gujra: 19th January 1882: Distance from Raipur 29 miles 6 fur. 13 yards.

Left Gujra at 6 a.m. passing the village of Doma at a distance of one mile.

Passed through country cultivated to the fullest possible extent, leaving the villages of Kurmitaraye, Demar, Arjun, and Balema, and reached the town of Dhumtere at a distance of 8 miles 5 fur. 70 yards from Gujra; camp on the opposite side of the town at 9 miles 7 fur. 125 yards. Total distance from Raipur 39 miles 4 fur. 138 yards.

Dhumtere is a large town with about 5000 houses, and a population of 14.000 or thereabouts. There is a school house, hospital, police station houses, and tahsildar's cutcherry; there are several large tanks, and splendid mango and tamarind topes which surround the town, and some garden cultivation.

Labor is available here to a large

extent; hire as follows: coolie one and a half annas each (men); smiths, carpenters and bricklayers at from three to five annas per day; good clay is procurable for bricks, as well as limestone.

The chief produce of the country is rice; wheat, linseed, several descriptions of grain and ragi are also cultivated and exported in considerable quantities; tea also forms a large item in the export trade, as I met sixteen carts laden with it leaving Dhumtere.

Tobacco, chilies, pumpkins, calabashes, Brinjals, and several other descriptions of vegetables are cultivated in gardens.

The mango, custard apple and bora fruit are procurable in the season; and plantains are to be had at all times, and are largely cultivated.

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Dhumtere, 21st January, 1882; Distance from Raipur 39 miles, 4 fur. 138 yards.

Left camp at Dhumtere at 6 a.m. through fine mango topes for half a mile; then through wet cultivation up to the village of Koodree; 2 miles 0 fur. 115 yards from Dhumtere.

After passing this village, entered jungle with patches of cultivation here and there; the track here runs along the left bank of the Mahánaddee, past the villages of Narrades, (3 miles 5 fur. 70 yards) and Gangrel (5 miles 4 furlongs 120 yards), crossing the river at 6 miles 3 fur. 120 yards, reaching the village of Kokree at 7 miles 2 fur. 6 yards from Dhumtere.

Near this village there is a large quantity of stratified gneiss rock cropping out, suitable for building purposes.

The track continues up the valley of the Mahánaddee (on the right bank) up to 8 miles 4 fur. 68 yards, where it turns up the valley of the Dorkee Nadder, which it crosses at 10 miles 4 fur. 8 yards. The valley is

about 2 miles in width, with an almost level cross section; on each side there is a low ridge of hills thickly wooded with good trees, principally Sppa and Matti, and a few Teak trees.

At 11 miles 1 fur. 55 yards passed the village of Lamkenna, round which there is a large area of cultivated land; soil sandy.

At 12 miles 4 fur. 180 yards reached camp at Durgahun where there is a police station here. There are several good camping grounds near the village, and good drinking water procurable from a well; distance from Raipur 52 miles 1 fur. 98 yards.

Durgahun, 22nd January, 1882. Distance from Raipur 52 miles 1 fur. 98 yards.

Left camp at Durgahun through cultivation, until reaching the village of Sanghola at 0 miles 7 fur 10 yards distance. This village is situated on rocky ground, and has a good tank below it; there is some garden cultivation near the village, principally tobacco and castor oil trees.

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At 1 mile 4 fur. 58 yards reached the village of Kheerawan, a small hamlet at the foot of some hills.

At 2 miles 4 fur. 140 yards passed the village of Nagragahun, round which there is a large area of wet cultivation, and numbers of Sppa trees.

There is some sugar cane cultivated in the valley of a small stream crossed at 3 miles 3 fur. 100 yards, and a sugar cane mill at work; the ground is swampy at this place.

At 4 miles 0 fur. 30 yards entered the Kanker State near the village of Alva, which is fenced all round as a protection against wild animals. There is a little cultivation near the village in low lying ground.

At 6 miles 3 fur. 80 yards entered light jungle, with plenty of good sized Sppa and Matti trees; quartz and gneiss rock cropping up on all directions.

Reached the village of Charama on high ground at 7 miles 5 fur. 80 yards, after crossing two streams; there is a little cultiv

-tion near the village, which stands in the midst of jungle; kunkur limestone is found near the village

Reached camp near the village of Vilowai at 10 miles 2 fur. 84 yards; near the village is a large tank of fairly good water, and a good camping ground; soil all along sandy red clay.

Distance from Raipur 62 miles 3 fur. 182 yards.

Vilowai 23rd January. 1882. Distance from Raipur 62 miles 3 fur. 182 yards.

Left camp at Vilowai at 6.15 a.m. and passed through uncultivated country and some swampy land, reaching the village of Sawada at 7 furlongs and 186 yards. There are numbers of young mango trees planted near the village, and there is about one square mile of wet cultivation.

At 1 mile 4 fur. 70 yards crossed a stream (40' x 7') with clay bed and banks. there is wet cultivation from this up to the village of Khona, which is a collection of miserable mud hovels; distance from Vilowai 2 miles 0 fur. 150 yards.

Reached the Mahanaddee at 2 miles 3 fur. 125 yards; there is no rock visible in the sandy bed of the river; the banks are clay and well defined.

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From this the country is uncultivated; Sppa trees very plentiful.

Crossed the Makree river at 7 miles 0 fur. 60 yards (150' x 12') ; bed sandy, and well defined banks of clay; passed the village of Berawar at 7 miles 2 fur 190 yards where there is some little cultivation.

Reached the town of Kunker at 9 miles 7 fur. 58 yards and crossed the Didh river at 10 miles 1 fur. 60 yards; bed sandy, and banks of clay. well defined (82' x 8') ; passed the Rajah's house, and a temple on the west, and encamped beyond the town; distance from Vilowai 10 miles 7 fur. 50 yards.

Total distance from Raipur 73 miles 3 fur. 12 yds.

The Rajah's house and the temple, which stand at the foot of a rocky hill, are built with brick in chunam; kunker limestone is found here, but little or no labor is to be had, ther

being only two bricklayers, two smiths, and one carpenter in the town.

The chief product of the county is rice; rape, green gram, horse gram, Bengal gram, black gram and dall are also cultivated, and a very poor kind of plantain, as well as the usual variety vegetables.

Kánker, 25th January, 1882; distance from Raipur 73 miles 3 furs. 12 yards.

Left camp at Kánker at 6 a.m. through small jungle with thick undergrowth; this continued up to 2 miles 7 furs. 0 yards, where the Halkhol river was crossed (167' × 15'); sandy bed, and well defined banks of clay. Observed much kunker limestone near the crossing; beyond the river the ground is somewhat broken, and further on, slightly undulating.

At 3 miles 6 furs. crossed a smaller stream (40' × 9') with sandy bed and well defined banks of clay.

At 4 miles 0 furs. 210 yards reached the village of Kongera, a small cluster of miserable huts and with about 6 acres of cultivated land near. There

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is a small area of garden cultivation consisting of tobacco and castor oil trees.

Continued through dense jungle up to 5 miles 6 furs. 44 yards where the Amordarje river was crossed (40' × 10'); the banks of this stream above the crossing are well defined; the bed is sandy.

Traversed jungle till the village of Kail was reached at 7 miles 4 furs. 210 yards. There is a large area of sugar cane, tobacco and plantain cultivation in the gardens, as also castor oil trees; the clearing near the village is extensive.

No sál trees were met with up to this but beyond, this was almost the only description seen.

At 8 miles 2 furs. 174 yards crossed the Halkhol river again (117' × 14'); higher up the stream the bed and banks are rocky and the cross section somewhat less. The bed is sandy at the crossing, and the bank rocky, the other, clay.

Crossed a small stream (10' × 6') with rocky bed, and reached camp in a small clea

on the forest, at 9 miles 4 fur. 135 yards. There is an abundance of good timber here, chiefly Sál.

There is no good camping ground, but good water is obtainable from the Kathul river, one furlong distant.

Distance from Raipur 82 miles 7 fur. 147 yards.

Camp in the forest near Salabat, 26th January. 1882.

Distance from Raipur 82 miles 7 fur. 147 yards.

Started from camp at 6 a.m. & the Kathul river, distant 1 fur. 100 yards; passed up the valley in the bed of the stream for one mile, then

Aneroid Reading 8.80. up the right bank to Chiprail: 2 miles 83 yards from camp.

Continued up the course of the stream, sometimes on the right bank, and sometimes on the left, and latterly through dense bamboo jungle, through which the sun could only be seen at intervals; to

Aneroid Reading 8.67. 7 miles 2 fur. 86 yards at the junction of two large streams; passed some very large rigid Mutti trees in the forest, and also Sal; from this place the guides desired to take me across to Chiklidi, but I decided to continue up the bed of the stream until I should reach the plateau, and proceed accordingly. Up to this no obstacles were met with to hinder the construction of a first class road or railway; the cross section of the ground being almost level.

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Here, however, some difficulties are encountered; the banks of the stream are precipitous; above, the hills came sloping down at an angle of 45°, and the jungle was impenetrable. I had therefore to move up the bed of the stream, frequently crawling over the rocks which were as slippery as glass on my hands and knees; the perambulator could not run over such rocks, and was therefore carried for about two miles, which occupied two hours to get over.

There is much quartz rock in the bed of the river of a pink color; and gneiss of various colors, black, or nearly so, slate colored, and reddish; this last being studded with crude garnets.

Aneroid Reading 28.40

At 9 miles (about) the junction of the main stream from Sidawan was reached, and a small path found, along which the perambulator was again started; and, leaving the river bed, passed through Sal jungle, for 2 miles 2 fur. 110 yards, when Sidawan

Aneroid Reading 28.14.

was reached; this is a fairly large village surrounded by a substantial fence of strong stakes, about six feet in height; there is a large clearing, and extensive wet cultivation near the village; the camping ground is not good, there being no shade, and good water is not procurable.

Total distance from Raipur 94 miles 2 fur. 37 yards: (about).

Sidawan, 27th January 1882. Distance from Raipur 94 miles 2 fur. 37 yards: (about)

Left camp at six a.m. through dense Sál jungle with few trees of any size, thick undergrowth of date shrubs about three feet high.

At 2 miles 4 fur. 83 yards crossed a stream (30'×7') with well defined banks of clay, and sandy bed, and reached the village of Korgaon at 2 miles 7 fur. 104 yards. There is a literally large clearing round the village; a small area of wet, and some garden cultivation; soil sandy brown clay.

At 5 miles 0 fur. 130 yards reached the village of Kalgaon through Sál jungle. There are large boulders of gneiss near the village continued through sal jungle to the village of Kajrau, where there is a large area of wet and garden cultivation; tobacco, plantains and some cauliflowers vegetable.

Crossed the Bardhia river at 10 miles 0 fur. 210 yards; bed sandy; banks clay, and well defined.

Crossed another stream at 10 miles 5 fur. and 90 yards and reached the village of Liagaon at 11 miles 3 fur. 16 yards. This is the largest village passed since entering the Bastar State. There are a number of carts lying about the village. The area under wet cultivation is large, and there are several small gardens.

Crossed a large stream at 12 miles 5 fur. 36 yards. (82'×18') with sandy bed, and well defined banks of clay, and reached camp at Banskot, after crossing a swamp near the village at 11.30 a.m.; distance 14 miles 3 fur. 10 yards.

Banskot is a small village on a

clearing in the jungle, and has but a small area of wet cultivation in the swamp close by.

Banskot, 28th January, 1882. Distance from Raipur 108 miles 5 fur. 47 yards.

Left camp at Banskot at 6 a.m. passing through sal jungle with small date shrub undergrowth.

Crossed swampy ground under paddy cultivation and entered the village of Dodra at 2 miles 4 fur. 136 yards; a small village in a small clearing in the jungle.

At 4 miles 2 fur. 110 yards reached the village of Simora, a small village in a clearing in the jungle with some wet cultivation near.

Crossed a stream (22' × 12') with well defined banks of clay and sandy bed, and passed through the village of Simida, the largest village passed this day. There is an extensive area of wet cultivation and sugar cane, castor oil trees and plantains in gardens; two iron

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smelting furnaces at work in the village.

Passed the small village of Kudi at 7 miles 1 fur. 70 yards in a small clearing in the jungle; and passing through some jungle entered a fine sal forest at 9 miles 2 fur. 40 yards; this continued for about one mile; numbers of trees measuring 14 feet in girth, four feet above the ground.

Reached camp at Paorbel a small village in a clearing in the jungle; camping ground not good, and good water not procurable; distance 11 miles 0 fur. 160 yards.

Paorbel, 29th January, 1882. Distance from Raipur 119 miles 5 fur. 207 yards.

Left Paorbel at 6 a.m through dense sal jungle with but few trees of any size.

At 1 mile 1 fur. 180 yards passed through a small village also called Paorbel where there is a splendid camping ground, fine mango and fig trees giving grateful shade. There is some garden cultivation, plantains, castor oil trees and cholum near the village.

Again entered sal jungle and crossed

a stream (20 × 7') with sandy bed and clay banks at 2 miles 0 fur. 0 yards; continued through sal jungle up to the village of Udepur at 3 miles 6 fur. 200 yards; some garden cultivation consisting of tobacco plantains castor oil trees and cholum; some wet cultivation in low swampy land near the village.

After crossing this swamp, again passed through sal jungle to the village of Kothunda, at 6 miles 0 fur 20 yards; another small village of the same name lies two furlongs further on; a stream with rocky bed and well defined banks of clay flowing between the two; In the latter village there is an iron smelting furnace at work, and near each there is some wet cultivation; tobacco, cholum, castor oil trees and plantains are largely cultivated in gardens.

Passed through sal jungle until reaching camp at Gurjinga, at 9 miles 6 fur. 180 yards from Paorbel. This is a small village in a clearing in the jungle, surrounded by a fence of stakes; part of the enclosure is under tobacco, cholum, plantains and castor oil tree cultivation; camping ground

Gurjinga, 30th January 1882. Distance from Raipur, 129 miles 4 fur. 167 yards.

623/75 Left camp at 6 a.m. through sal jungle passing through a belt of good forest, many trees (sal) measuring eleven feet in girth, four feet above the ground; soil sandy red clay.

At 1 mile 3 fur. 100 yards crossed a stream (18' × 8') with sandy bed and well defined banks of clay; and a second stream at 2 miles 2 fur. 0 yards with rocky (gneiss) bed and banks at the crossing, as for some distance up stream (58' × 9').

At 3 miles 2 fur. 20 yards crossed a third stream (40' × 8'), and at 4 miles 2 fur. 160 yards a fourth stream (20' × 8'); both streams having rocky beds and banks.

Reached the village of Turlabahal at 5 miles 4 fur. 0 yards; here there is an excellent camping ground, a large clearing, and good shade from mango and fig trees; There are also some fine ifpl trees here, and good water is procurable; an extensive area is under wet cultivation just outside the village; some garden cultivation also; soil, quartz gravel.

At 6 miles 6 fur. 145 yards passed the village of Serapur, in a small clearing in the jungle.

Proceeded through alternate belts of sál jungle, and abandoned clearings covered with grass five and six feet high, to the village of Bakuda; distance 11 miles 6 fur. 200 yards.

Camping ground not good; no shade; good water is procurable.

Bakúda, 31st January, 1882. Distance from Raipur, 141 miles 3 fur. 147 yards.

Left camp at Bakuda at 6 a. m. through sál jungle.

Crossed the Dumabal river at 5 furlongs 100 yards (90' × 12'), with sandy bed and well defined banks of clay; after passing through a belt of sal forest, crossed the Pakbal river at 2 miles 1 fur. 20 yards. (68' × 10'); the bed and banks of the river are rocky.

After passing a very large area, recently under wet cultivation, entered the village of Kámini at 3 miles 6 fur. 100 yards; here there is an excellent camping ground in a fine large mango tope, and good shade. There are several good gardens with castor oil trees, plantains and tobacco cultivation

623/76

At 4 miles 7 fur. 10 yards crossed a stream (18' × 9') with sandy bed, and well defined banks of clay; there is much rock above the crossing.

At 5 miles 0 fur. 20 yards reached the village of Bodokóro, a small village in a clearing; castor oil and plantain trees in gardens, and fine mango and tamarind trees outside the village.

Crossed a stream at 5 miles 7 fur. 0 yards (18' × 12') with sandy bed and clay banks, and reached the village of Borondi at 6 miles 2 fur. 130 yards; here there are gardens with sugar cane, plantains, castor oil trees and tobacco; and a large area of wet cultivation. There are some fine mango and tamarind trees south of the village, and good water is procurable from the stream.

At 7 miles 4 fur. 100 yards passed the village of Kochhiana, where there is a tank and an irrigation channel about a quarter of a mile long; the village is small, but there is a large area under wet cultivation.

11 Miles 7 furlongs 55 yards reach camp at Omerkote, a large village with a large area of wet and dry cultivation: tobacco, castor oil and plantains in gardens, and several descriptions of country vegetables. There is a police station house here and a force of 18 police constables and one head constable.

The camping ground is on a fine topes, where there is good shade; good water is procured from the river at hand.

Total distance from Raipur 150 miles 2 furlongs 202 yards.

Camp, Omerkote,
1st February, 1882.

C. Formac.
Sub. Engineer.

K.J. Nordmann
Executive Engineer
on special duty

Enclo: C

Mr. Cormac's Diary
of Reconnoissance
from Kaipur to Omerkote
in Jeypore —
via Pramtoli and Kankeir

623/78

75

Mr. Cormac's
Diary
of
Reconnaissance
from
Rajpagan via Jeypore to Koraput.

15th + 16th February 1882

Distance 24 miles.

15th February. 1882. Pupagaon. { 1981 feet above M. Sea Level.

623/79

Left camp at 6 a.m. over waste land, passing the village of Pupagaon at 0 miles 3 furlongs. 160 yards. where there is a tank of good drinking water and a large number of fine mango and tamarind trees giving good shade.

After leaving the village, passed through a considerable area of swampy paddy fields and crossed a stream (30'×8') with muddy bed and clay banks which are not well defined.

At 1 mile 6 fur. 184 yards passed the village of Dungaragáon a small cluster of wretched huts with a small area of paddy fields.

At 3 miles 1 furlong 4 yards passed the village of Dondasanagodas on the left: on right Sal jungle with jack and illpa trees; soil sandy: a large area of rice fields just beyond the village.

At 4 miles 2 fur. 200 yds. crossed a stream (40'×11') with well defined banks and muddy bed.

and then through paddy fields to the village of Kandapilly which was passed at 4 miles 7 furlongs 14 yds. There are only ten houses in the village which has a tank of good drinking water, and several fine topes of mango and tamarind trees.

At 6 miles 2 fur. 20 yds crossed the Potra stream (120' × 14') with wells deposit clay banks, and sandy bed; a fine tope of mango tree on the left bank, on each side of the stream there is a wide area of rice fields.

At 7 miles 0 fur. 28 yards reached the village of Omerjaon with 60 houses and several fine mango topes; a blacksmith was at work in a small shed making knives. At this village I was met by the Dewan of the Mahrajah of Seypore.

Here I joined the road from Bowgumma to Seypore.

Crossed a stream in swampy ground (18' × 8') and passing on rising ground, undulated, crossed a second stream (12' × 8'); small bush jungle to the right and paddy fields to left.

In the swampy places the road is in embankment, about 2 feet high; the streams

are not bridged.

623/80

Crossed high ground, along the road, and then turned eastward, along a roughly made narrow road, crossing several small streams leading into a large tank covering an area of upwards of half a Square mile; tanks on the right and a halting bungalow on the left. Then through a fine mango tope and past a second large tank, to the camping ground in a mango tope, outside the town of Seypore. Distance traversed 10 miles 4 fur. 20 yards.

There is a good bungalow here for travellers and good drinking water; there are large topes of fine mango trees covering a very large area and giving good shade, which make excellent camping grounds.

There are about 2500 houses in the town and 8000 inhabitants; about 20 houses are tiled and one terraced, the remainder being thatched.

The Mahrajah of Seypore resides in the town, a palace of brick and stone is now being constructed in the enclosure which contains a number of small dirty buildings, which form

the Maharajah's present residence, and offices.

There are a sub magistrate, an inspector of Police and fifteen constables in the town; there is an elementary school maintained by the Maharajah.

The produce of the taluq consists of rice (sold at 30 seers per rupee in Seypore) ragi, green gram, dall, Bengal gram, wheat (in the Kotapad taluq) and linseed, Sal, jack, pipal, tamarind, matti and mango trees (especially the latter) are abundant. There are some silk weavers in the town who procure the cocoons of the Tussar worm from Kotapad. About thirty gold smiths, thirty carpenters and ten smiths reside in the town, but no bricklayers; these being brought up from Salour when required; stone cutters are obtained from the Ganjam District. Kankar limestone is obtained from Suggamallipuram, a village about three miles distant from Seypore.

The town lies in a hollow, near the foot of the hills; the site does not seem a healthy one. The unhealthy season is in July and August, after the commencement of the rains.

The adjacent hills are gneiss; laterite is also found in abundance.

1878

16th February. 1882. Seypore. 1955 feet above mean sea level.

623/81

Left camp at 6 a.m. through mango topes, and joined the road from Seypore to Koraput at 0 miles 5 fur. 0 yards. Travelled along the road from this place with small scrub jungle on both sides (ground side-lying and rocky) crossing some small streams to 2 miles 0 fur. 0 yards, when a large stream (63' × 14') with rocky bed, and well defined banks, was crossed.

This spot is only 24 feet higher than the starting point of this days march, and up to 2 miles 4 fur. 70 yds the rise is inconsiderable, from here, however to 3 miles 2 fur. 160 yds there is a rise of 348 feet, the gradient being 1 in 12: in the next half mile, there is a descent of 84 feet; then a continuous rise to 5 miles 1 fur. 0 yds of 622 feet; the gradient being 1 in 11½: a fall of 84 feet follows in the next half mile, and then an ascent by a gradient of 1 in 40 to 6 miles 3 fur. 160 yds.

The village of Bogipodra, which was passed here, lies some distance away to the right:

Crossed undulating and hilly country, with some good timber trees about, and a small area of sal jungle, about a mile distant. The country is cleared of jungle up to the village of Damiguda at 11 miles 2 fur. 100 yds.; this is a small village of about twenty houses with a small area of cultivated land near; a stream lies between the village and the road.

At 12 miles 0 fur. 20 yards reached the Saddle overlooking Koraput (height 2999 feet) and descended to the town of Koraput passing through the station along the road, reached camp near the quarters of the Special Assistant Agent at 13 miles 3 fur. 14 yards.

Koraput
4th February. 1882.

Jormac,
Sub Engineer.

K. J. Nordmann
Executive Engineer
on Special Duty

623/82

Encl: D

Mr. Cormac's Diary

from Rupagaon to

Jeypore and Koraput

E.

No. I
0

Camp. Omerkote.

1st February. 1882.

From

Sub Conductor J. Cormac. 623/83

Sub Engineer

To

K. F. Nordmann. Esq.

Executive Engineer.

On Special Duty.

Sir

1. I beg to inform you that in obedience to your orders I left Raipur on the 16th ult. for Omerkote, via Dhumtari and Kanker.

2. The road from Raipur to Dhumtari is gravelled for about half a mile outside Raipur, after which there is simply a cart track, without any surface covering; it has been so worn by traffic that in some places the level is lower than that of the adjacent fields: avenue trees have been planted all along, but are not now in a very healthy condition: margosa trees, which give little or no shade, compose the avenue for quite fifteen miles.

3. The line is bridged for the first 5 miles, and for this distance the soil is generally sandy: beyond it is black cotton soil, full of holes and fissures; and during the rains the road will be almost, if not quite impracticable for carts.

4. No large streams are crossed between Raipur and Dhumtari, and the country is almost level: it is dotted over, at present, with large stacks of rice straw, which testify to the abundance of the crop recently cut.

5. The grains chiefly cultivated are rice, wheat, linseed, Bengal gram, green gram, and ragi: rice is now being sold at Dhumtari at 55 seers, and wheat at 40 seers per rupee.

6. The chief exports are rice, wheat, linseed, and lac: I met sixteen carts leaving Dhumtari laden with the latter and passed forty one camels going there for loads of the same: this lac is the product of an insect, the coccus ficus, which deposits its eggs upon certain trees, and

and covers them with a reddish resinous substance, which is lac, and intended as a protection to the eggs.

623/84

7. Some native cotton cloths are manufactured at Dhumtari and Tusser silk cloths at a village twenty miles distant; the Tusser silk worm being found in all the sal jungles in this part, feeding upon the leaves of the sal and the mahi.

8. There is no systematic irrigation, the crops being dependent on the season's fall of rain: there are however numerous tanks, kept in admirable repair by the ryots at their own expense; these are however generally used for drinking purposes, and are not situated as to be of much use for irrigation.

9. The soil is very fertile, and the country passed through is cultivated to the fullest possible extent: there are but few small patches of uncultivable land to be seen.

10. There are good topes of fine mango trees

trees near the villages, but no other timber was seen except a few unhealthy looking acacias, dotted over the country near Dhunteri; firewood is scarce and dear.

11. Dhunteri was reached on the 19th ult: the town has a population of about 14000 inhabitants and about 5000 houses chiefly mud huts; there is a tahsildars cutcherry, post office, police station house and hospital in the town, which is surrounded with magnificent topes of mango and tamarind trees; there are several fine tanks near the town.

12. Limestone is procurable near Dhunteri, and a fair supply of labor; coolly hire being one and a half annas per day for men; and, for such bricklayers, carpenters and smiths as are to be had there, from three to five annas per day.

13. Leaving Dhunteri on the 21st ult. I crossed the Mahánaddee river twice, and the Makri and Dudh rivers, reaching Kanker on the 23rd; the

Calter river divides the town of Kanker into two portions.

623/85

14. There is a good and easy cart track all the way from Dhunteri to Kanker; and as the soil is more sandy; the line will not be to difficult in the wet weather as between Dhunteri and Raipur.

15. The country between Dhunteri and Kanker is jungly, only one third for cheratmts of the whole area, being under cultivation; so far as I could learn. The Kanker State produces little more than is required for consumption within its own limits, and the exports are inconsiderable.

16. The grains chiefly cultivated are rice, wheat, green gram, Bengal gram, horse gram and ragi.

17. Mango and Ippa (Mhowah) trees abound; the spirit distilled from the flowers of the latter tree is sold in the village at one anna per quart; a few teak trees were also met with, but none of any size.

The

18. The hills, which run almost parallel with the track for about fourteen miles from Dhumteri, are well wooded, chiefly with Ippa, Katha and Bora trees; a deal of care is given to the planting of mango trees, several topes of young trees having been passed on the way.

19. The villages in the Kanker State are small, and generally speaking, composed of miserable mud hovels; the town of Kanker is a little better in this way, the huts being somewhat larger; and possessing a temple and house belonging to the Rajah, built of brick in chunam; the villages are all fenced in, as a protection against wild animals.

20. The camp at Dhurahar was twice alarmed in the night by a chela and the footprints of one of these animals and of a tiger were observed for a distance of two miles along the track traversed; wild buffaloes are said to be numerous here, though none were seen by me.

21. The country near Kanker is hilly: chiefly rocky hills of gneiss with low jungle.

Kanker

8883

Kankar limestone is found at several places and was seen near Charima and Kanker. There are two bricklayers, two smiths, and one carpenter in the latter town; their hire being two and a half annas per day; coolly hire one anna per day.

623/86

22. I left Kanker on the 25th, and passed up the valley of the Halkul river, through dense jungle, with fine katha trees here and there, and thick undergrowth; meeting with Sal trees on entering the Bastar State.

23. I camped the same night in the jungle; and having sent on my baggage the next day via the Tel ghat, to Sidawan on the plateau, I started up the valley of the Halkul river, passing Chiprail; making my way, where the jungle on the banks was impenetrable, in the bed of the stream; there was no path, but the perambulator was run for seven miles (five beyond Chiprail) and the barometer showed a rise in this distance one hundred and

24. From this point the perambulator could not travel, and had to be carried; the banks were covered with dense undergrowth quite impenetrable, and were in some places, precipitous; so that I had to make my way up the bed of the stream, climbing, at times on my hands and knees; the rocks being so slippery as in several places; about two miles was covered in this manner, the aneroid showing a rise in that distance of 270 feet a path was then found, and the perambulator started along it, measuring two and a quarter miles to camp with an ascent of 260 feet; this was the highest point reached, and the approximate height above mean sea level was 2050 feet.

25. From Sidawan the country commenced to fall, and continued to do so until Omerkote was reached.

26. The villages passed are composed, generally speaking, of a few miserable huts, built near watercourses, and fenced round with stout stakes placed closely together, about six feet high, inside which is

plantains, and the usual native vegetables. The villages are usually about three miles apart, with alternate belts of Sal forest and abandoned clearings intervening. 6/23/87

27. The area cultivated is certainly not more than one twentieth of the whole, so that there is ample room for a large number of immigrants; this remark applies to the whole country from Kanker to Omerkote.

28. Good camping grounds were observed at Paorbel, Turlabahal, Bamini, and Omerkote; near the other villages passed, all trees have been cleared, and there is no shade. The water supply on the plateau is not good; and as there are no means of storage, there must be a scarcity in the dry season.

29. Several belts of fine Sal forest were passed through; some trees measuring eleven feet in girth, four feet above the ground.

30. The soil in the hollows and swampy places, is black clay; and in the portions at a higher level, sandy reddish clay.

31. The country is sparsely populated, and all labor will have to be imported; the clay found everywhere is suitable for bricks, and stratified gneiss suitable for building purposes is found in several places. Kunker limestone is found here and there, and will, I believe, be found all over the plateau if searched for; there is an abundance of good Sál wood viz. Burlae and Seyssore.

I beg to remain Sir
Your most obedient servant

Cormac.
Sub Engineer.

W. Armstrong
Exec. Engineer

623/88

Encls: E

Mr Francis
14/3/82

Mr Cowiac's Report,
on his Reconnoissance
via Dhamteri and Kankeri -
No. I/0 dy 1st February 1882

1886

Reports by Colonel A. Francis,
late Executive Engineer, Raipur Division

623/87

Report on the Road from Raipur to Dhamteri.

The total length of this road from the Cantonment boundary is 38 miles -

Soil

Of these only eight are moorum, sandy loam or laterite, the remaining thirty are black cotton, very deep; and at least ten miles of these thirty are under water from six to sixteen inches deep for from four to five months during the rain, owing to the road being on the same level, or a little lower than the rice fields which are on both sides.

Masonry works

The first six miles and a quarter are bridged with seven dridins and bridges; the water-way of five of these is too little and the approaches have been breached.

These breaches have been now sloped down to allow high floods to pass

pass over. It would be an improvement to revet both sides of these slopes with a masonry wall, as then a foot of good broken stone could be rammed between them, and a causeway would be formed that would remain hard even after rain.

Nullahs and Rivers.

Between the last bridge built and the village of Bukára, a distance of 18 miles, there are ten nullahs, all of good size, from fifteen to sixty feet broad and which have all soft and swampy bottoms, and offer considerable obstructions to traffic up to the end of January; and even when the bottoms become dry and hard, yet from the very steep slopes leading to them they detain heavily laden carts for hours.

Improvements required.

These nullahs should have causeways; and instead of the

raised causeways, such as have been built on the Bellaspur and Sumbulpur road, it would be both better and cheaper to build walls level with the bed of the stream and running up the approaches as far as high-water mark, on the up and down stream sides, and then fill in between them a foot of hard road metal well consolidated.

There is but little scour, and it would stand well; the raised causeways become very slippery and covered with green moss.

From Bukara to Dhamteri there is only one causeway required, but that one though not large will have to be carefully constructed, as it is in one of the submerged lengths; and in the rains the first intimation a traveller has that there is a nullah is, finding the waters above his saddle flaps. A raised causeway with hand rails above

~~above~~ high water level, and with openings for the bottom water to pass through, would probably be the best for this. All the approaches to these nullahs require being brought to a proper slope which could easily be done.

The map shews that the Karroon river runs with the road on the west side, at a distance varying from one to three miles; the road runs north and south nearly, and the drainage is from east to west.

The country is very flat, and the road running across the drainage has suffered very much from the scouring of its side ditches, in some places they are eight feet deep.

These side ditches have been dug between the road and avenue, and should be filled and dug

outside the avenue, or better still omitted altogether; as, owing to the light nature of the soil, the smallest stream of water cuts deeply in a few hours, until the hardier subsoil is reached.

623/91

To convert the present road into a bridged road, for all weather, would be very expensive, as on an average the whole thirty miles of black soil would have to be embanked about three feet, to lift it one foot above high water mark.

Eleven streams would have to be bridged, all of which owing to the proximity of the Karroon river rise and overflow their banks when that river is in flood; besides these eleven bridges numerous small three feet drains would be required.

The present state of the road shews how dangerous it is to carry the water from one nulla to another along the sides of the road.

camp Drug
19th March 1876.

[signed] A. Francis Lloyd
Exec: Engineer, Rail[illegible]

Report on the road from Dhumtery towards Raigark, as far as the boundary of the Central Provinces.

First stage from Dhumtery to Kokrel; distance 8½ miles.

Starting from the new Tasildar, the main street of Dhumtery is broad for a short distance; it then contracts into a narrow lane, the houses having encroached on it until there is only about nine feet left; and this in the rains is knee-deep in water. After getting clear of the town, there is a mere track to the Achōla ghaut, across the Mahánadde river the road requires marking out.

The soil is very sandy and heavy, but there is moorum in the vicinity, and a good road could be made at a small expense. The road could also be made good

1889

good up to the Tasildar with very little damage to the houses, as by a little care in lining it would be chiefly compound walls and outhouses that would be taken down. 623/92

The distance from the town to the River is 2½ miles. The banks of the river require but little doping; the north bank especially is easy, the south requires a little done to make an easy slope. A memo of probable expense will be given at the end, as more easily noted than if scattered through the report.

After crossing the River, the cart track is well defined; the soil is sandy for the first half mile; jungle open. The soil then changes to good red moorum up to the village of Bhoina, which is 4 3/8 miles from Dhumtery, where the soil becomes a sandy loam, varying from hard to very sandy, and continues with little change to Kokrel.

The two Nullahs on the road are easy, with hard bottoms, with stone at hand for causeways, if

Considered necessary; but unless the traffic increases very considerably, the causeways will not be required.

Water is procured from a Nullah which, though indifferent in quality, is sufficient now; later there must be some scarcity.

The Malguzars of this place are Baboojee Huddut and Singars; they appear well-to-do, and informed me they held other thirty four villages; they have an Elephant and good ponies, but professed entire ignorance as to the road beyond their own village.

From Kokrel to the village of Bumbagoad, about 1½ miles, the track is good and easy, and water is here also procured from the nullah below the village. After passing this, the line of road as marked on the Map, Sheet No 1 of the Ganjam and Orissa Topographical Survey, runs over rocks and stones;

to avoid this the cart track turns to the village of Komda. A glance at the map will shew that the line runs along a water-shed; and up to the borders of Bustar near Burgudee, the tracks are well chosen in this respect, avoiding nullahs and cross drainage; and the points passing from one water-shed to another are wonderfully well chosen. 623/93

2nd Stage, from Kokrel to Dokal, distance 10½ miles.

The whole length by the old track is 8 miles to Dokal from Kokrel, but the Cart track is a mile and a half longer; still it is to be preferred for a fair-weather road.

The jungle is of the same description as to Kokrel; tall trees without much girth, only fit for poles, with no underwood. The grass has mostly been burnt. The head man of Dokal is Mithoo naik who gave a good deal of information willingly. He is a very intelligent

old Brinjaree; he has dug a tank and built a temple, and possesses about one hundred head of cattle.

3rd Stage, from Dokal to Gattásillee, distance 10 miles.

From Dokal there are three tracks, but only no 1 is good for carts; the second is at present impassable except for foot passengers and pack animals; the 3d an empty or lightly laden cart can pass with difficulty. No 1 goes by Parwari, Donora, Palgaon and on to Gatásillee; a very round about track, but easy; the extra length is 3 miles.

The 2d is that shewn in Sheets nos 1 and 3 of the G. O. T. Survey, and the only difficulty is at the crossing of the Sillari River. Should this line be taken, and it is the best of the three, a proper crossing must be traced, which is

1891

not difficult.

623/94

The present crossing is taken straight down the face of the hill on to a low spur, and then, turning on the spur, nearly straight to the river; this point on the spur should be retained, and the slope worked from it upward along the side of the hill where any desired gradient can be worked out; and downwards, first keeping a little way along the side of the hill, till sufficiently low, and then bending round by the left to the river. A trial trace should be first made, three feet wide; there will not be much blasting, most of the rock is detached boulders. For approximate expenditure see memorandum at the end.

The 3d line leaves Parwari on the left and runs by Attákolee to Gattásillee. The crossing of the river is easier than in no 2, but the Nullahs that have

to be crossed are a little larger,
and it approaches Gattasila
from the wrong side of the
tank, through swampy ground;
and notwithstanding easier
crossing and less clearing of
jungle required, will not be
so satisfactory in the end. The
track is here as elsewhere generally
about 8 feet broad, in places
it is much more, even 30 feet,
and looks like a road; but
this is only for very short distances.
Up to Dokal the road may compare
favorably with the road from Buona to
Burwankera on the Sumbulpur road;
and after this crossing is made and
jungle cleared &c, the road on the Gattasilee
will be equally good. There are in this
stage six Nullahs to cross, besides
several smaller drainage channels;
but all have hard bottoms and can
have easy slopes to their banks.

The ground near Parwári

1892

looks as if it would be very swampy
in the rains, and up to November.

623/95

4th stage from Gattasilee to Burgudee
in Bustar territory, distance 9 3/4 miles.

From Gattasilee to Burgudee
the road is everywhere passable; where
there is jungle, the trees are thicker together,
but still there is very little valuable timber,
and open spaces are more frequent than
in the 2d and 3d stages. There are four
Nullahs in this stage; the one nearest
Burgudee will be the longest, and it is
the only one that has a bad bottom.
The detour taken by the road here is necessary;
for on examination of the ground to the
right, with a view to cutting off this
bend, it proved to be very swampy,
and a long and heavy embankment
would be necessary; besides the Nullah
here would have to be bridged, as it
is very muddy and holds water to the
end of the hot weather. The road
crosses the boundary of Bustar near
the 9th mile from Gattasilee, and the
town of Burgudee belongs to Bustar.

The Sikáwa road turns just before reaching Burgudee, from which Sikáwa is about 4 miles. Several of the villages marked on the map have been deserted. Gatigáon remains; Kangora and Sabtupara have disappeared; but a village in these parts means a few huts made of 4 sticks without mud walls, and very imperfectly thatched.

Burgudee is the best-to-do village on the line; grain and other supplies are procurable. There was a difficulty about guides here, and a Peon had to be sent down to Bellergaon to bring up a guide, the headman of Burgudee steadily refusing to give any guide. When guides had been procured from Bellergaon, he then gave one who knew the country well, though for four hours he had declared, not a man in the village knew the road to Borai.—

5th Stage, from Burgudee to Borai, distance 19¼ miles—

From Borai to the boundary distance 3 miles
Total distance from Dhuntery to Boundary 61 miles—

From Burgudee hills are

623/96

visible on both sides, and also in front; the road here is very undefined, apparently it is cultivated in the rains, and the traffic picks out a path in the dry weather. Up to this point there passed on an average twelve carts and 30 foot-passengers a day, and sixty head of pack-cattle every other day.

From this point carts cease; only ten pack-cattle pass in three days, and about fifteen foot-passengers.

At Keontipára, 3/4 of a mile from Burgudee, the Mahánadi is crossed; this is also the boundary of Bustar. From this the line is to Kalsa the road runs by Bamka to Bellergaon; this latta is a very straggling village. Three Nullahs are passed, and the ground will be swampy until late in November. After the road is fairly opened, an embankment will be needed here, and causeways; but the whole of this 3 miles requires lining out; probably a better crossing could be found for these Nullahs.

The country changes from Bellergaon; the hills draw close to the road, the jungle is thicker and the trees are of better size. The track continues fair

fair after passing Bellagam; but 7½ miles from Burgudee the road runs round a very steep hill, marked A on the trace; this is rocky, with a nullah on the right, and will have to be worked out. The whole road from Burgudee should be relined and straightened, the jungle cleared and nullahs sloped; the general direction cannot be altered on account of the ground.

The road from this point is only a foot-path, though four carts came down with the camp, with only one breakage. 12½ miles from Burgudee, the Chitra River is crossed for the first time; during the day an attempt was made to see if the road could be turned round this river and be brought down the left bank on the line shewn by red dots B. B. B.; but the ground is very difficult, and the expense of making even a twelve-foot track through it would be great. To ascertain the feasibility properly, a trial trace should be cut, but the natural difficulties (rock and

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ravines) appear to be too great for a line of road, the traffic on which can never be anything but very small.

Crossing the Chitra River, the road gets a little better, and the path is more defined; for merely a fair-weather road the fact of crossing the river twice is of little consequence, as the crossings can be made very easy.

Towards the top of the ascent, the brushwood commences and becomes thicker as you proceed. Before reaching Borai it is thick, the trees along this portion of the road are larger, several fine sal trees were seen. The jungle becomes more open; after reaching Borai it ceases; fields and low hills replacing it. About 2 miles of jungle have been cleared on this line of road, before reaching Borai; but the trees have been cut too high up and the stumps are rather long and sharp; but still it renders the track easier.—

From Borai, Buniadi village is visible; and between this and Autmode is the boundary dividing the Central Provinces and Jeypore. This line runs through fields, and should be embanked from

from 1½ to 3 feet high. The nullah is a very troublesome one, and as there is plenty of timber lying and rotting within three miles, I would suggest a good substantial well-put-together wooden bridge; the only cost would be the carriage and labor. Care should have to be taken to clear all grass from its vicinity early in November, to prevent its being burnt; and a bridge could be put up that would last for 20 years.

From the boundary Raigarh is about 15 miles; from thence to Naorangpur is sixty five miles; the road is not yet in hand on this section. From Naorangapur to Koraput there is a dry-weather Cart road, distance 36 miles. Potinghy ghaut is 28 miles from this, and Salur 24 miles beyond Potinghy. This would fix Potinghy, which is not marked on any of my Maps, at about 18° 56 North and 83° 12-30 East. Salur is well known, it is 66 miles from Calingapatam, 52 miles from Bimplipatam, and 66 from Vizagapatam,

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from it, and is 20 miles in length. The distances given are by the road, not straight across country; the ghaut is not expected to be finished till 1878; by which time the rest of the road may probably be somewhat advanced.

In looking at the G. O. T. survey, it appeared likely that a line from Borai, leaving Huttma to the left, up to Goraway would probably be easier than the Chita River route; although, if this line should be decided on, owing to the swampy nature of the ground near Palmanda and Mainpur, it will still be advisable to run the road by Borai, joining into the Chita River road on the ground just above the village.

Returning from Borai to Dhuntoi

the first stage had to be any place where water was to be found, as there are no villages on the line. The spot selected was Birpani, just at the junction of the roads from Hutma and Kormi to Goraiwan. It takes its name from a large Bir tree.

1st Stage, on return from Borai, by Hutma to Birpani — 10½ miles
From Border to Borai — 5 "
Total 15½ "

The first seven miles are easy; the proper line would be somewhere between the two red dotted lines, but the jungle is too thick to decide without cutting a real trace.

The next four miles, after crossing the Dhuntoi border, present as many difficulties in the way of rock cutting and clearing as the Chita river route, though only one Nullah of any size is crossed up to this point.

There is a thick Bamboo jungle for these last four miles, with rocky

hillocks on both sides of the path; and the line is exactly that shown in the Map, with the drainage sometimes from right to left and sometimes from left to right.

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2nd Stage, from Birpani to Borsidonga — 6½ miles

The Nullah is crossed immediately after leaving Birpani, and long slopes with some rock cutting will be required. Bamboo jungle continues as before up to the place where the road for Jangaon turns off; here it ceases; open jungle commences, the country becomes more and more clear, and the soil changes from good to black cotton. From this point up to Borsidonga will be wet and swampy until January. Any line can be taken here, the carts drive all over the country. From Borsidonga Hills are visible on all sides, from one to five miles distance.

3rd Stage, from Borsidonga to Jangaon, 9 3/4 miles.

From Borsidonga up to Deekdonda there is no defined road, but carts drive over the country in any direction they wish,

making a detour to avoid any difficult
The ground is usually black, and w
be swampy till late; it is quite dr
now.

The Mahánadi is crossed ne
Dirokot, and is about 250 feet broad.
There is no jungle, only pollard trees.
A Dekhoand a road joins from Bamka,
and from this point there is a well
defined route; the pollard trees continue,
and soil changes to hard sandy loam.
There are after this about two miles of uncut
jungle, open and with no large trees. Passing
the trees have again all been lopped;
and on to Jamgáon the country continues
the same, with here and there short
distances of swamp, or what would be
swamp in the rains and cold weather.

4th Stage from Jamgáon to
Modgadaian, — 9½ miles.

From Jamgáon the track continues
good and well defined; Country open, trees
are lopped as before; a river 200 feet broad is crossed, near which is
a narrow belt of uncut jungle; the soil
is black cotton with a few yards of hard
kunkar now and then. The small drainage

drainage channels would be troublesome
if there were any traffic. All the large
nullahs have good sandy bottoms and
easy slopes. There is a little cultivation
at the village of Bunsodi; after this
there is a mile of very good road, and
then three chains of swamp; after which
for three miles the road is good, running
through open jungle, and the soil improves
and continues good up to a small drainage
drainage channel which has a soft
bottom; on the other side of which is
black soil until the nullah is reached
on the bank of which is the village of
Modgadaian.

5th Stage from Madgadaian
to Temlí, 9 miles.

This march is a difficult one.
Carts can go, but nullahs are numerous.
The road is shut in with rocky hills,
and so confined that one large nullah
is crossed four times; six other nullahs
are passed, and everywhere the track is
sandy and heavy, except where it is
rocky. There are about 2½ miles of rocky
track on which a good deal of labor will
be required to make it easily passable,
and the line is one that would not be

chosen if there was the slightest possibility of the road being bridged or much improved.

6th Stage from Temli to Dhumtery 8 miles. Total from Border to Dhumtery 56 1/4 miles.

From Temli the road crosses the Silari river, and is shut in for about 1/2 miles between the river and a ridge of rock; the hill then recedes from the river, and the track runs through cultivation and waste to the Mahánadi which is crossed at Rodree ferry. The traffic up to this point is very heavy. After crossing the river there is half a mile of good hard soil, and then alternately sand and swampy ground, to the town of Dhumtery.

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Summary.

From the above it will be seen that there are two tracks; one by Kokrel, Dokal, Galásika, Burgudee and Borai, sixty one miles in length; and the other by Temli, Madgandaian, Jangaon, Burudonga, Birpur and Borai, 56 1/4 miles.

The first runs, with the exception of 1 3/4 miles, entirely through country belonging to the Raipur District and under the Tasildi of Dhumtery; it is now used by carts as far as Burgudi, offers no great obstacles, and up to this point can be improved, to any extent that may be considered advisable, by a corresponding expenditure. The soil on the whole is favourable, and the only heavy work is that detailed from Burgudi to the boundary, 2 2 1/4 miles. This road is also linked by a fair cart track to Sihawa from Burgudee, and what cart traffic there is, follows this line.

The 2d line is through a much more open country, and the soil is generally unfavourable swampy and heavy; and it would be a good month longer than the first route in becoming dry. The last two stages from Madgandara

to Tenla and Dhumtary is also very difficult and could not be taken for anything but a fair-weather road. The distance is 4 3/4 miles shorter than the first route; but owing to the heaviness of soil carts would take longer to traverse the shorter distance; it also runs for half its length through Kondeis territory and the Sikáma carts would have to follow the first route as far as Bamka before being able to join into this track.

Under these circumstances the first appeared the best, and a memo. of expenditure required to open it for a cart track fifteen feet [illegible] is appended.

/signed/

Camp Dráy
18th March 1876

A. Francis, Lieut. Col
Executive Engineer, Raipur

/True Copy/

Camp Náorangpúr
12th February 1882

K.F. Nordmann
Executive Engineer
on Special Duty

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Enclo: F

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103

Reports by
Colonel A. Francis,
late Exec: Engineer,
Sirpur Division —

on L. marks between
Sirpur, Wankeri
Sironcha and Borai

15/5/99

1478.

Govt. of [1882] Madras.

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G. O., 11th January 1882, No. 623 P.

Nos.

Virzagapatam & Raipur Railway. Report on the Encroachments for the Recorded

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