(1) Number of pages 82

(2) Date of repair 27-7-87

(3) Initials of the Referencer Lm

# TAMIL NADU ARCHIVES

## GOVERNMENT OF TAMIL NADU

P.W DEPARTMENT

| G.O. No. / B.P. No. | 3079 | Press. / Mis. |
|---|---|---|
| Dated | 31-10-1883 | 198 . |

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31st October 1883, No. 3079 W., Public Works.

3079/1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Establishment.

Read—the following paper:—

Office note from the Examiner, Public Works Accounts, dated 13th October 1883, No. 735.

Order—dated 31st October 1883, No. 3079 W., Public Works.

The pay of Mr. Nordmann and his establishment, while engaged on the special duty of road-surveys in the Wynaad, will be charged to the Nilgiri division.

(True Extract.)

Major, R.E.,
Under Secy. to Govt., P.W.D.

To the Superintending Engineer, Fourth Circle.
" Examiner, Public Works Accounts.

Exd. A. Aubert.
Spare Copies

GENERAL.
ESTABLISHMENT.

# Govt. of {1883} Madras.

PUBLIC WORKS.

*Dated October, 31st.*

*Encl.*
*Read.*

**G.O., 31st Oct. 1883, No. 3079 W.**

**OCTOBER.**

**Mr. K. F. Nordmann**

*The pay of* — and his establishment, while engaged on road-surveys in Wynaad, to be charged to the Nilgiri division.



3079/2

No. 413. Read the following letter from the District Engineer, Vizagapatam, to the Secretary to Government, Public Works Department, dated Camp at Salur, 20th February 1873, No. 435:—

I HAVE the honour to request you will be good enough to obtain the sanction of Government to the following establishment for the Special Assistant Engineer employed on the Jeypore Ghaut works:—

1 Overseer, at Rupees 80 per month.
1 Writer and Accountant, at Rupees 30.
4 Lascars, at 8 Rupees.

2. Work is about to commence in a new and difficult piece of country, where no skilled workmen of any description are to be had, and where a system of free labour has yet to be introduced. Owing to the climate being notoriously unhealthy for a considerable portion of the year, the natives of the low country have the greatest dread of it, and special advantages in pay and position must be offered to induce competent persons to accept employment there.

3. Some two years since when Government, at the request of the Agent, directed the Superintending Engineer to send a man to Jeypore for employment as Overseer under the Assistant Agent, it was with difficulty that a person was found willing to undertake the duty at a salary of Rupees 150.

4. Mr. Nordmann suggests, as the fittest person for the post of Overseer on the ghaut, N. Manickavasagam Pillay, now an Acting Overseer in the Coimbatore District, who has been employed for several years past in Wynaad and on the Collegal Hills, and understands ghaut work.

5. Manickavasagam was appointed an Acting Overseer in 1863-64, and was confirmed as Overseer by Government in 1865-66. Owing to his health failing in Wynaad he accepted the post of Overseer to the Calicut Municipality, and has been unable to recover his footing in the department owing to the stringent rules subsequently introduced regarding the entertainment of Overseers.

6. It is understood that this man who is specially qualified to assist Mr. Nordmann on the ghaut works, would be willing to go to Jeypore if Government will make an exception of his case, and give him a permanent post in the department without passing the usual examination test.

7. I send herewith Mr. Nordmann's letter, and beg to recommend most strongly that his proposal for the employment of N. Manickavasagam Pillay as Ghaut Overseer may be sanctioned.

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From K. F. Nordmann, Esq., Assistant Engineer, on special duty, Jeypore Hill Roads, to the District Engineer, Vizagapatam, dated Camp at Vizianagram, 1st February 1873, No. 4.

I HAVE the honour to request that you will be good enough to apply to Government to transfer the services of Acting Overseer N. Manickavasagam Pillay from the Coimbatore District to the Jeypore Ghaut works, and to confirm him at the same time as an Overseer in the department.

2. The man has been employed under me for several years past, both in Wynaad and on the Collegal Hills, as well as in the plains, and understands ghaut work. But he would probably be unwilling to face the Jeypore country in a mere acting capacity, in which he is liable to be thrown out of employ at any time. It is therefore that I would suggest his being confirmed, conditionally however on his joining the Jeypore Ghaut works at once.

3. The regular Overseer's examination can in the case of this man be dispensed with without any infringement of the rules, as Manickavasagam Pillay was appointed Acting Overseer in 1863-64 and confirmed in his appintment by Government in 1865-66, (I am unable to state the dates exactly without records.) But owing to his health failing in Wynaad, and as a means of furthering his prospects, he was transferred to the Calicut Municipality, whereby however he lost his footing in the department, which he was eventually unable to regain owing to the stringent rules then introduced about examinations. It is not likely that this man can now pass the prescribed examination, but from my own prolonged knowledge of him, this will form no bar to his usefulness as a practical Overseer, especially on the kind of work which I am about to undertake.

No. 419. ORDER THEREON, 17th March 1873, No. 838.

ESTABLISHMENT, No. 51.

AN exception will be made in the case of Manickavasagam Pillay, and the District Engineer, Vizagapatam, will be permitted to entertain him on the permanent establishment in the 3rd class if the number allotted for his district has not already been filled up.—See G. O., No. 467, of 13th February 1873.

2. Mr. Nordmann can entertain the establishment of an officer employed on special duty, namely:—

| | RS. |
|---|---|
| 1 Draughtsman and Estimator ... ... ... ... ... ... | 40 |
| 1 Clerk and Computor ... ... ... ... ... ... | 30 |
| 4 Lascars at 7 ... ... ... ... ... ... ... | 28 |
| | 98 |

(True Extract.)
(Signed) G. W. WALKER, Colonel, R.E.,
*Secretary to Government.*

To the District Engineer, Vizagapatam.
„ Controller of Public Works Accounts.

Ed. S. T. Austin.

3079/3

Govt. of 1873 Madras.

PUBLIC WORKS.

To

THE DISTRICT ENGINEER, VIZAGAPATAM.

&c. &c. &c.

Dated March 17th

Encl.

Recd.

G. O. 17th March 1873, No. 839.

MARCH

Nos. 418 419

*Proceedings of the Madras Government, Public Works Department,*
*17th March* 1873.

No. 420. Read the following letter from the District Engineer, Vizagapatam, to the Secretary to Government, Public Works Department, dated Camp at Salur, 1st March 1873, No. 512:—

I HAVE the honour to report that it will not be practicable to expend more than 1,000 Rupees on the Jeypore ghaut in this official year.

2. The Special Assistant appointed for this work arrived in this district at the end of January, and the Inspecting Engineer reached Waltair at the same time. With these officers I proceeded into the Jeypore country at the beginning of February, and the whole of that month was occupied in the examination of saddles and possible ghaut lines.

3. A ghaut head has at length been selected about midway between the Peuchipentah and Tadivalsa ghaut saddles, which will probably be the one finally adopted. The height of this saddle above the sea is about 3,200 feet, and it seems possible that a trace may be laid out from it into the plains on a gradient of 1 in 19, or 1 in 20.

4. A trial trace has been commenced, but on this and other preliminary operations it is not possible that more than 1,000 Rupees at the utmost can be advantageously laid out before 31st March.

5. I have therefore the honour to request you will be so good as to have Rupees 1,500 transferred to other works, that being the balance of the allotment made for the ghaut in G. O. No. 1,487 of 25th October last, and not now required.

---

No. 421. ORDER THEREON, 17th March 1873, No. 839.

CIVIL WORKS, No. 28.

ORDERED to be recorded.

2. The sum of Rupees 1,500 will be held at the disposal of Government.

(True Extract.)

(Signed) G. W. WALKER, Colonel, R.E.,
*Secretary to Government.*

To the District Engineer, Vizagapatam.
,, Financial Department.
,, Controller of Public Works Accounts.

Encl. Passing orders on the letter from the District Engineer, Vizagapatam, applying for an establishment for Mr. Assistant Engineer Coordinally on special duty, Jeypore.

Ed. E. C. Shunker.

Govt. of 1873 Madras

PUBLIC WORKS.

To

THE DISTRICT ENGINEER, VIZAGAPATAM.

Dated March 17th

Read

Encl

G. O., 17th March 1873, No. 839.

MARCH

Nos. 420 421

*Joypore Ghaut Works.*—Rupees 1,500 surrendered by the District Engineer, Vizagapatam, from the allotment for the Joypore ghaut works, ordered to be held at the disposal of Government.

3077/5

*Proceedings of the Madras Government, Public Works Department, 25th March* 1873.

No. 581. Read the following Endorsement of the Chief Secretary to Government, dated Fort St. George, 1st March 1873 :—

From the Acting Collector and Agent to the Governor of Fort St. George in Vizagapatam, to the Chief Secretary to Government, Fort St. George, dated Vizagapatam, 22nd February 1873, No. 215.

I HAVE the honour to acknowledge the receipt of Proceedings of Government, No. 3,033, dated 19th December 1872. The Proceedings reached me while on circuit, which will account for my not having replied to them ere this.

2. In paragraph 2 of the Government Order passed on the above Proceedings, it is stated that, in the opinion of the Governor in Council, it has not been satisfactorily shown why the Pachipenta ghaut was abandoned. It is on this point that I now propose to give some explanation, but before doing so I must notice some inaccuracies in the letter of the Acting Superintending Engineer recorded in the above Proceedings.

3. In paragraph 2 of this letter, Colonel Fischer states that he gave Mr. Fletcher, the Surveyor, certain instructions. I would observe that Mr. Fletcher, while employed in this district, was never under Colonel Fischer's orders, and consequently never in a position to receive or carry out any such instructions. Mr. Fletcher was* the Surveyor and Leveller sent to serve under Mr. Turner in place of the qualified native subordinate whom the Acting Superintending Engineer was directed in G. O. No. 57, Public Works Department, dated 15th March 1871, to place under the Assistant Agent. Of course, while under Mr. Turner, his work lay entirely on the trace between Potinghi and Tadivalasa, and if he had left his work to go and explore the Pachipenta ghaut, which he would have had to do to carry out the instructions Colonel Fischer says he received, he would no doubt have been fined by Mr. Turner. Mr. Fletcher naturally sent no surveys to Colonel Fischer, as he was employed in taking levels under Mr. Turner's orders. Before concluding I would add that Mr. Fletcher was dismissed and did not resign as stated in paragraph 4 of Colonel Fischer's letter. From the list of documents given in the margin of the letter, it would appear that after Mr. Fletcher's services had been dispensed with by Mr. Turner, Colonel Fischer obtained from him an account of his experiences on the ghaut works. I think and I hope the Government will agree with me in thinking that Colonel Fischer would have acted more in accordance with official etiquette and with what is usual had he applied to Mr. Turner himself for any information he might require instead of obtaining it from a subordinate like Mr. Fletcher.

4. In paragraph 2 of his letter, Colonel Fischer mentions having been called upon to report on a proposal of Mr. Minchin to connect the Joypore district with Vizagapatam by the Pachipenta ghaut, and adds that this route was ordered to be adopted. From this it would naturally be inferred that it had been determined, on Mr. Minchin's recommendations, to make the Pachipenta ghaut fit for wheel traffic, and I am sure that neither Mr. Minchin nor any one else who had ever been up

* Government Proceedings, Public Works Department, 16th June 1871, No. 262.
Government Proceedings, Public Works Department, 29th July 1871, No. 505.

the Pachipenta ghaut would propose to convert the existing line into a bandy road. Mr. Minchin in his letter referred to was discussing the relative advantages of the various ghauts leading from Jeypore to the plains, and considered the position of the Pachipenta ghaut the best, and he advocated the construction of a bandy road in that neighbourhood. One of the reasons for this selection was the existence of a road from Jeypore, *via* Potinghi, to the head of the ghauts. In the latter part of paragraph 2, Colonel Fischer speaks about gaining the pass leading to Jeypore at Soonkeycotta. This comes of speaking on the authority of a map on the scale of 4 inches to the mile without having seen the ground. Soonkeycotta lies at the bottom of a ghaut, one of the many the Pachipenta track crosses at right angles. The Soonkeycotta pass by which I suppose is meant the valley in which the halting place known as Soonkeycotta lies would lead not to Jeypore but to a point between the hills of Galikonda and Malasingharry, far south of the required situation. I need scarcely add that, as Mr. Minchin knew of no such route, he did not propose it.

5. I will now proceed to give the explanation referred to in paragraph 1. I would commence by stating that the Pachipenta ghaut is one of the many tracks leading from the hill plateau to the plains. Two others are mentioned in Mr. Minchin's letter, but there are several more which are more or less used by foot passengers and pack bullocks. This track was improved by Captain Smith when Assistant Agent. The work was undertaken by him without any other sanction than that of the Agent, and it has always been customary for the Agent to distribute and allot as seemed best to him the annual grant for jungle clearing and Jeypore roads. When, therefore, the Maharajah of Jeypore offered Mr. Turner to pay for the construction of a bandy road from the Jeypore plateau to the plains, and that offer was accepted by Government, it only remained to see how the object in view could best be obtained. To spend the money on attempting to make the Pachipenta ghaut fit for wheel traffic was out of the question, and would have been sheer waste of money. Mr. Turner explored the various valleys leading down from the plateau, and decided on selecting that which reaches the plain at Tadivalasa. It was important that whatever the line selected it should connect the road from the head of the Pachipenta ghaut to Jeypore with some point in the direction of Salur, which is a great market for the exchange of hill produce. The Tadivalasa line did this; the top of the ghaut is within 2 or 3 miles of Potinghi, which is on the Jeypore road. Tadivalasa, the foot of the ghaut, is about 15 miles from Salur. The distance from Salur to Potinghi, *via* the new ghaut and *via* the Pachipenta ghaut, is about the same. The advantages of the new ghaut as compared with the old are, firstly, that in the former nothing is lost of the ascent once gained, while in the latter several chains of hills are crossed at right angles, the descent in each case being nearly as steep as the original ascent; secondly, the actual ghaut is of less length in the former than in the latter; thirdly, the gradients in one case are easy, in the other they are extremely steep.

6. The objection to the new line put forward by Colonel Fischer is that it crosses most of the drainages already intersected by that portion of the Vizianagram-Parvatipore road which lies between Bobbily and Seetanagaram. This objection is made, I must premise, solely on the strength of a glance, and apparently not a very careful one, at the map, as Colonel Fischer has never been within 20 miles of either Pachipenta or Tadivalasa. Had the glance at the map been a more careful one he would have seen that a similar objection could be made to the road from the foot of the Pachipenta ghaut to Salur. Whether the road from Ramabhadrapuram on the Parvatipore road goes to Pachipenta by way of Salur or branches off at Salur to Tadivalasa, the Salur river must be crossed, a river which is already traversed by an additional stream has to be crossed, namely, that which descends the Tadivalasa ghaut, but this disadvantage is more than counterbalanced by the advantages which the new ghaut possesses over the Pachipenta one. I would add that though these drainages are, as Colonel Fischer says, traversed by the Vizianagram-Parvatipore road, they have never been bridged, nor is it likely that they will be for years to come; neither, in my opinion, should the two streams on the Tadivalasa line be bridged. There is little or no traffic in Jeypore during the rains, which are almost as heavy as on the Western Coast. Everybody who can avoids moving and there would be no object in spending large sums of money on bridging streams which are always fordable at the time of year during which there is any traffic.

7. I would conclude by saying that, as it has been usual for the Agent to decide on what roads the annual grant for Jeypore should be spent, and as the money spent on the Pachipenta ghaut was spent solely under that sanction, it was not considered necessary to obtain a special sanction from Government in order to authorize expenditure on the Potinghi-Tadivalasa line, and I hope that Government will consider the explanation given under the circumstances satisfactory.

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TRANSFERRED to the Department Public Works.

(Signed) W. HUDLESTON,
*Chief Secretary.*

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No. 582. ORDER THEREON, 25th March 1873, No. 923.

CIVIL WORKS, No. 39.

His Excellency the Governor in Council is quite satisfied with the explanation given by the Acting Collector and Agent to the Governor in Vizagapatam. It entirely confirms the general opinions expressed in the 1st paragraph of G. O. No. 3,033 of 19th December 1872; and His Excellency in Council trusts that the result of the deputation of the Inspecting Engineer for Ports and Communications, with a Special Assistant, to Jeypore will not only confirm the judgment of the Assistant Agent in working between Potinghi and Tadivalasa instead of by the Pachipenta ghaut, but show that some at least of his work can be utilized. What was required was practical experience. This has now been supplied, and His Excellency the Governor in

3079/7



Council has no doubt that the officer selected for the work will receive the cordial support of the Governor's Agent and his Assistants whenever it may be required.

(True Extract.)

(Signed) G. W. WALKER, Colonel, R.E.,
*Secretary to Government.*

To the District Engineer, Vizagapatam.
,, Inspecting Engineer for Ports and Communications.
,, Agent to the Governor in Vizagapatam.
,, Judicial Department.

Esd. E. C. Shunker.

15/10/83

Govt. of [1873] Madras.

PUBLIC WORKS.

To

THE DISTRICT ENGINEER, VIZAGAPATAM.

&c., &c., &c.

Dated March 25th.

Recd. Encl.

G. O., 25th March 1873, No. 923.

MAP

Nos. 581-582

*Jeypore Ghaut Works.*—Passing or
on letter from the Government Age
Vizagapatam, reporting on the abandi
ment of the Pachipenta ghaut line.

3079/8

*Proceedings of the Madras Government, Public Works Department,*
*22nd April* 1873.

No. 363. Read the following letter from Major J. BEATTY, R. E., District Engineer, Vizagapatam, to Colonel G. W. WALKER, R. E., Secretary to Government, Public Works Department, dated Waltair, 1st April 1873, No. 703 :—

THE Controller informs me that until the Jeypore works are constituted a separate range he cannot receive accounts and returns direct from the special Assistant Engineer, and instructs him to draw money and account for it through the nearest Range Officer.

2. Mr. Nordmann's head-quarters, during the working season in Jeypore, will be at least 95 miles from No. II. Range Office, at Waltair, and I anticipate much delay and inconvenience from the course indicated by the Controller.

3. The Executive Engineer's Establishment is at present so overtasked that it is with the greatest difficulty the business of his office can be carried on ; and if to this be added the necessity of references and correspondence with the officer in charge of the Jeypore works, the accounts of No. II. Range must be seriously delayed.

4. It is also of much importance in the case of the ghaut works, where there are special difficulties connected with the supply of labour, that payments should be promptly and regularly made, and that all risk of delay in the receipt of funds should be avoided ; such delays must however be frequent if application for funds and the supply of cheques be dependent on the district post, while the Vizianagram Range Officer is constantly travelling about his large range.

5. I have therefore the honour to request you will be good enough to move Government to constitute the works in Jeypore under the charge of Mr. Assistant Engineer Nordmann, a separate Range.

No. 364. ORDER THEREON, 22nd April 1873, No. 1,158.

CIVIL WORKS, No. 31.

THE Jeypore Ghaut works will be considered a separate Range.

(True Extract.)

(Signed) G. W. WALKER, Colonel, R.E.,

*Secretary to Government.*

To the District Engineer, Vizagapatam.
,, Inspecting Engineer for Ports and Communications.
,, Controller of Public Works Accounts.

Exd. S. T. Austin.

Govt. of {1873} Madras.

PUBLIC WORKS.

To

THE DISTRICT ENGINEER, VIZAGAPATAM.

&c., &c., &c.

Dated April 22nd.

Recd. Encl.

G. O., 22nd April 1873, No. 1,158.

APRIL

Nos. 363-364

*The Jeypore Ghaut Works* to be considered as a separate range.

24TH OCTOBER 1882, No. 855 I., PUBLIC WORKS.

3079/9

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Establishment.

No. 110.

READ—the following paper:—

From the Superintending Engineer, Third Circle.

ABSTRACT.—Disallowance Lists Nos. 104 and 209 of 1882-83.

No. 111.

ORDER—dated 24th October 1882, No. 855 I., Public Works.

The deputation of Mr. Garrett, the Executive Engineer in charge of the C. Project Division, for special duty in taking surveys and levels in connection with the Periyár project, in the Madura District, in the month of June last, is approved.

2. The Examiner of Public Works Accounts is authorized to pass Mr. Garrett's pay and travelling allowance for the period he was on special duty. He should be allowed double travelling allowance for the time spent in camp, west of Cumbum in the Madura District, under paragraph 671 of the Public Works Code.

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Ag. Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Superintending Engineer, Third Circle.
" Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.

Exd. S. T. Austin.
Spare Copies

IRRIGATION.
ESTABLISHMENT.

Govt. of {1882} Madras.

PUBLIC WORKS.

*Dated October, 24th.*

*Rcvd.* *Enel.*

**GO., 24th Oct. 1882, No. 855 I.**

**OCTOBER.**

**Nos. 110-111.**

**Mr. Garrett, Executive Engineer.**

*The deputation of* — for special duty on the Periyár project approved, and the Examiner of Public Works Accounts authorized to pass his pay and travelling allowances for the period he was so employed.



3079/10

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

No. 43.

READ—the following Memorandum by Colonel R. H. SANKEY, C.B., R.E., Chief Engineer, Public Works Department, dated 23rd January 1882:—

Having had the honor of accompanying His Excellency the Governor in his late tour through the Wynaad, it is necessary that I should state briefly the arrangements, which it seems necessary to adopt in regard to the trunk roads of that tract of country, to which so much attention has lately been drawn.

The facts brought under the immediate notice of His Excellency either by personal experience or by the information submitted in the addresses of the various influential bodies, and otherwise, have dissipated any doubt which might previously have existed as to the adequacy of the present communications for meeting in any proper sense the present needs of the Wynaad.

2. Suffice it to say that with the exception of the Támrachéri Ghât (an admirable work so far as it goes and about half completed as a trunk line) the rest are only fair-weather lines, some fairly traced, others indifferently so, and all insufficiently opened or formed, and as a rule quite unmetalled.

3. The papers printed with G.O., 14th November 1881, No. 2821 W., and particularly Major Mead's letter of the 16th July, define very clearly the limits of desirable action on the part of Government, the late discovery of auriferous reefs in North Wynaad pointing to the necessity for linking that portion of the country with the general system of Provincial roads, which as proposed by that officer would stand as follows:—

(1.) The road from Calicut to Vayitri by the Támrachéri Ghât.
(2.) Do. from Vayitri by Gúdalúr Ghât to Ootacamund.
(3.) Do. from the bifurcation about 4 miles out of Vayitri to Sultan's Battery.
(4.) Do. from Vayitri to Manantoddy.

4. The further examination of most of these lines has practically suggested little change in this scheme as a whole, though, for the sake of convenience, I shall in the following remarks adopt a somewhat altered classification, based on the requirements so far as ascertained of each portion:—

(1.) *Calicut to Malapuram.*—The main line now used, by Puddanellum as far as Támrachéri, though in its early portion with a hard gravel (laterite) surface, has extremely bad gradients; owing to the latter defect traffic it is understood even now seeks the somewhat circuitous though flatter road *viâ* Challaye to Támrachéri, and it will clearly be desirable to have the merits of both lines carefully investigated. I am not by any means satisfied that such an investigation, owing to the very small bridging required and the ease with which bad gradients can be flattened, may not show that the present road can be dealt with more economically than the other; but, whichever line may be finally accepted, I would, generally speaking, assume there will on the whole be some 30 miles to deal with at an average outlay of Rs. 5,000 per mile.

(2.) *Malapuram to Vayitri.*—Practically this is the Támrachéri Ghât, 13 miles. Some widening and flattening of gradients required throughout with remetalling of the whole surface 6 inches in consolidated depth, say at Rs. 6,000 per mile.

(3.) *Vayitri to Mopenad.*—Much of this line has only been indifferently traced and hardly any of it properly formed; metal surface there is none.

It can hardly admit of a doubt that the general direction and probably most of the trace will have to be adhered to, as the Culputty hills must in any case have to be skirted south. On the whole I should assign Rs. 6,500 per mile for completion of these 20 miles.

(4.) *Mopenad to 3 miles west of Gúdalúr.*—All this portion will apparently have to be retraced and worked out as the present line, running close by Pundaloor and Devála, hugs too closely the ghât range and courts difficulties which it would be desirable to avoid. I have little doubt that a better line will be found leading more direct from Mopenad to Nelliyalum along the old line which passes the dispensary south of the "Needle Rock" and thence towards Gúdalúr. Most of this would be new and could hardly cost on an average less than Rs. 9,000 per mile for its whole length, say 20 miles.

(5.) *From 3 miles west of Gúdalúr to Gúdalúr.*—To this imperfectly worked out portion may be assigned Rs. 6,000 per mile.

(6.) *Gúdalúr to Naduvatam.*—This which is practically the Gúdalúr Ghât may be taken at 9 miles in which the rise is not less than 2,000 feet. Traced fairly at first the roadway has in reality been only half opened out, being but 8 feet wide in portions and much rock left unremoved. The gradients in many places need to be flattened, the whole road widened to 15 feet and metalled throughout. Rs. 7,000 is the least that can be estimated as required per mile.

(7.) *Naduvatam to the bund at end of the Ootacamund Lake.*—This has all been very fairly traced, and has now a good deal of metal either collected or laid, but it is incompletely worked out in many places and the gradients here and there, though not frequently, require reduction. Rs. 4,000 per mile would probably meet the requirements of the 18 miles in length measured up to the lake at Ootacamund.

(8.) *From 4 miles north-east of Vayitri to Mootycherra.*—This, which may be called the first portion of the Vayitri-Sultan's Battery road, has in places very steep gradients and has never been really well formed. The length may be taken as 10 miles and to require Rs. 6,500 per mile.

(9.) *From Mootycherra viâ Sultan's Battery to the Noogoo or the boundary stream on the road to Mysore.*—I was only able to see a small portion of this line which runs generally through a less broken country than the roads to the south; the difficulties eastward, however, probably increase, and it would be as well to estimate that the whole 20 miles here would need an outlay of Rs. 5,500 per mile.

(10.) *Vayitri to Manantoddy.*—I was unable to inspect this road, but judging generally from its condition at commencement and the character of the country it traverses not less than Rs. 5,000 per mile will probably suffice for its whole length about 30 miles.

Summing up these results the approximate outlay on the several lines required to bring them into a fit state for bearing monsoon traffic would be as follows:—

| Through Line. | Items as above. | Miles. | Rate. | Total. | Grand Total. |
|---|---|---|---|---|---|
| | | | Rs. | Rs. | Rs. |
| Calicut *viâ* Vayitri and Gúdalúr to Ootacamund. | (1.) Calicut to Malapuram ... | 30 | 5,000 | 1,50,000 | |
| | (2.) Malapuram to Vayitri ... | 13 | 6,000 | 78,000 | |
| | (3.) Vayitri to Mopenad ... | 20 | 6,500 | 1,30,000 | |
| | (4.) Mopenad to 3 miles west of Gúdalúr ... ... | 20 | 9,000 | 1,80,000 | |
| | (5.) 3 miles west of Gúdalúr to Gúdalúr ... ... ... | 3 | 6,000 | 18,000 | |
| | (6.) Gúdalúr to Naduvatam ... | 9 | 7,000 | 63,000 | |
| | (7.) Naduvatam to Ootacamund Lake ... ... ... | 18 | 4,000 | 72,000 | |
| | | | | | 6,91,000 |



3079/11

| Through Line. | Items as above. | Miles. | Rate. | Total. | Grand Total. |
|---|---|---|---|---|---|
| | | Rs. | Rs. | Rs. | Rs. |
| Vayitri *viâ* Sultan's Battery to Mysore Frontier. | (8.) From 4 miles north-east of Vayitri to Mootycherra. | 10 | 6,500 | 65,000 | |
| | (9.) Mootycherra to *viâ* Sultan's Battery to Mysore Frontier ... ... ... | 20 | 5,500 | 1,10,000 | |
| | | 30 | 5,000 | 1,50,000 | 1,75,000 |
| Vayitri to Manantoddy. | (10.) ..... | | | | 1,50,000 |
| | Total ... | ... | ... | ... | 10,16,000 |

Say ten lakhs.

5. The approximate sums given above would provide for fully formed and metalled roads. Excepting on the ghâts and near Calicut where laterite is readily procured, metal is extremely scarce and gravel it is to be feared absolutely unprocurable. Quarries for the former will have to be established, and considerable expense in cartage incurred.

6. As regards the bridges, the present wooden ones though apparently flimsy are generally quite able to bear weights of $1\frac{1}{2}$ tons per wheel. Some will probably have to be removed at once and others replaced, from the subsequent maintenance allowances, as weakness shows itself.

7. The rates I have given would in all probability allow of half or one-third of the present wooden beams being replaced by iron plate girders in cases of small spans, and Warren girders for 50 or 60 feet spans. Advantage might be taken of such renewals to increase the width of the roadways from 12 to 16 feet throughout without altering the existing abutments which though only rough stone set dry or generally soundly constructed.

8. To the cost of the works as above roughly estimated, must be added that of the pay and shelter of the requisite establishment.

9. Probably five years would be needed for projection, estimation and execution of the works, and as not less than one Executive Engineer, three Assistants, ten Upper Subordinates, and an adequate Medical Staff would be needed, considering the unhealthiness of the country throughout much of the working season, the cost (taking into account special Wynaad allowances to which all the members of the department there employed would be entitled) cannot, I fear, fall short of 30 per cent. of the expenditure on the works.

10. The provision of proper shelter for the establishment is also an indispensable necessity, for preservation of health not only as regards the European officers and subordinates, but for the fixed establishment of coolies and mates, which must be maintained for carrying out promptly monsoon repairs of all finished portions.

11. In this view I should estimate approximately that the following provision must be made, viz.:—

| | Rs. |
|---|---|
| Executive Engineer's office and house probably at Vayitri ... | 15,000 |
| Five inspection bungalows at various points about 30 miles apart at 6,000 rupees each ... ... ... ... ... | 30,000 |
| Twelve houses for Upper Subordinates 10 to 15 miles apart at 2,000 rupees each ... ... ... ... ... ... ... | 24,000 |
| Two houses for Hospital Assistants do. ... ... ... | 4,000 |
| Twenty-four cooly lines (for a mate and ten coolies each) at from 5 to $7\frac{1}{2}$ miles apart at 1,000 rupees ... ... ... ... | 24,000 |
| Total ... | 1,97,000 |

12. Tools and plant may be taken at the usual amount, viz., $2\frac{1}{2}$ per cent. on cost of works.

13. It must further be borne in mind that, no sooner has any portion of road been finished than provision must be made for proper maintenance.

14. When the whole 173 miles have been completed the following scale for maintenance may suffice:—

| | RS. |
|---|---|
| 30 miles of road in Malabar at Rs. 250 per mile ... ... ... | 7,500 |
| 22 miles Támrachéri and Gúdalúr Ghâts at Rs. 600 per mile ... | 13,200 |
| 121 miles in Wynaad and Nilgiris at Rs. 350 per mile ... ... | 42,360 |
| Total per annum ... | 63,060 |

15. Taking into account the comparatively small proportion of this ultimate amount, which will be required during the first five years, it will suffice to allow an all round average of 15,000 rupees per annum, or 75,000 rupees for maintenance during this period. To this should be added Rs. 25,000 for repairs of houses and offices, making a total for repairs of all classes of 1 lakh.

16. The remaining contingencies will consist chiefly of compensation for land taken up for sites for buildings; for quarries for stone, metal, or gravel; for brick-fields; for widening portions of old and forming new roads, &c. Notwithstanding the strongly expressed desire on the part of owners of estates to meet the Government in the most liberal spirit in regard to this question, demands of this character must be expected and will have to be provided for; but it would be impracticable here to attempt any detailed calculation for the probable cost. There can be little doubt that in the aggregate the charge must be considerable, and it would therefore be well to put down 1 lakh on this account.

17. The cost of the scheme may be summed up as follows:—

WORKS.

| | RS. | RS. |
|---|---|---|
| *Original*— | | |
| (*a.*) Reformation or completion of 173 miles of road. | 10,00,000 | |
| (*b.*) Buildings ... ... ... ... ... | 1,97,000 | |
| (*c.*) Compensation for land ... ... ... ... | 1,00,000 | |
| | 12,37,000 | |
| *Repairs*— | | |
| To roads and buildings ... ... ... ... | 1,00,000 | |
| Total Works ... | | 13,97,000 |
| ESTABLISHMENT. | | |
| (Calculated at 30 per cent.) ... ... ... ... ... ... | | 4,01,100 |
| TOOLS AND PLANT. | | |
| (Calculated at 2½ per cent.) ... ... ... ... ... ... | | 33,425 |
| Grand Total ... | | 18,31,425 |

Say in round numbers 18¼ Lakhs.

18. With exceptional energy and free resort to contract the scheme might no doubt be worked out in less than the five years assumed, but in that case enhanced labor rates, which would neither suit Government nor those interested in planting or mining, would certainly have to be resorted to. As matters stand, if the construction of the railway be decided on at an early date, this result will, it is feared, be unavoidable, and must add to the outlay.

19. Assuming that 18¼ lakhs will suffice, and that the establishment can be set to work in next October, the following provision of funds would in all probability have to be arranged for:—

| | RS. |
|---|---|
| 1882-83 (half-year)... ... ... ... ... ... ... | 75,000 |
| 1883-84 ... ... ... ... ... ... ... ... | 2,00,000 |
| 1884-85 ... ... ... ... ... ... ... ... | 3,00,000 |
| 1885-86 ... ... ... ... ... ... ... ... | 4,00,000 |
| 1886-87 ... ... ... ... ... ... ... ... | 5,00,000 |
| 1887-88 (half-year)... ... ... ... ... ... ... | 3,50,000 |
| Total ... | 18,25,000 |



3079/12.

20. For administrative purposes it will be necessary to form the whole into a separate charge (under the Superintending Engineer, Fourth Circle,) which might be designated the "*Wynaad Road Division.*"

21. The present arrangements for maintaining the existing roads through the agency of the Local Fund Engineer need not necessarily be disturbed, till such time as the establishment of the new Public Works Division, is in a position to take over the work of complete reconstruction in any particular portion, and the grants-in-aid as now given by Government might with slight modification continue till completion of the scheme, when the arrangements would no doubt call for reconsideration.

22. The chief difficulty in initiating a scheme of the character proposed will be found in securing efficient establishment, the present Public Works Department having more work on hand than it can satisfactorily supervise, and having moveover but few members specially qualified for the work. I am now, however, engaged in making the needful inquiries regarding the establishment, and in the meanwhile the general character of the scheme as above sketched, and the incidence of the charge may, if thought desirable, be considered by Government.

23. On the accompanying map the proposed roads are shown in green.

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READ—the following G.O., dated 1st April 1882, No. 319, Financial.

*Read*—again the following G.O., dated 27th June 1881, No. 1192, Revenue:—

*Order*—dated 27th June 1881, No. 1192, Revenue.

The Board of Revenue will call upon the Local Fund Boards concerned to make a special report upon the state of the communications referred to in the memorial, which they will then forward to Government with such remarks and suggestions as the circumstances of the districts concerned may seem to demand.

(Signed) C. G. MASTER,
*Acting Chief Secretary.*

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*Read*—the following Proceedings of the Board of Revenue, dated 23rd January 1882, No. 202:—

Read—the following letter from G. McWATTERS, Esq., President of the Local Fund Boards, Malabar District, to the Secretary to the Board of Revenue, dated Calicut, 21st December 1881, No. 1013:—

With reference to the Proceedings of the Board of Revenue, dated 4th August 1881, No. 1594, communicating G.O., dated 27th June 1881, No. 1192, I have the honor to forward the Local Fund Engineer's detailed reports on the state of the communication leading from the Coast to South and South-east Wynaad.

No. I is the Local Fund Engineer's inspection report on the present state of these roads.

No. II comprises his remarks on the relative advantages of the Karkur and Támrachéri routes compared with the cost of a 2 feet 6 inches railway.

No. III is an estimate for putting the Karkur road in order for fair-weather traffic and for loads not exceeding 5 tons. The total amount is Rs. 18,640.

No. IV is an estimate for bridging and making the Karkur road a first-class communication in all weathers. The total is Rs. 4,74,620.

No. V comprises three estimates for similarly making the roads from Calicut to Lackadi, Lackadi to Manantoddy, and Lackadi to Choladi, being our limits on the line to Devála. The total is Rs. 6,49,860. From Choladi to Devála in South-east Wynaad would probably cost another lakh.

No. VI is an estimate for making a 2 feet 6 inches railway from Calicut to Manantoddy and Devála *via* the Támrachéri and Terriot Ghâts. The total cost is Rs. 36,29,000.

The papers speak for themselves. It appears to me that the advantages are altogether in favor of the railway.

ENCLOSURE No. 1.—Local Fund Engineer's detailed reports on the state of the communication leading from the Coast to South and South-east Wynaad.

*Resolution*—dated 23rd January 1882, No. 202.

The Board by their Proceedings, dated 4th August 1881, No. 1594, forwarded to the Presidents of Malabar and Nílgiri Local Fund Boards the Government Order noted in the margin, which directs a special report to be submitted regarding the state of the communications between the Malabar Coast and the Wynaad Gold Fields referred to in a memorial addressed by the Secretary of one of the Mining Companies to the Secretary of State. The Order of Government requires further that the Board forward the report called for with such remarks and suggestions as the circumstances of the districts concerned may seem to demand.

Dated 27th June 1881, No. 1192.

2. The report from the Nílgiris has not yet been received. A reminder has been sent to the President.

3. The paper read above furnishes full information as regards Malabar and contains proposals for carrying out improvements necessary for rendering satisfactory the state of the communications referred to.

4. The Local Fund Engineer's report appears to be complete and shows clearly that the road from Calicut to the Wynaad (Nadagany) *via* the Karkur Ghât, which is 69 miles long, is practically impassable.

5. For 50 miles the surface of the road is good enough, but 14 miles are said to be in very bad condition, having never been properly made. It is, however, practically unimportant, as regards present traffic, what the condition may be of the road's surface, since 12 bridges are unsafe or capable only of supporting insignificant loads. In a climate such as that of Malabar this involves the certainty of traffic being entirely suspended for half the year, and, considering the configuration of the country, probably altogether, for it is not easy to find a way across even shallow streams when banks are steep and beds rocky. To make this into a *fair-weather* road, suitable for traffic of two-axle carts carrying five tons, would cost Rs. 18,640 according to the Engineer's rough estimate.

6. There is a loop from Condoty *via* Areacodé to Eddawana, some 15 miles in length, which is 3 miles shorter than the road *via* Manjeri, but this line is now broken by a fallen bridge, and the Engineer does not recommend its restoration as the expense would be much greater than that of repairing the line now in use.

7. To make the Karkur Ghât Road into a first-class communication in all weathers for heavy traffic would cost Rs. 4,74,620.

8. But the Engineer prefers the route by the Támrachéri Ghât to Lackadi, &c., as being more generally useful and serving a more important part of the district. The distance to Devála by this route is 76 miles from Calicut against 73½ by the Karkur Ghât. The cost would be Rs. 6,49,860 against Rs. 4,74,620. But this would carry the line only to the frontier of Malabar, and the President puts down another lakh from the frontier to Devála.

9. An alternative scheme is proposed in the shape of a railway 2′ 6″ gauge. This would run from the Coast *via* the Támrachéri Ghât to Devála, and the cost would be about Rs. 36,29,000. The President thinks the balance of advantages is in favor of this scheme.

10. Speaking of the construction of the railway, the Engineer says the work could be completed to Lackadi in 18 months after starting the works, *provided* the road were closed to traffic meanwhile.



3079/13

11. At paragraphs 23 to 26 of his report the Engineer makes some forcible remarks regarding the manner in which gold-mining machinery is shipped, and offers suggestions for facilitating its transport over the roads.

12. The President has not examined these proposals in detail, nor does he make any observations regarding the cost of any of the works. Presumably he looks upon them all as quite beyond the financial power of the Local Fund Board to carry out and intentionally omits all reference to the subject, regarding discussion as mere waste of time. Whether or not he is justified in thus treating a matter upon which he was called upon to report specially, it is necessary for the Board, in forwarding his letter and its enclosures, to comply with the instructions of Government and to offer "such remarks and suggestions as the circumstances of the districts concerned may seem to demand."

13. The total annual revenue of the Malabar Circle amounts to about Rs. 3,80,000. The following statement gives the details for 1880-81:—

| — | Road Fund. | General Fund. | Total. |
|---|---|---|---|
| | RS. | RS. | RS. |
| Balance ... ... ... | 46,272 | 22,029 | 68,301 |
| Land Cess ... ... ... | 1,45,776 | 72,888 | 2,18,664 |
| Tolls ... ... ... ... | 75,992 | ... | 75,992 |
| Other Receipts ... ... | 69,793 | 16,068 | 85,861 |
| Total Receipts ... | 2,91,561 | 88,956 | 3,80,517 |
| Total including Balance ... | 3,37,833 | 1,10,985 | 4,48,818 |

14. It is of course possible for the Local Fund Board, by starving other works, to provide the Rs. 18,640 required to carry out the repairs to the Karkur Ghât Road necessary to render it useful for light traffic in fair weather, but this would by no means satisfy the Mining Companies. The other works proposed, even if it were admitted that they form a fair charge upon the Local Funds, would have to be carried out on loan. Supposing the Támrachéri line to be adopted, the amount needed (Rs. 6½ lakhs) would, at 5 per cent., cost the Local Fund Rs. 32,500, of which a small part, say a quarter, or Rs. 8,000, might be recouped from tolls on the road, and the balance would be a permanent charge on the funds of the Circle.

15. Interest on the capital (Rs. 36½ lakhs) required for the railway would, at 5 per cent., amount to Rs. 1,82,500. Nothing is said in the papers before the Board about probable receipts, and without data it is impossible to form any idea of the amount of traffic which might be expected. This, however, is certain, that, whether the Mining Companies succeed or not, the industry on which they are engaged is not of a character likely to supply a very large quantity of traffic after machinery has been got into position. If a dividend is to be looked for, it must be expected from the planters of the Wynaad rather than the miners.

16. Here the question arises whether, in the event of the proposal to construct a railway from above the ghâts to the coast being favorably received, the line now proposed is, in view of all requirements to be met, the most suitable which can be selected. The Gold-mining Companies not unnaturally think that their interests are paramount, but, however successful their enterprise may prove, it will be many years before it becomes an established industry such as it now is in the older parts of the Australian Colonies, and such as coffee planting and curing has long been above the Western Ghâts. In present circumstances it will probably not be disputed that coffee as compared with gold is entitled to the higher consideration, and consequently the terminus of the railway on the coast should be fixed according to the requirements of the planters rather than those of the miners.

17. The following statement gives particulars of the export of coffee from the three principal ports of the West Coast during 1880-81 :—

| Name of Port. | CWTS. | RS. |
|---|---|---|
| Calicut ... ... ... ... ... ... | 62,390 | 27,89,155 |
| Tellicherry ... ... ... ... ... .. | 132,355 | 53,33,056 |
| Mangalore ... ... ... ... ... ... | 69,323 | 29,97,557 |

From this it appears that Calicut comes only third in importance with regard to the coffee trade, while Tellicherry is *facile princeps*. Again Tellicherry is nearer to Manantoddy than is Calicut, and presumably the cost of the line to that port would, as regards distance, be less than to Calicut. Consideration should also be paid to the fact that Tellicherry is nearer to the military station of Cannanore than is Calicut, and more in a line with Mysore, should connection with the interior be hereafter advisable. On the other hand the line to Tellicherry would seem to cross much more water, requiring highly-expensive bridging, than the more southern line to Calicut, and it is understood that the Mysore authorities propose to continue their railway system to Gundalpet, which would favor the Calicut connection.

18. The points for decision seem, therefore, to be—

(1.) Whether, in view of the possible establishment of the gold-mining industry, improvement in communication between the Wynaad and the Coast is to be made at once ?

(2.) What form the improvement, if determined upon, is to take ?

(3.) If the form of a first-class *road*, whether the line by the Támrachéri Ghât or that by the Karkur Ghât should be adopted ?

(4.) If a railway, what port is to be selected as its littoral terminus ?

(5.) How, in any case, is the cost to be met ?

19. The Gold Companies want means to enable them to get up their heavy machinery from the West Coast ports. To contemplate the construction of a railway in connection with this subject is out of the question for the reason stated above and also because the railway would not be ready for traffic for 18 months after starting the works (and then only if the line is closed the while to all traffic) and some time must elapse before the works are started. What is wanted is immediate communication between the Wynaad and the West Coast. The rail road is a matter of importance as a means of communication with the interior, but as likely to afford assistance to the Gold-mining Companies the Board cannot recommend it. Of the two lines of road, the Board are of opinion that that by the Támrachéri Ghât should be made into a first-class communication as proposed, but it is not within the power of the Local Fund Board to provide the required funds, and, if the immediate execution of the work is determined on, it is necessary that the cost should be met by Government.

(A true Copy and Extract.)

(Signed) E. GIBSON,
*Acting Sub-Secretary.*

To the Chief Secretary to Government, Financial Department,
with one enclosure in original, to be returned.
" President of the Local Fund Boards, Malabar.
Copy to the President of the Local Fund Board, Nilgiris.

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*Read*—the following Proceedings of the Board of Revenue, dated 27th January 1882, No. 277 :—

Read—the following letter from R. W. BARLOW, Esq., President of the Local Fund Board, Nilgiris, to the Secretary to the Board of Revenue, dated Ootacamund, 19th January 1882, No. 3 :—

In reply to the Board's official memorandum, dated 17th instant, No. 63, drawing attention to Proceedings, No. 1594, dated the 4th August last, I have the honor to forward copy of a special report received yesterday from the Local Fund Engineer regarding the state of communications leading to the Wynaad Gold Fields.

3079/14



ENCLOSURE No. 1.

From J. O'SHAUGHNESSY, Esq., C.E., Local Fund Engineer, Nilgiri District, to the President of the Local Fund Board, Nilgiris, dated 17th January 1882, No. 47.

In reference to your endorsement on Proceedings of the Board of Revenue, dated 4th August 1881, No. 1594, calling for a report on the state of certain roads leading to the Gold Mines in the Wynaad, I have the honor to state that there has been no impediment to the transport of gold-mining machinery over the roads of this district.

2. The main line of communication in this district which connects the Coast with the Gold Mines is, I need scarcely say, the road from Mettupálaiyam *viâ* Coonoor, Ootacamund, Naduvatam, Gúdalúr, Nadagani, Devála, Pandaloor, and on to the limits of the district near Cherambádi.

3. The road is divided into six sections as follows :—

| | MILES. |
|---|---|
| 1st.—Mettupálaiyam to Coonoor ... ... ... ... ... ... | 20 |
| 2nd.—Coonoor to Ootacamund ... ... ... ... ... ... | 12 |
| 3rd.—Ootacamund to Naduvatam ... ... ... ... ... ... | 21 |
| 4th.—Naduvatam to Gúdalúr ... ... ... ... ... ... | 10 |
| 5th.—Gúdalúr to the Devála Road, near Nadagani, 8 miles, and thence to the 11th mile on Karkur Ghat, 3 miles ... ... ... ... | 11 |
| 6th.—Nadagani to Choladi Bridge near Cherambádi ... ... ... | 21 |
| Total ... | 95 |

4. Sections 1 and 2 from Mettupálaiyam *viâ* Coonoor to Ootacamund is thoroughly completed and is perhaps one of the finest ghat roads in the world. The bridges are however all of timber, and it is impossible to say where a beam, a bolt, or a plank may give way, and this, at a time when a heavy load may be passing over a bridge, would endanger the whole structure, but for all practical purposes these two sections of the road may be considered always open to loads of any weight that can possibly be carried upon it.

5. Section 3, from Ootacamund to Naduvatam, 21 miles, was formed to widths of from 9 to 18′ and open to cart-traffic in 1870 ; it passes for nearly its whole length through clay and loamy soil and has never been finished ; it is a fair-enough road for ordinary traffic in dry weather, but, though carts have struggled along it even in wet weather, it cannot be considered a cart-road in the rainy season of the year.

6. The rough estimate of improving this road amounted to Rs. 84,000 as reported on the 14th October 1880. The estimate for thoroughly completing the road to a width of 18′ throughout, 12′ of which to be metalled with a depth of 6″ of broken stone and 1½″ of gravel, with bridges culverts, side and catch drains, stone and earthen parapets, has now been framed, and it amounts to 1,60,000 rupees, or an average of about 8,000 rupees per mile. Considering that a cubic yard of broken stone including quarrying, breaking, carting, spreading, and rolling costs 5½ rupees and that the cost of the other portions of the work is proportionally high, the work cannot possibly be done in a proper and efficient manner for less than this amount.

7. By Government Order in the Public Works Department, No. 299, dated 21st February 1881, Rs. 10,000 for 1880-81 and Rs. 10,000 for 1881-82 were allotted from Provincial Funds for the improvement of this road, and a further sum of 30,000 rupees from Chinchona revenue was at the same time promised for this purpose. Arrangements were at once made for the execution of the most necessary portions of the work up to this amount of 50,000 rupees. The Provincial grants have been expended, but there appears to be some delay in allotting the 30,000 rupees promised from Chinchona revenue, and I have heard, though I have received no official intimation on the subject, that the Government of India have refused to sanction this grant. The Government of Madras will, no doubt, provide funds from some source to enable this Board to meet the engagements made on the promise of a grant of 50,000 rupees, and the stoppage of the work would even then be disastrous, as tools, cattle, and labor sufficient to complete the whole road before the end of 1882-83 have been collected at great expense and trouble, and the disposal of the tools and cattle and the dispersion of the labor would entail serious loss and delay.

8. Section 4, from Naduvatam to Gúdalúr (the Gúdalúr Ghat), was begun in 1865 and was open to cart-traffic in the year 1870. This road also has not been fully completed, but it passes through good road-making soil, and, though rough and uneven in many places, it is a sound and firm road, and it is practicable for common carts with any possible load throughout the year.

9. Section 5, the road from Gúdalúr to Nadagani, 8 miles, and the portion of the Karkur Ghat in this district, beyond Nadagani, 3 miles,—total 11 miles—was made by me in 1865 ; all the culverts except two are of masonry abutments and arches. The only large bridge, the Seeputty, which is 50′ span, is a wooden girder able to carry any weight that could be put on it ; this was completed by the late Captain Coningham, R.E., in 1866. This road has been partly

metalled. It is now in very fair order, though the traffic on it is calculated to be 500 carts daily. It wants remetalling throughout its entire length.

10. Section 6, road from Nadagani to the limits of this district at Cholady, 21 miles. This road was constructed by the planters, principally by Mr. Minchin of Devála and Captain Cox of Cherambádi. The Planters' Association received a grant-in-aid for its upkeep, but at the end of 1879-80 the Association found itself unable to get the work done, and the grant for that year was, at the request of the Association, transferred for expenditure to the Public Works Department. The road has been kept up since April 1880 by this Board, and it is said to have been much improved during that time. This road has never been properly traced or formed, and, in view to carry out the proposal to connect the head of the Karkur Ghat at Nadagani with the head of the Támrachéri Ghat at Vayitri by a first-class road, an entirely new trace, utilising the existing road (so called) as much as possible, should be first made.

11. The next most important road in this district is that from Kuckanulla on the Mysore frontier *viâ* Tippacadu to Gúdalúr. From Kuckanulla to Tippacadu, about 4 miles in length, is a portion of the old road from Ootacamund *viâ* Sigúr Ghat to Mysore and is in fair order, passable for cart-traffic with any load at all times of the year. From Tippacadu to Gúdalúr was thoroughly formed, bridged, and partly metalled in 1865, 1866, and 1867; it is in fairly good order, but wants remetalling for almost its whole length of 11 miles.

12. All the other roads in this district, 292 miles, are mere dry-weather roads, unmetalled and incomplete; as regards width and formation, they have mostly all been made during the last fifteen years in a hurried and inexpensive a manner as possible to meet the wants of the numerous plantations scattered far and wide apart throughout the district. They are kept in fair order for dry-weather traffic, and there have been no complaints lately of their condition; when they can be made into first or even second-class roads it is impossible to say.

13. The most important of these roads is the Kótagiri Ghat, 20 miles in length; this was begun in 1871 on an estimate of 45,000 rupees and opened to cart-traffic in 1875; most of the bridges are what is called temporary, and the average width is only about 10'. The upkeep of this road is of great importance to the station of Kótagiri and the very large number of plantations in that part of the district. It was damaged very seriously by the storm of the 21st November last (1881), when two bridges were carried away and great lengths of the road blocked and destroyed by land-slips; the obstructions to traffic were removed in a few days at a cost of Rs. 806-12-0. The estimate for reconstructing the bridges and restoring the road amounts to a further sum of Rs. 7,000.

14. The present state of the roads to which special allusion is made in the Revenue Board's Proceedings under reference may be summarised as follows:—

| Name of Road. | Present State. | Expenditure required. | Remarks. |
|---|---|---|---|
| | | Rs. | |
| Main road from Mettupálaiyam *viâ* Coonoor, Ootacamund, Naduvatam, Gúdalúr, and Devála to limit of district at Cholady—1st and 2nd Sections, Mettupálaiyam to Ootacamund, 32 miles. | In perfect order.. .. | | |
| Third, Ooty to Naduvatam .. .. .. | Incomplete and impassable in wet weather. | 1,60,000 | To complete it thoroughly. |
| Fourth, Naduvatam to Gúdalúr, 10 miles .. | Passable at all seasons; wants metalling. | 40,000 | To make it a first-class road. |
| Fifth, Gúdalúr to Nadagani and on to the limits of district on Karkúr Ghát, 14 miles. | Passable at all seasons; wants metalling. | 40,000 | Do. do. |
| Sixth, Nadagani to Cholady, 21 miles .. | A track made by planters. | 2,00,000 | For an entirely new road of the first class and allowing for portions of present track that may be utilised. |
| Road from Mysore portion to the Devála Gold Fields, portion from Kuckanulla to Gúdalúr, 15 miles. | Passable for any load at all seasons, wants remetalling and the renewal of two small bridges. | 60,000 | To make it a first-class road. |
| Kótagiri Ghát .. .. .. .. .. | A fair-weather road .. | 1,00,000 | To make it a second-class road. |
| | Total .. | 6,00,000 | |

Of this amount five lakhs of rupees appertain to the demands of the Gold Mining Company's officers and one lakh to the wants of the Kótagiri Division.

15. The most pressing and necessary portions of these works are the road from Ootacamund to Naduvatam and the Kótagiri Ghát. A grant of Rs. 60,000 in addition to the Rs. 20,000 lately expended is required for the first-mentioned road to make it passable at all seasons of the year, and Rs. 10,000 is urgently required to repair recent damaged portions and to improve other portions of the Kótagiri Ghát.

16. I observe that the Nílgiri Planters' Association has intimated to His Excellency the Governor that my rough estimate of Rs. 5,000 per mile for a portion of the proposed road from

3079/15



Nadugani to Cherambádi is *excessive*. That estimate was for merely metalling and improving the present tract, and I doubt if it would be sufficient for even this purpose. A mile of finished road cannot be made, according to the standard specifications of the Public Works Department, in any part of this district for less than from Rs. 10,000 to Rs. 15,000 according to its class. The road from Tippacadu to Nadagani cost, I think, Rs. 12,500 per mile. The Karkúr Ghât cost Rs. 20,000 per mile, and the Támrachéri Ghât cost, I believe, Rs. 50,000 per mile.

17. The earthen formation of a mile of road in easy soil will

| | Rs. | A. | P. | |
|---|---|---|---|---|
| cost at least ... ... ... ... ... ... | 1,500 | 0 | 0 | per mile. |
| Culverts and bridges at least ... ... ... ... | 1,500 | 0 | 0 | ,, |
| Metalling at 1,450 cubic yards at Rs. 5 ... ... ... | 7,250 | 0 | 0 | ,, |
| | 10,250 | 0 | 0 | ,, |
| Add for supervision and sundries at 25 per cent. ... | 2,562 | 8 | 0 | ,, |
| Total ... | 12,812 | 8 | 0 | ,, |

and this estimate makes no allowance for rock, which is almost invariably met within the formation of a long line of road.

18. I do not suppose that His Excellency the Governor is at all likely to accept off-hand the irresponsible, and on this subject the ignorant, opinions of the Secretary to the Nílgiri Planters' Association, but it is as well that His Excellency should be informed of the exact state of the case as soon as possible.

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*Resolution*—dated 27th January 1882, No. 277.

Submitted to Government in continuation of Board's Proceedings, dated 23rd January 1882, No. 202.

2. It appears that the Local Fund Engineer estimates that the sum of five lakhs of rupees would be necessary for the purpose of putting into order all the roads in the Nílgiri District which are used by the Gold Mining Companies.

(True Copies and Extract.)

(Signed) E. GIBSON,
Acting Sub-Secretary.

To the Chief Secretary to Government, Financial Department.
Copy to the President, Local Fund Board, Nílgiris.
,, ,, ,, ,, ,, Malabar.

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ORDER—dated 1st April 1882, No. 319, Financial.

Communicated to the Public Works Department for consideration in connection with the schemes now being dealt with for connecting the gold fields with Ootacamund and for constructing a railway from Beypore to Gúdalúr with extension to Mysore.

(True Extract.)

(Signed) J. D. REES,
*for* Acting Chief Secretary.

To the Public Works Department, with enclosures.
,, Board of Revenue.

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ENCLOSURE.

From G. ANDERSON, Esq., District Engineer, Malabar Local Fund Department, to the President, Local Fund Board, Malabar, dated Calicut, 17th December 1881.

In accordance with your instructions appended to Board of Revenue's Proceedings, No. 1594, of 4th August last, I have the honor to report that a careful and detailed inspection has been made by me of the present direct road from Calicut to South-East Wynaad *viâ* Manjeri and Karkúr Ghât, as also the section of Road No. 5, Kondótti to Edawanah *viâ* Areakode, which is a portion of the direct road proper, but this is now closed to through traffic, owing to a break at the Kodingalore river midway between Kondótti and Edawanah.

2. The route from Calicut to Nadagani *viâ* Manjeri is 69 miles against 66 *viâ* Areakode.

3. The surface of the road on the first 50 miles from Calicut is in good condition throughout; it has a good cross section, is well drained, and has a covering of broken laterite stone

6 inches thick that is capable of carrying the present heavy traffic during fair weather, but should the same heavy traffic continue throughout the whole year and during heavy monsoon weather the road will most certainly be cut up and suffer severely.

4. From the 50th to 64th mile the road surface is in very bad condition, and after a shower of rain becomes heavy and trying to all classes of wheeled and pack traffic. There is no covering material proper throughout the whole of the last 14 miles. This portion of road was never finished, only widened out, sectioned and side drained; and from time to time since opening for traffic, boulders, pebbles, broken stone and gravel have been thrown down indiscriminately in patches, on the portions that suffered most, during heavy rains in the hopes of getting a firm bottom. In most places the system has succeeded in getting a certain firmness, but the result has not been satisfactory, for owing to the varying wearing qualities of the materials employed in levelling and giving a temporary covering to the road surface it is now a succession of small mounds and ruts, and in many places it is studded with large stone 4 inches to 6 and 8 inches in diameter standing about 2 to 3 inches above the road surface in a manner that is very trying to both up and down traffic.

5. Repairs are now being carried out at the worst places and the large stones are being removed and broken up into 1½ inches cubes and again relaid.

6. The gradients throughout the whole length of road between Calicut and Nilgiri boundary are even the worst of them suited for the present slow heavy traffic with exception of the short length between 27-6 and 28-0.

7. The road surface has an average width of 15 feet throughout on banks through paddy flats 12 feet and on side cutting 18 feet clear width which is sufficient for the present traffic. The only alteration that is now needed is the widening of a few narrow portions—under 12 feet width—on the ghât amounting in all to about 1½ miles in length for a width of 2 yards and 3 yards height.

8. All bridges and culverts, with exception of those mentioned in the following table and in paragraph 10, are now up to loads not exceeding 10 tons, on one carriage with maximum load not exceeding 2·5 tons on any one axle. For loads greater than 2·5 tons the additional axles required must have their centres not less than 6 feet apart.

*Table showing culverts to be reconstructed.*

| Miles from Calicut. | Description of Culverts. | Necessity for carrying out alterations proposed. |
|---|---|---|
| 22·0 | One 9 feet arch, ring 2¼ feet thick ... | On account of arch being unsafe for loads over 2·0 tons per axle. |
| 24-4 | One 5½ feet flat covered culvert ... | On account of dangerous position of culverts. |
| 27-6 | One 10 feet arch, ring 2¼ feet thick... | This bridge is unsafe for loads over 1½ tons per axle. |
| 57-4 | One 4 feet wooden culvert ... ... | Beams decayed and unsafe for present traffic. |
| 58-4 | One 9 do. do. ... ... | Beams too light for present traffic. |
| 58-7 | One 4 do. do. ... ... | Beams decayed and unsafe for present traffic. |
| 59-4 | One 6 do. do. ... ... | Do. do. do. |
| 60-3 | One 6 do. girder ... ... | Do. do. do. |
| 61-2 | One 6 do. culvert ... ... | Do. do. do. |

9. The above-named culverts should be repaired at an early date to meet requirements of present ordinary traffic and will cost about Rs. 1,190.

10. The three large bridges at 38-0, 38-2, and 43-7 are now only capable of carrying loads of 1·5 tons per axle, and the maximum safe load on any one of the ordinary carriages on 2 axles such as are now used in bringing up the heavy mining machinery must not exceed 3 tons and only one vehicle to be allowed on any bridge at a time. To make these bridges equal to the safe loads of 2·5 tons per axle and up to but not exceeding 5 tons on 2 axles at not less than 6 feet centres, wheel track beams should be laid over the joists for the purpose of distributing the wheel loads. The cost of these beams would be Rs. 1,100.

11. To convert the above-mentioned bridges into structures capable of carrying loads over 5 tons on any one vehicle, say up to 10 tons on 4 axles, would require a sum of Rs. 43,950.

12. The enclosed estimate No. 1 gives the approximate cost—Rs. 18,640—of works required to be carried out to make the road safe and capable of meeting existing heavy traffic during fair weather and allowing a maximum load on any one vehicle of 5 tons on bridges at 38-0, 38-2, and 43-7, and of 10 tons on all other structures.

13. In the case of all loads over 2·5 tons and up to 5 tons they must be carried on 2 axles at centres not less than 6 feet, and in the case of loads over 5 tons and up to 10 tons a Bogie carriage should be used with axles of Bogies at not less than 6 feet centres and the centres of

3077/16



Bogies at not less than 20 feet apart. These loads must of course be clearly understood to include weight of the carriage or truck in every case.

14. If the road is to be made equal to carrying a quick and heavy traffic throughout the year with same axle loads as now allowed, then the following works would have to be carried out.

15. Widening of roadway to not less than 18 feet throughout.

16. The tracing and construction of about 5 to 6 miles of new road to bring the (existing heavy) grades (on the 18, 23, 26, 27, 28, 30, 46 and 47 miles) down to 1 in 20, the greater portions of the work would be in easy side cutting.

17. Metalling with 9 inches of broken stone 12 feet wide throughout the length of 64 miles of road.

18. The removal of present trusses and girders at 38-0, 38-2, and 43-1 and replacing them by new girders of wrought iron.

19. The construction of an iron bridge over river at Ferroke Ferry on the 7th mile.

20. The amount required to carry out and complete the works above mentioned will be about Rs. 4,74,620, for details of which see my approximate estimate No. 2.

21. It would not, I think, be advisable to alter the present through route *viâ* Manjeri to the shorter line *viâ* Areakode. The latter is less important as a local road, and it would cost a much larger sum of money to carry out the necessary alterations in easying gradients and constructing bridge at 23-3 to make it suitable for quick and heavy through traffic than would be required for the corresponding section *viâ* Manjeri.

22. I am of opinion that loads over 5 tons on any single vehicle should not be allowed over any part of the road, but should the Board think it desirable to allow heavier loads then I would suggest that immediate notice be given that the loads to be admitted will only be such as are in accordance with those specified in paragraph 13, and under no circumstance should greater loads per axle or per carriage be allowed on to the road.

23. The whole of the very heavy machinery that has gone up to the Wynaad by the Karkúr Ghât might easily have been sent out in a much more portable form, say in sections not exceeding 2 tons, if a little care and consideration had been bestowed upon the design, and the only additional cost to those most interested would have been the fitting of the sections together on arrival at their destination.

24. There has been a considerable amount of damage done to many portions of the road surface owing to want of sufficient power to move the heavier loads of 2½ tons and upwards freely over the softer portions of road and some of the worst gradients. The bullocks are often not able to do more than just move the load, and whenever this occurs the men in charge begin slewing and swinging the carriage from side to side, thus trying to get it over the difficult part; this action very soon breaks up the road surface, and eventually in many cases a large hole is at last formed out of which it is often impossible to move the bandy which is then left standing on the road to the great inconvenience of the general traffic until the contractor can get additional cattle or other power.

25. This system of working the traffic is undoubtedly telling seriously on the weaker portions of this road and must be stopped at once; some fixed system that will ensure fair play being given to the covering material should be adopted and insisted upon being carried out. For loads over 1½ tons there should be not less than four bullocks per ton over all portion of the road.

26. The simplest and easiest way of preventing the safe loads being exceeded would be for the Board to have two or three Bogie carriages constructed, and notice should be given that loads over 5 tons and up to 10 tons (including weight of special carriage) shall only be allowed on to the road on one or other of these carriages and a charge made according to the class of load sufficient to recoup the Board, say even with two or three trips, and further the contractor should be bound to take the load through to its destination and back to Calicut or Ferroke Ferry within a specified time, failing which he should be fined or charged a certain fixed sum for each day over the time named. The weight of Bogie truck or carriage for maximum load would be about 2 tons, which leaves 8 tons as the maximum load to be carried on a truck.

27. Looking at the question of communications between the Coast and Wynaad, I think it could hardly be advisable, in any interest of the Boards or of the district generally, to recommend the altering of the Karkúr Ghât route to Wynaad into a first-class road having an 18 feet formation, with 12 feet width of metalled surface, bridged throughout and capable of carrying a fast and heavy traffic with axle loads up to but not exceeding 2·5 tons at a cost of Rs. 4,74,620. The expenditure of such a large sum of money on this road would not, I think be justifiable under any existing circumstances.

28. The distance from Calicut to Nadagani at the head of the ghât is 69 miles *viâ* Manjeri and to Devála 73½ miles; it touches the villages of Kondótti, Manjeri, Edawanah, Nilambúr, and taps the Devála and Ouchterlony valleys, thus leaving out entirely both North and South Wynaad.

29. The line that offers the greatest advantages both as regards an economical construction and also facilities in the way of easy and direct communication between the more important localities and villages of the Wynaad, and between Wynaad and the Coast is undoubtedly the one from Calicut to North and South-East Wynaad *viâ* Támrachéri Ghât. This road enters the plateau at Lackadi 35 miles from Calicut.

30. From Lackadi to Manantoddy is 31 miles, or a total distance of 66 miles from Calicut.

31. From Lackadi to Devála is 41 miles or a total distance of 76 miles from Calicut as against 73½ miles to Devála *viâ* Karkúr Ghât.

32. These lines of communication pass through the following villages:—1st Section Karandur, Támrachéri, Poodoopady, Achoor, Terriote and Manantoddy, and on the 2nd Section it touches the villages of Vayitri, Chundale, Meppádi, Cherambádi, Pandalur and Devála.

33. To make this road fit for a heavy and quick traffic, it will have to be metalled throughout with a layer of broken stone not less than 9 inches thick and 12 feet wide.

34. The road between the coast and foot of ghât has some severe gradients, about 1 in 10 to 1 in 15 and 1 in 18. A new trace and construction of say 4 or 5 miles of new road would probably enable us to get ruling grades of 1 in 20.

35. The formation has now an average width of about 15 feet and the narrower portions can be widened out at a small cost.

36. The water-shed crossed by both lines is very light, and with the exception of three large bridges on the Lackadi-Manantoddy Section there are no other large or important works to be constructed.

37. The timber work on all culverts and small bridges must be renewed.

38. The greater portion of the existing masonry structures are strong enough to meet the requirements of a first-class road with loads of 2·5 tons per axle and up to 10 tons on 4 axles. The cost of carrying out and completing the two lines would be about Rs. 6,49,860, as per approximate abstract estimate No. 3, item No. 3 appended.

39. The labor difficulty has to be encountered throughout the Wynaad, and this will no doubt become more serious as the mining industry developes. In the event of any of these lines being taken up it would therefore be advisable to substitute, as far as possible, mechanical power in lieu of manual or animal power. I would recommend that two road rollers of the latest types weighing not less than 8 tons fitted with gearing for driving stone breakers, and two stone-breaking machines complete should be procured. The roller would carry the stone-breaking machines from place to place as required, and it could also be employed in hauling out the broken metal for distribution along the road. An eight ton roller would give 224 lb. inch pressure for first rollings, and after the metal covering had been exposed to the wheel rolling of the ordinary traffic the final operations of the road roller would give an inch pressure of 400 to 500 lb. to the raised portions of the metal that have been left untouched between the cart wheel tracks and thus ensure the surface covering being thoroughly consolidated and free from any chance of disturbance under even the heaviest traffic.

40. The cost of a roller and stone breaker complete delivered in this country would be about Rs. 11,280, and the working expenses per day would be Rs. 5 to Rs. 7, equal to As. 1-3 per cubic yard of stone broken. The quantity capable of being turned out is about 100 cubic yards per day.

41. I propose to use for bridges having one or more spans up to 30 feet a continuous girder resting on iron piers, the whole structure to be formed out of old rails which can be erected at about the same cost as timber work for same spans and will of course eventually allow of a very considerable saving in maintenance.

42. It may be mentioned that the present maintenance allotments are only fit for keeping up such unfinished roads as we have on the Karkúr Ghât, Támrachéri Ghât, Lackadi-Manantoddy, and Lackadi to Devála Sections as fair-weather roads. The maintenance rates for first-class roads on the Western Ghâts, Konkans and Bombay District and Ceylon Hill roads ranges from about Rs. 600 to Rs. 1,200 and even Rs. 2,000 per mile.

Judging from my short experience of our hill roads, I do not think it will be possible to maintain any one of them in an efficient condition throughout the year for a less sum than Rs. 500 to Rs. 600 per mile.

Taking into consideration the heavy outlay that will have to be incurred in completing the roads and the further heavy annual maintenance allotments that will be required to keep them in good order, it would, I think, be very much more economical and unquestionably prove of far greater advantage to the whole district generally if a light narrow gauge railway were constructed instead of the lines of roads proposed.

The sum required for maintenance of the 108 miles of proposed roads at the rates named above would if capitalised be equal to 12 to 13 lakhs, or one-third of the sum required to complete the whole 120 miles of proposed railway.

3079/17



I inspected somewhat hurriedly the country between Devála and Manantoddy *viâ* Vayitri and am satisfied that there is nothing likely to prevent the construction of a line that would allow of ruling gradients of 1 in 100 being developed, but to get a cheap surface line short lengths of 1 in 50 to 1 in 30 might be introduced.

Between Calicut and Lackadi the present road might be followed, and where wide enough over 20 feet and otherwise suitable the railway might be laid down on the one or other side of it, and thus as far as possible utilise a valuable property which, if the line is once constructed, will certainly be but little used except by small and unimportant local traffic between villages and homesteads situated between stations.

The whole of existing gradients between the coast and foot of ghât might be altered so as to give ruling gradient of 1 in 50 by new alignments that would necessitate the construction of say eight or nine miles of new cuttings and banks with average height of three feet and nine feet formations.

The watershed to be crossed by both the proposed lines as already mentioned in paragraph 36 is very light and the only large bridges required would be as per following table:—

| Name of Section. | No. of waterways required over 20 feet up span. | Clear waterway. | Remarks. |
|---|---|---|---|
| Calicut ... ... | 2 | 60 feet. | One has abutments built in rubble chunam. |
| Lackadi ... | 6 | 30 feet. | |
| | 4 | 50 | |
| Lackadi ... | 2 | 40 feet. | One has abutments built in rubble and chunam. |
| Manantoddy ... | 2 | 100 feet. | |
| Section ... ... | 6 | 30 feet. | One has abutments built in rubble and chunam. |
| | 1 | 200 feet. | |
| | 1 | 250 feet. | |
| Lackadi ... | 3 | 30 | One has abutments built in rubble and chunam. |
| Devála ... | 2 | 40 | |
| Section ... | 2 | 80 | |
| | 1 | 100 | Piers and abutments built in rubble and chunam. |

All other waterways would cost about Rs. 2,000 to Rs. 3,000 per mile.

The Támrachéri Ghât is 8 miles in length and has an average gradient of 1 in 18; it could easily be worked by a rack railway and with one of Abts or Riggenbach's latest types of rack locomotives similar to those used on the Rorschanet and Heiden Railway. These locomotives are capable of working on an ordinary railway by adhesion; and by the adjustable rack wheel it can work on to the rack rail without stopping the train and are then capable of taking loads 4½ times their own weight up grades of 1 in 15 at 4 miles per hour.

The curves on this ghât are capable of being utilised; and but little alteration would be required if the whole ghât is given up entirely to the railway which it is believed might easily be done, for after opening of the line it could hardly be expected that any through traffic would exist that could warrant the keeping open of such an expensive line of communication.

This line is the more important when we consider that the alterations required to make it suitable for a narrow gauge—2 feet 6 inches—railway might be carried out within a year and the whole section up to Lackadi might be completed and opened for traffic within 18 months—after first starting of works—if this concession of closing the road were granted.

It would be a shortsighted policy to withhold the entire use of this portion of the road, considering the advantages it offers in giving us ready to hand such an important item as the completed earthworks of the ghât section of this railway would form, and also the fact that only a small and unimportant section of the community would be likely to suffer in consequence of the road being closed to ordinary traffic.

There are at present six zigzags on the ghât which could be worked by reversing stations, but two or three of these might be altered by putting in short curves of 1½ chain radius with grades of 1 in 10 to 1 in 6.

New cuttings to ease curves would have to be carried out at various points, amounting in all to, say, about 1 mile, with an average width of 4 yards and a height of 3 yards as per appended Estimate.

Four bridges, each of 50 feet span, would have to be constructed upon the ghât for the purpose of easing curves at sharp re-entering angles.

The cost of the main line to Devála and the branch to Manantoddy would be Rs. 36,29,095 as per approximate Estimate No. 12 of Wynaad-Calicut Railway appended.

The probable working expenses are given in Estimate No. 9 and amount to Rs. 3,28,900.

The estimate for Railway plant and materials are based upon prices quoted during past month by three leading English firms who have had considerable experience in the especial requirements of such light lines as the one now proposed.

## GOLD ROAD.

### CALICUT TO SOUTH-EAST WYNAAD.

Special Inspection in accordance with instructions of G.O., No. 1,192, dated 27th June 1881, Revenue Department.

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-Divisional Officers or Overseers. |
|---|---|---|---|---|
| 1 | 26th Oct. 1881. | ... | Left Calicut and proceeded to Ramnad; 9th mile. Found the road in very good condition throughout. | |
| 2 | ... | ... | The only interruption to free communication on this section is the Feroke Ferry, where a very considerable loss of time takes place in transporting the wheeled traffic across the river. | |
| 3 | ... | ... | This river is some 500 feet in width, with a mean depth, at ordinary river water level and at highest tide, of 12 feet, and has a flood-water level of some 10 feet above this, or a total mean depth of water at highest floods of 22 feet approximately. | |
| 4 | ... | 7-7½ | Four 4 feet arch openings, all in good order. | |
| 5 | ... | 5-8 | Two 6 feet arch, ring 1½ feet thick, in good order. | |
| 6 | 28th Oct. 1881. | ... | Ramnad to Kondótti, 16½ miles. Inspecting road and bridges. | |
| 7 | ... | 9-4 | Two 4 feet arch openings, ring 1½ feet thick, in good order. | |
| 8 | ... | 9-4½ | Two 4 feet arch openings, ring 1½ feet thick, in good order. | |
| 9 | ... | 9-7 | One 6 feet arch, ring 1 foot thick, in good order. | |
| 10 | ... | 10-2 | Two 4 feet arch, ring 1 foot thick, in good order. | |
| 11 | ... | 10-5 | One 4 feet arch, ring 1 foot thick, in good order. | |
| 12 | ... | 10-5½ | One 4 feet arch, ring 1½ feet thick, in good order. | |
| 13 | ... | 11-2½ | Two 4 feet arch, ring 1½ feet thick, in good order. | |
| 14 | ... | 12-3½ | One 4 feet arch, ring 1½ feet thick, in good order. | |
| 15 | ... | 13-6 | One 4 feet arch, ring 1 foot thick, in good order. | |
| 16 | ... | 14-3 | Three 1½ feet flat top, stone cover 6 inches thick, in good order. | |
| 17 | ... | 14-3½ | Three 6 feet arch, rings 1½ feet thick, in good order. | |
| 18 | ... | 15-4 | One 3 feet arch, ring 1 foot thick, in good order. | |
| 19 | ... | 15-4½ | One 6 feet arch, ring 1½ feet thick, in good order. | |
| 20 | ... | 15-0 | A good quarry might be opened for metal. If necessary, it could be supplied at about Rs. 1-8-0 per cubic yard laid into work for any distance up to two miles. | |

3079/18



Special Inspection in accordance with instructions of G.O., No. 1192, &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-Divisional Officers or Overseers. |
|---|---|---|---|---|
| 21 | ... | ... | The whole section of road between Ramnad and Kondótti is in very good order, and road covering consists of laterite 4 to 6 inches thick and fit to convey a heavy traffic during dry weather. | |
| 22 | ... | ... | The average width of roadway is about 15 feet, on banks through paddyfields it is about 12 feet, and on side long ground is 18 feet. | |
| 23 | ... | ... | The gradients are easy, and there is no portion of the road that is likely to interfere with either quick light or slow heavy traffic. | |
| 24 | 2nd Nov. 1881. | ... | From Kondótti to Manjeri *via* Road No. 6. This route is now used by the whole traffic between South-East Wynaad and the Coast, instead of the section of No. 5 Road between Edawanah and Kondótti *via* Areacode. Notes on this section are appended. | |
| 25 | ... | 17-1 | Two 4 feet arch, ring 1½ feet thick, in good order. | |
| 26 | ... | 17-4½ | Two 3 feet flat covered culvert, cover stone 10 inches thick, all in good order. | |
| 27 | ... | 17-5½ to 17-5¾ | Rising grade of 1 in 18, road surface in good order. | |
| 28 | ... | 17-7½ to 18-0 | Falling grade of 1 in 18. | |
| 29 | ... | 18-1½ | Two 4 feet flat covered culvert, cover stones 9 inches thick, in good order. | |
| 30 | ... | 20-3½ | One 6 feet arch, ring 1½ feet thick, in good order. | |
| 31 | ... | 20-7½ | A good stone metal quarry could be opened, and would cost probably 12 annas, broken into cubes 1½ inches at quarry site. | |
| 32 | ... | 21-6½ | One 4 feet arch, ring 1½ feet thick, in good order. | |
| 33 | ... | 22-0 | One 9 feet arch (ring 2¼ feet thick), in good order; parapet walls want raising. This culvert is an old structure, and has been built very irregularly, it is, however, still well suited to carry ordinary traffic of, say, up to 2 tons per axle for years to come. It is considered necessary a light rail girder, capable of carrying heavier loads, could be erected at a cost of Rs. 500. | |
| 34 | ... | 22-3 | A good metal quarry might be opened. | |
| 35 | ... | 22-0 to 22-3½ | A rising grade of 1 in 16; road in good order. | |
| 36 | ... | 22-3½ to 25-5½ | Falling grade 1 in 16, in good order. | |

Special Inspection in accordance with instructions of G.O., No. 1192, &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-Divisional Officers or Overseers. |
|---|---|---|---|---|
| 37 | ... | 23-3 | One 6 feet arch, ring 1 foot thick, in good order. | |
| 38 | ... | 23-5¼ | Two 6 feet arch, ring 1½ feet thick, in good order. | |
| 39 | 3rd Nov. 1881. | ... | Road No. 56, portion of Gold Road. Inspected road and bridges from 23-2 to Manjeri. | |
| 40 | ... | 23-7 | One 4 feet arch, ring 1 foot thick, in good order. | |
| 41 | ... | 24-2 | One 5½ feet flat covered culvert, cover stones two; in thickness, one 7 inches and the other 4 inches thick, or a total of 11 inches thickness. This bridge will do well enough for ordinary traffic, but with the occasional heavy loads now brought upon it must soon collapse. This culvert is, from its position, altogether unfit to be on a main road, and it is a puzzle to me how it can so long have existed without an accident happening. It is situated at a sharp bend, or rather an angle formed by the road as it leaves the hill-side with a falling gradient of 1 in 16 on to a paddy flat, over which the road aligns to the north, forming an angle of some 60 degrees with the road running down through the wood on the hill-side. The roadway between parapets is only 10 feet wide. This bridge must be replaced by an iron rail girder bridge if heavy traffic of 3 tons and upwards per axle is to continue. | |
| 42 | ... | 25-2 to 25-5 | There is a rising grade of 1 in 15 and a falling grade from 25-5 to 25-7. These could be altered to grades of 1 in 20, or 1 in 30 by a new trace that could easily be got along the opposite side of valleys. | |
| 43 | ... | 22-0 to 25-7 | The road could be altered to more suitable gradients by trace and construction of probably not more than 4½ miles of new road. | |
| 44 | ... | 26-6 to 27-0 | Rising grade of 1 in 15. | |
| 45 | 4th Nov. 1881. | 27-1 to 27-4 | Falling grade of 1 in 12. | |
| 45A | ... | 26-6 to 27-4 | These grades could be altered at the cost of new trace and construction of about ¾ of a mile to grades of about 1 in 20. | |
| 46 | ... | 27-5 | Two 6 feet flat cover culvert, cover stones 1 single stone 12 inches thick, all in good order. | |



3079/19

Special Inspection in accordance with instructions of G.O., No. 1192, &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-Divisional Officers or Overseers. |
|---|---|---|---|---|
| 47 | ... | 27-6 | One 10 feet arch (ring 2½ feet thick). This bridge shows decided signs of weakness either in arch ring or abutments. There are several large longitudinal cracks extending the whole length of soffit. The face of arch ring shows a decided outward hang, and I consider the bridge to be quite unsafe for anything over ordinary country cart traffic. The abutments are, I believe, very light, only 1½ feet thick. The bridge should be removed and a rail girder bridge should be erected. Plans and estimates for proposed new bridge will be sent in shortly. This bridge has only 9 feet width of roadway between parapets, and it, together with the culvert at 24-2, goes far to prove that in most cases over bridge roadways might be reduced to a 9 feet width throughout, except where a large bridge adjoins a town, and where there would be at all times of the day a constant flow of traffic in both direction. A reduction to width of 9 feet or 10 feet would on many of our bridges allow of a large saving in cost of construction, as also in maintenance. | |
| 48 | ... | 27-6 | The roadway should be raised for a length of 50 feet on both sides of bridges, as the sudden dip in both sides makes it very trying for heavy traffic. This bridge is situated in a very nasty and dangerous corner, at foot of a 1 in 15 grade which aligns from the bridge at an angle of some 10 degrees. | |
| 49 | ... | 27-6 | A new trace should be carried towards 28-0, as the present grade of 1 in 10 to 1 in 12 and the sharp alignment of road from bridge makes the place decidedly dangerous for heavy traffic. The new alignment for road between 27-6 and 28-0 must be south round hill-side through cultivated terraced lands. The new trace might be made almost level with scarcely any increase of length of road and at a very small cost as the cutting would be in side long ground. | |
| 49A | ... | ... | The road surface between Koudótti and Manjeri is in very good order and capable of carrying heavy traffic during dry weather. The covering consists of 6 inches of broken laterite stone. | |

Special Inspection in accordance with instructions of G.O., No. 1192, &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-Divisional Officers or Overseers. |
|---|---|---|---|---|
| 50 | 5th Nov. 1881. | 28-6 | Manjeri to Edawanah (over Road No. portion of Gold Road). One 14 feet span plain wooden beam 12″ × 10;″ No. 3 girders in width of roadway at 6 feet 8 inches centres. This bridge is all in good order and up to any weight. The waterway is insufficient, and an additional span should be added, or a clear opening of 24 feet width and 6 feet clear height to underside of girder is required. During heavy floods the water rises over the roadway to south of bridge for a length of 80 feet with average depth of 1 foot. The existing north abutment, which consists of 3 courses of laterite stone in chunam, rests on very hard laterite rock at 3 feet below the present and proposed girder bed level. The new south abutments would have to be carried down 2 feet below nullah bed, or a total depth of 8 feet below girder bed level. | |
| 51 | ... | ... | At junction of Areacode road there is an unprotected well close up to side of road; it is in a most dangerous condition. Overseer has been ordered to raise a parapet wall 3 feet high and 1½ feet thick all round it. | |
| 52 | ... | 29-6 to 30-2 | There is a rising grade of 1 in 18; road surface in good order. This grade might be eased between the points named if a new trace were made up the other side of a valley. The trace and construction would not be very heavy, and the whole cost would probably not exceed Rs. 3,500. | |
| 53 | ... | 30-6 to 30-7½ | There is a falling grade of 1 in 15, and here again an alteration for the better could be effected by a new trace and construction of ¼ of a mile of new road at a cost of, say, Rs. 3,000, including land charges, &c. | |
| 54 | ... | 31-6 | Two 6 feet arch, ring 1½ feet thick, all in good order. | |
| 55 | ... | 33-4 | Road No. 5, Gold Road proper; two 10 feet semi-circular arch, wing 1½ feet thick, masonry laterite in chunam; half of this bridge was only very recently rebuilt. The whole structure is in good order. | |
| 56 | ... | 34-1 | Two 6 feet arch, ring 1½ feet thick, all in good order. | |



3079/20

Special Inspection in accordance with instructions of G.O., No. 1192, &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-Divisional Officers or Overseers. |
|---|---|---|---|---|
| 57 | ... | 35 | One 25 feet arch, semi-circular, ring 2¼ feet thick. This bridge shows a crack right along longitudinal centre line. The crack was first discovered about 9 months ago, and the plaster that was then laid over it shows no signs of disturbance. I do not think the crack is likely to increase or be enlarged. I have ordered three tie rods to be laid through the spandril walls, and this will be sufficient to prevent any further damage. Bridge is otherwise in good order and up to any weight under 20 tons. | |
| 58 | ... | 37-3 | Edawanah to Nilambúr section. One 15 feet arch, ring 1½ feet thick, all in good order. | |
| 59 | ... | 38-0 | Emgothoodoo Bridge. This bridge consists of three wooden trusses, each of 31 feet clear span, and height of roadway above Nullah. Bed at highest pier is 30 feet. With the exception of some petty repairs there has been nothing done to this bridge since it was built 10 or 12 years ago. There are three trusses carrying roadway in each span. The ends of the trusses carried by piers rest directly over a column, of which there are three forming each of the trestle piers. The trusses are all in fairly good order with exception of the outside one on upstream side in No. 1 span. The main or stringer beam and the distance pieces between ends or tops of struts on the trusses are very much decayed, and the heavy traffic should be confined to two-wheel tracks laid along on both sides of the centre trusses in each span. Plan and estimates will be sent in for carrying out this work. The piers are in fairly good order, but signs of dry rot have appeared at the ground line of each column; it, however, only effects the sapwood portions. No. 1 pier is 30 feet in height and requires diagonal tracing. Some of the joists are beginning to show signs of dry rot. The roadway planking is all very much decayed on underside of planks, and although suited to carry the ordinary loads of common country carts, it is very unsafe for anything heavier than 1½ tons per axle. On the whole I consider that the | |

Special Inspection in accordance with instructions of G.O., No. 1192, &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-Divisional Officers or Overseers. |
|---|---|---|---|---|
| | | | platform joists and roadway planking should be renewed at an early date even for carrying ordinary country cart traffic. The bridge as it now exists might be allowed to carry loads of 2·5 tons per axle up to 5 tons on 2 axles, and if wheel tracks and additional beams were laid over the present joists and planking immediately over the main or stringer beams as per plans to be sent in. | |
| 60 | ... | 37-1 | One 25 feet semi-circular arch (ring 2¼ feet thick), has two very slight cracks running whole length of soffit under spandril walls. The cracks are not serious, but to prevent any further disturbance I have ordered 3 tie rods to be fixed from the outside of each wall under the roadway, and thus brace them securely together. | |
| 61 | ... | 38-2 | Two 56 feet iron Warren girders. This bridge is in very good order, and up to a load of 2·0 tons per axle, or a total load of any one carriage at centre of span not exceeding 5 tons. | |
| 62 | ... | 40-2 | Two 2 feet flat covered culvert, stones 11 inches thick, in good order. | |
| 63 | ... | 41-2 | Two 3 feet flat covered culvert, stone 10 inches thick, in good order. | |
| 64 | ... | 41-7 | Two 4 feet flat covered culvert, stone 11 inches thick, in good order. | |
| 65 | ... | ... | Road and grades from Edawarah to Nilambúr are in good order. There are six rising and falling grades of 1 in 15 to 1 in 18 of an average length of 100 yards that must tell on heavy traffic after rains. The road covering materials are not good, consisting as they do of a sharp friable laterite stone that yields to weathering influence, and after a shower of rain becomes little better than mud. | |
| 66 | ... | 43-1 | Karampoya Bridge is a wooden structure consisting of four spans of Howe trusses 61 feet in the clear and 66 feet over all, with an effective depth of 11 feet. The roadway is carried on joists 8 inches × 5 inches, placed at 2 feet 10 inches centres, and have an effective span of 15 feet. The roadway is formed of 2½-inch jungle-wood planks placed diagonally. This bridge is now very much in want of immediate repairs to carry even ordinary cart traffic, as several of the planks are quite decayed and unsafe; some of them have been broken through. The cross beams or joists are in many cases very badly affected with dry rot; the worst of them have been strengthened by placing new rough jungle-wood joists 6 inches × 4 inches alongside of them. The bridge is now up to loads of 1·5 tons per axle, and anything heavier, say up to but not exceeding 2·5 tons per axle, should be carried on permanent wheel tracks laid down upon the centre of each span to distribute the load over two or more joists. The maximum load of any one carriage to be allowed on this bridge should not exceed 5 tons on two axles. | |

3079/21



Special Inspection in accordance with instructions of G.O., No. 1192, &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks by Sub-Divisional Officers or Overseers. |
|---|---|---|---|---|
| 67 | ... | 44-3 | One 4½ feet flat covered culvert, stone 10 inches thick, in good order. | |
| 68 | ... | 45-4 | One 4 feet flat covered culvert, stone 10 inches thick, in good order. | |
| 69 | ... | 48-1 | Two 4 feet flat covered culvert, stone 9 inches thick, in good order. | |
| 70 | ... | 48-5 | One 6 feet flat covered culvert, stone 9 inches thick, in good order. | |
| 71 | ... | ... | Road surface from Nilambúr to Edakara in fairly good order with exception of portions of 47th and 49th miles. The whole of the covering material of this section is bad, but the subsoil is fairly good with the exception of the two miles named. These two places should be metalled with broken stone, which can, I believe, be got of a good quality at a quarry some 2½ miles off, or by laying down a plank roadway. Estimate for both will be made out and forwarded shortly. | |
| 72 | ... | 50-0 | Iron bridge of one span 96 feet in the clear; all in very good order and up to a load of 3 tons per axle and a load on any one carriage not exceeding 12 tons at the centre of span. | |
| 73 | ... | 51-7 | One 4 feet flat culvert, cover stone 9 inches thick, in good order. | |
| 74 | ... | 51-2 | One 4 feet flat culvert, cover stone 9 inches thick, in good order. | |
| 75 | ... | 53-3 | Two 4 feet covered culvert, stone 9 inches thick, in good order. | |
| 76 | ... | 52-2 | One 6 feet covered culvert, stone 5 inches thick, in good order. | |

Special Inspection in accordance with instructions of G.O., No. 1192 &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-divisional Officers or Overseers. |
|---|---|---|---|---|
| 77 | ... | 53-0 *via* Areacode and 56-4 *via* Manjeri. | Ghât road begins. | |
| 78 | ... | | The road between Edakerra and foot of ghât is in very bad order, and the rains of last two nights have made it exceedingly heavy. The road has no covering material proper. In some places an attempt has been made to do a little metalling, but owing to the very economical system adopted of laying a single layer of stones in patches it has proved a very short-sighted policy, for the stone is now of no use as a covering to the road surface and the money expended has simply been thrown away. | |
| 79 | ... | 53-0 to 61-0 | Ghât road is in very bad condition throughout, the surface is now very much cut up and rutted, while in many places the boulders and broken stones that have been thrown down to form a hard bottom have become exposed in a manner that is certainly dangerous and must be very trying to traffic. There are several very narrow lengths of road under 12 feet width that should be widened out. The whole length of ghât up to Nilgiri boundary should be resectioned, proper side drains formed and metalled throughout for a full width of 12 feet with broken stone 6 inches thick; unless this work is carried out it will simply be impossible to maintain this section in anything like good order. | |
| 80 | ... | 56-4½ | One 4 feet wooden culvert; timber all in good order. | |
| 81 | ... | 57-4 | One 4 feet wooden culvert; timber all in bad order; must be removed at once; have ordered Overseer to put the work in hand. | |
| 82 | ... | 57-6 | One 4 feet wooden culvert; in good order. | |
| 83 | ... | 58-4 | One 9 feet wooden culvert; timbers are rather light for heavy loads that have been going over lately; they have now been supported at centres, thus reducing their effective span. The north abutment seems to have yielded a little at weak point. Have ordered streets to be put in between abutments. | |
| 84 | ... | 58-7 | Four feet wooden culvert; in bad order. Estimates, &c., will be sent in for repairing this at an early date. | |

3079/22



Special Inspection in accordance with instructions of G.O., No. 1192, &c.—*cont.*

| Item Number. | Date. | Miles from Calicut. | Notes and Remarks by District Engineer. | Remarks of Sub-divisional Officers or Overseers. |
|---|---|---|---|---|
| 85 | ... | 59-4 | One 6 feet wooden culvert; timber in bad condition, showing signs of dry rot. Have ordered beams to be supported at centres; estimates will be sent in at an early date for repairing this bridge. | |
| 86 | ... | 60-3 | One 6 feet wooden girder; beams in bad condition; must be removed at once and replaced by new ones. Overseer has been instructed to get this done. | |
| 87 | ... | 61-2 | One 6 feet wooden culvert; timber showing signs of dry rot. Overseer has been ordered to send in plan and estimate for work required to be done. | |
| 88 | ... | 61-6 | A land slip has occurred. The road has been temporarily protected and the Overseer is now engaged collecting material to rebuild revetment 40 feet high and for a length of 15 feet. | |
| 89 | ... | ... | The work required to be done in clearing out the ghat road to an average width of 15 feet would necessitate cutting of about 1½ miles in length, 2 yards wide, and some 3 yards in height. | |
| 90 | ... | ... | The average grade on ghat is about 1 in 18, but there are one or two very steep portions about 1 in 10 and 1 in 12 for very short lengths; these places might be eased by blasting out the rock if it is determined to make this road suitable for heavy and quick traffic. The cost of carrying out this work would be about Rs. 2,000. | |

(Signed) G. ANDERSON,
District Engineer, Malabar,
Local Fund Department.

## GOLD ROAD.

## APPENDIX.

### Road No. 5, Kondótti to Edawanah Section.

| Item Number. | Date. | Miles from Calicut. | Inspection Notes and Remarks by District Engineer. | Remarks by Sub-divisional Officers or Overseers. |
|---|---|---|---|---|
| 1 | 29th Oct. 1881. | 17 to 23-1½ | Six minor culverts and tunnels of 4 to 6 feet; water-way all in good order and up to 2·5 tons per axle. | |
| 2 | ... | 17-0 to 18-4 | Grade rises about 1 in 18. | |
| 3 | ... | 18-4 to 19-6 | Grade falls in 1 in 13 to 15. | |
| 4 | ... | 19-6 to 21-7½ | There is a succession of short rising and falling grades of 1 in 15 to 1 in 20. | |
| 5 | ... | 21-7½ to 23½-0 | Falling grade of 1 in 18. | |
| 6 | ... | 23-1½ | Two 8½ feet arches, ring 1½ feet thick in good order. | |
| 7 | ... | 23-2 | One 15 feet arch, ring 1½ feet thick, in good order. | |
| 8 | ... | 23-3 | Is Kadangaloor river or backwater about 100 feet wide. The bridge over this river was destroyed in 1877 during a very heavy flood. Under ordinary circumstances during highest floods the water-way would be sufficient, but on the occasion referred to a large quantity of newly-felled timber that had been left lying insecured at the side of the river was carried on to the bridge and piled up against it, so that the timber piers collapsed. The water-way required will be 100 feet width with clear height to under side of girders not less than 30 feet above lowest nulla bed. The old site of foundation of south abutment should be used as it appeared for probings made that the soil at and immediately around the old site was very firm and compact at a depth of 3 feet underlying a bed of silt that has been deposited since the destruction of old bridge. The same nature of soil extends—judging from the probings made—from about 10 feet. North of centre of water-way to north abutment underlying a silt deposit of 3 to 4 feet in thickness; screw-pile piers and iron girders would probably be the best and cheapest durable class of bridge that could be erected over this river and would cost from Rs. 9,000 to Rs. 10,000. | |
| 9 | ... | 23-5 | Two 6 feet arch, ring 1½ feet thick, all in good order excepting a small portion of flooring that must be repaired at once. | |
| 10 | ... | 24-2 | Two 6 feet arch, ring 1½ feet thick; all in good order. | |
| | | 24-3 | One 6 feet do. do. | |
| 11 | ... | 26-3 | Two 6 ,, do. | |
| 12 | ... | | | |

3079/23



### Road No. 5, Kondótti to Edawanah Section—*cont.*

| Item Number. | Date. | Miles from Calicut. | Inspection Notes and Remarks by District Engineer. | Remarks by Sub-divisional Officers or Overseers. |
|---|---|---|---|---|
| 13 | ... | 27-2 | One 6 feet arch ring 1½ feet thick, all in good order. | |
| 14 | ... | 27-6 | One 6 feet do. do. | |
| 15 | ... | 29-3 | One 15 feet do. do. | |
| 16 | ... | 29-7 | Two 36 feet arch, in progress. Masonry up to spinning and now stopped for revised estimate and plan. Above spinning line I think a light girder would save a lot of money and time in finishing this work in lieu of the arch. Plan now in progress. | |
| 17 | ... | 30-4 | Two 6 feet arch, ring 1½ feet thick, all in good order. | |
| 18 | ... | 31-1 | Two 5 feet do. do. | |
| 19 | ... | 31-4 | One 4 feet arch, ring 1½ feet thick, in good order and up to any weight. | |
| 20 | ... | 32-5 | One 12 feet arch, semi-circular, ring 1½ feet thick in good order. | |
| 21 | ... | ... | The section from Kondótti to Edawanah cannot at present be used by traffic coming from Karkúr Ghât on account of break in this line of communication at 23-3, but even before the bridge was destroyed the heavy through traffic has at all times followed the Manjeri route since it was opened. The road covering of this section is not suitable for carrying a heavy traffic even during dry weather, as it consists for the most part of a very friable and poor class of laterite stone nearly devoid of all binding properties. To alter the present steep gradients into grades suited to quick and heavy traffic, say not exceeding 1 in 20, a new trace and construction of some 3 miles of new road would have to be made. The present road at the worst places—heaviest gradients—is aligned along the side of an abruptly rising hill. This section *viâ* Areacode is some 3 miles shorter than *viâ* Manjeri, but it is not I think nearly such an important road, and taking into account the additional cost of new bridge at 23-3, the alteration of road grades, and the want of or difficulty in getting good metal covering to carry heavy traffic, I am of opinion that the present route *viâ* Manjeri should be adhered to. | |

CALICUT,
19th December 1881.

(Signed) G. ANDERSON,
District Engineer, Malabar,
Local Fund Department.

## ESTIMATE No. 1.

ESTIMATE of the probable cost of making certain urgently required repairs to meet existing ordinary traffic on road from Calicut to Nilgiri boundary *viâ* the Karkúr Ghât.

| Item Number. | Mileage. | Particulars. | Amount. RS. A. P. | Total. RS. A. P. |
|---|---|---|---|---|
| 1 | ... | 2½ *Miles.*—Metalling roadway (on the worst portions of road) with 6″ broken stone and 1½″ blinding 4 yards broad, including sectioning and clearing drains, at Rs. 2-6-0 per running yard, or Rs. 4,180 per mile ... | 10,450 0 0 | 10,450 0 0 |
| 2 | ... | 1½ *Mile widening.*—2,640 × 2 × 3 = 15,840 cubic yards at As. 3-0 ... ... ... | 2,970 0 0 | |
| | | Side drains 2,640 × ¼ × ½ = 330 cubic yards at As. 1-6 ... ... ... ... ... | 30 15 0 | |
| | | Sundries ... ... ... ... ... | 29 1 0 | 3,030 0 0 |
| 3 | 22-0 | Converting a 9 feet one arch culvert into a rail girder ... ... ... ... ... | ... | |
| | | Cost of rails including carriage and fixing ... | 80 0 0 | |
| | | 40 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... ... | 70 0 0 | |
| | | For removing arch and sundries ... ... | 20 0 0 | 170 0 0 |
| 24-2 | | Converting 5½ feet cover stone do. ... | ... | |
| | | Do. do. ... | ... | |
| | | Cost of rails including carriage and fixing ... | 60 0 0 | |
| | | 24 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... ... | 42 0 0 | |
| | | For removing cover stones and sundries ... | 18 0 0 | 120 0 0 |
| 27-16 | | Do. 10 feet one arch do. do. ... ... | ... | |
| | | Cost of rails including carriage and fixing ... | 100 0 0 | |
| | | 42 cubic feet timber for planking and hand rails Rs. 1-12-0 do. ... ... ... | 73 8 0 | |
| | | For removing arch and sundries ... ... | 26 8 0 | 200 0 0 |
| 57-4 | | Do. 4 feet timber platform do. do. | ... | |
| | | Cost of rails including carriage and fixing ... | 40 0 0 | |
| | | 21 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... ... | 36 12 0 | |
| | | For removing old work and sundries ... ... | 13 4 0 | 90 0 0 |
| 58-4 | | Converting 9 feet timber platform into a rail girder ... ... ... ... ... | ... | |
| | | Cost as for that on 22-0 nearly ... ... | 160 0 0 | 160 0 0 |
| 58-7 | | Converting 4 feet do. do. ... ... | ... | |
| | | Cost as for that on 57-4 ... ... ... | 90 0 0 | 90 0 0 |
| 59-4 | | Converting 6 feet do. do. ... ... | ... | |
| | | Cost of rails including carriage and fixing ... | 60 0 0 | |
| | | 24 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... ... | 42 0 0 | |
| | | For removing old work and sundries... ... | 18 0 0 | 120 0 0 |
| 60-3 | | Converting 6 feet do. do. ... ... | ... | |
| | | Cost as above ... ... ... ... ... | 120 0 0 | 120 0 0 |
| 61-2 | | Do. 6 feet do. do. ... ... | ... | |
| | | Cost as above ... ... ... ... ... | 120 0 0 | 120 0 0 |



3079/24

Estimate of the probable cost of making certain urgently required repairs, &c.,—*cont.*

| Item Number. | Mileage. | Particulars. | Amount. RS. A. P. | Total. RS. A. P. |
|---|---|---|---|---|
| | | Cost of 1 Bogie carriage 115⅓ cubic feet teak timber at Rs. 3 per cubic foot ... ... | 346 0 0 | |
| | | 4 axles with wheels Rs. 50 each ... ... | 200 0 0 | |
| | | Cost of 2 ... ... ... ... ... | 546 0 0 | 1,092 0 0 |
| | 38-0 | Planks on bridge for wheel track ... ... | ... | |
| | | Two 100′ × 15″ × 4″ = 250-3 = 83⅓ cubic feet at Rs. 3 ... ... ... ... ... | 250 0 0 | 250 0 0 |
| | 38-2 | Do. do. ... | ... | |
| | | Two 112′ × 15″ × 4″ = 280-3 = 93⅓ at Rs. 3 per cubic foot ... ... ... | 280 0 0 | 280 0 0 |
| | 43-7 | Do. do. ... | ... | |
| | | Two 260′ × 15″ × 4″ = 650-3 = 216⅔ cubic feet at Rs. 3 ... ... ... ... ... | 650 0 0 | 650 0 0 |
| | | Total ... | ... | 16,942 0 0 |
| | | Add 10 per cent. for Superintendence ... | ... | 1,698 0 0 |
| | | Grand Total ... | ... | 18,640 0 0 |

If the Board agree to my proposal to restrict maximum load to 5 tons on one vehicle with load distributed as specified, then the Bogie carriage amounting to Rs. 1,092 should be omitted.

## ESTIMATE No. 2.

ESTIMATE of the probable cost of forming and completing Road No. 5 from Calicut to Nilgiri boundary *viâ* Manjeri-Karkúr Ghât as a first-class road having an 18 feet formation and 12 feet width of metalling 9″ deep.

| Item Number. | Mileage. | Particulars. | Amount. RS. A. P. | Total. RS. A. P. |
|---|---|---|---|---|
| 1 | ... | 64 *Miles Widening*— | | |
| | | 50 × 1,760 × 1 × 1½ = 132,000 cubic yards at As. 2 ... ... ... ... | 16,500 0 0 | |
| | | 14 × 1,760 × 1 × 1½ = 35,960 cubic yards at As. 3 ... ... ... ... | 6,930 0 0 | |
| | | Side Drains— | | |
| | | 30 × 1,760 × ¼ × ½ = 6,600 cubic yards at As. 1-6 ... ... ... ... | 618 12 0 | |
| | | Weir cutting (on new trace)— | | |
| | | 6 × 1,760 × 7 × ½ = 36,960 cubic yards at As. 3 ... ... ... ... ... | 6,930 0 0 | |
| | | Cost of tracing 6 miles at Rs. 50 per mile ... | 300 0 0 | |
| | | Sundries at 2 per cent. ... ... ... | 621 4 0 | 31,900 0 0 |

Estimate of the probable cost of forming and completing Road No. 5 from Calicut, &c.—*cont.*

| Item Number. | Mileage. | Particulars. | Amount. | Total. |
|---|---|---|---|---|
| | | | RS. A. P. | RS. A. P. |
| | | 64 *Miles Metalling Roadway* with 9″ broken stone and 1½ blinding 4 yards broad including sectioning and clearing side drains at Rs. 3-6-0 a yard ... ... ... ... | ... | |
| | 14 | Miles ghât and high land at Rs. 5,940 per mile ... ... ... ... ... ... | 83,160 0 0 | |
| | 50 | Miles low country at Rs. 3,500 per mile ... | 1,75,000 0 0 | |
| | | | | 2,58,160 0 0 |
| | 22 | Converting a 9 feet one arch culvert into a rail girder— | | |
| | | Cost of rails including carriage and fixing ... | 80 0 0 | |
| | | 40 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... ... | 70 0 0 | |
| | | For removing arch and sundries ... ... | 20 0 0 | |
| | | | | 170 0 0 |
| | | Converting a 9 feet do. do. Cost as above. | 170 0 0 | |
| | | | | 170 0 0 |
| | 24-2 | Converting 5½ feet cover stone do. do. ... | ... | |
| | | Cost of rails including carriage and fixing ... | 60 0 0 | |
| | | 24 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... ... | 42 0 0 | |
| | | For removing covering stones and sundries ... | 18 0 0 | |
| | | | | 120 0 0 |
| | | Converting 5 feet do. do. Cost as above ... | 120 0 0 | |
| | | | | 120 0 0 |
| | 27-5 | Converting 2 vent 6 feet cover stone culvert into a 15 feet one span rail girder. Cost of rails including carriage and fixing ... ... | 300 0 0 | |
| | | 60 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... ... | 105 0 0 | |
| | | For removing covering stones and sundries ... | 22 0 0 | |
| | | | | 427 0 0 |
| | 26-6 | Converting 10 feet one arch culvert into a rail girder— | | |
| | | Cost of rails including carriage and fixing. | 100 0 0 | |
| | | 42 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... | 73 8 0 | |
| | | For removing arch and sundries ... ... | 26 8 0 | |
| | | | | 200 0 0 |
| | | Converting 10 feet do. do. Cost as above. | 200 0 0 | |
| | | | | 200 0 0 |
| | 28-6 | Converting 14 feet timber platform culvert into a one vent 24 feet span rail girder— | | |
| | | Cost of rails including carriage and fixing ... | 500 0 0 | |
| | | 132 cubic feet timber for planking joists and hand rails at Rs. 1-12-0 per cubic foot ... | 231 0 0 | |
| | | Rough stone in chunam abutment 48 cubic feet at Rs. 20 per 100 ... ... ... | 9 9 7 | |
| | | For removing old abutment platform and sundries ... ... ... ... ... | 33 6 5 | |
| | | | | 774 0 0 |



3079/25

Estimate of the probable cost of forming and completing Road No. 5 from Calicut, &c.—*cont.*

| Item Number. | Mileage. | Particulars. | Amount. | Total. |
|---|---|---|---|---|
| | | | RS. A. P. | RS. A. P. |
| | 38-4 | Converting 3 vent 31 feet span trestle bridge into single 95 feet vent lattice girder— | | |
| | | Cost of girders including carriage to site and erection 26 tons at Rs. 350 per ton ... ... | 9,100 0 0 | |
| | | 267½ cubic feet timber for joists and planking at Rs. 1-12-0 per cubic foot ... ... ... | 468 2 0 | |
| | | For removing old work and sundries ... ... | 181 14 0 | |
| | | | | 9,750 0 0 |
| | 39-2 | Strengthening a 2 vent 56 feet span girder bridge— | | |
| | | By adding a new girder to each existing girder and renewing all the cross girders and for planking with 2½″ planks 16 tons new girder including carriage to site and erection at Rs. 350 per ton ... ... ... ... | 5,600 0 0 | |
| | | 300 cubic feet timber for planking at Rs. 1-12-0 cubic foot ... ... ... ... ... | 525 0 0 | |
| | | For removing and altering existing works and sundries ... ... ... ... ... | 1,075 0 0 | |
| | | | | 7,200 0 0 |
| | 43-7 | Converting a 4 vent bridge timber Howe trusses into a wrought-iron girder Whippte Murphy Type with joists 7″ × 10″ × 2½ planking 72 tons girder including carriage to site and erection at Rs. 350 per ton ... ... ... | 25,200 0 0 | |
| | | 1,306 cubic feet timber for planking and joists at Rs. 1-12-0 per cubic foot ... ... ... | 2,285 8 0 | |
| | | For removing old work and sundries ... ... | 214 8 0 | |
| | | | | 27,700 0 0 |
| | 52-2 | Converting 6 feet cover stone culvert into rail girder— | | |
| | | Cost as for 24 ... ... ... ... ... | 120 0 0 | |
| | | | | 120 0 0 |
| | 57-4 | Converting 4 feet timber platform do.— | | |
| | | Cost of rails including carriage and fixing ... | 40 0 0 | |
| | | 21 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ... ... | 36 12 0 | |
| | | For removing old work and sundries ... ... | 13 4 0 | 90 0 0 |
| | 58-4 | Converting 9 feet do. do. Cost as for 22 nearly | 160 0 0 | 160 0 0 |
| | 58-7 | Converting 4 feet do. do. Cost as for 57-4 ... | 90 0 0 | 90 0 0 |
| | 59-4 | Converting 6 feet do. do. Cost as for 52-2 ... | 120 0 0 | 120 0 0 |
| | 60-3 | Converting 6 feet do. do. Cost as above ... | 120 0 0 | 120 0 0 |
| | 61-1 | Converting timber platform into a rail girder— | | |
| | | Cost as above ... ... ... ... | 120 0 0 | 120 0 0 |
| | 7-2 | Constructing a bridge across the Beypore river at Ferroke Ferry of 5 spans of 100 feet ... | 75,000 0 0 | 75,000 0 0 |
| | | Total ... | ... | 4,12,711 0 0 |
| | | Add 15 per cent. for Superintendence ... | ... | 61,906 0 0 |
| | | Grand Total ... | ... | 4,74,620 0 0 |

### Abstract Estimate No. 3, Detail No. 1.

Estimate of the probable cost of putting in order for ordinary traffic the road from Calicut to Lackadi *via* Támrachéri Ghat.

| Item Number. | Mileage. | Particulars. | Amount. | Total. |
|---|---|---|---|---|
| | | | Rs. | Rs. |
| | | 27½ *miles.*—Metalling roadway with 9 inches broken stone 1¼ inches blinding 4 yards broad including sectioning and clearing side drains at Rs. 2 per R. yard or Rs. 3,520 per mile ... ... ... ... ... | 96,800 | 96,800 |
| | | 8 *miles metalling* as above the Támrachéri Ghât at Rs. 5,940 per mile ... ... ... ... ... | 47,520 | 47,520 |
| | | 15 *miles widening.*—15 × 1,760 × 1 × 1½ = 39,600 cubic yards at As. 2 per cubic yard ... ... ... | 4,950 | |
| | | 2 miles do. on the ghât 2 × 1,760 × 2 × 3 = 21,120 cubic yards at As. 4 ... ... ... ... ... | 5,280 | |
| | | 20 miles clearing side drains<br>2 × 5 × 1,760 = 17,600<br>1 × 15 × 1,760 = 26,400 | | |
| | | 44,000 R. yards at Pies 3 ... | 687 | |
| | | | | 10,917 |
| | | 4 *miles tracing* at Rs. 100 per mile ... ... ... | 400 | |
| | | Earthwork 4 × 5,000 = 20,000 at As. 2 ... ... | 2,500 | |
| | | Compensation for Land. | | |
| | | 32 acres at Rs. 100 per acre ... ... ... ... | 3,200 | |
| | | | | 6,100 |
| | | 6 small bridges between Calicut and foot of ghât at Rs. 300 each ... ... ... ... ... ... | 1,800 | 1,800 |
| 24th | | One 72 feet span bridge of timber at Rs. 25 per foot ... | 1,800 | |
| 27th | | One 84 do. do. do. ... | 2,100 | |
| 28th | | One 50 do. do. do. ... | 1,250 | |
| 29th | | One 21 do. do. do. ... | 525 | |
| 36th | | One 14 do. do. do. ... | 350 | |
| | | | | 6,025 |
| | | | ... | 1,69,162 |
| | | Add 10 per cent. for Superintendence ... | ... | 16,938 |
| | | Total ... | ... | 1,86,100 |

### Estimate No. 3, Detail No. 2.

Estimate of the probable cost of putting in proper order for ordinary traffic the road from Lackadi to Devála *via* Chundale and Meppádi.

| Item Number. | Mileage. | Particulars. | Amount. | Total. |
|---|---|---|---|---|
| | | | Rs. | Rs. |
| | | 16 *miles metalling* roadway with 9 inches broken stone and 1¼ inches blinding 4 yards broad including sectioning and clearing side drains at Rs. 5,940 per mile ... | 95,040 | 95,040 |
| | | 8 *miles metalling* with 6 inches boulders 3 inches broken stone 1¼ inches blinding 4 yards broad including sectioning and clearing side drains at Rs. 6,710 per mile ... ... ... ... ... ... ... | 53,680 | 53,680 |
| | | 3 *miles widening* 3 × 1,760 × 2 = 21,120 cubic yards at 3 annas ... ... ... ... ... ... | 3,960 | |
| | | Blasting rock ... ... ... ... ... ... | 240 | |
| | | | | 4,200 |
| | | 11 culverts to be reconstructed at Rs. 300 each ... | 3,300 | 3,300 |
| | | | ... | 1,56,220 |
| | | Add 100 per cent. for Superintendence ... | ... | 15,620 |
| | | Total ... | ... | 1,71,840 |



3079/26

### Estimate No. 3, Detail No. 3.

Estimate of the probable cost of putting in proper order for ordinary traffic road from Lackadi to Manantoddy *via* Terriote.

| Item Number. | Particulars. | Rate. | Amount. | Total. |
|---|---|---|---|---|
| | | Rs. | Rs. | Rs. |
| 1 | 31 *miles metalling roadway* with 9 inches broken stone and 1¼ inches blinding 4 yards broad including sectioning and clearing side drains at per mile ... ... ... ... ... ... | 5,940 | 1,84,140 | 1,84,140 |
| 2 | No. 10 timber bridge 58 feet span per R. foot ... | 25 | 1,450 | |
| 3 | No. 15 do. 104 feet do. do. ... | 25 | 2,600 | |
| 4 | No. 20 do. 33 feet do. do. ... | 25 | 825 | |
| 5 | No. 27 do. 31 feet do. do. ... | 25 | 775 | |
| 6 | 2 culverts each at ... ... ... ... | 300 | 600 | 6,250 |
| 7 | Bridge 200 feet clear waterway at Kudrapundy Ferry ... ... ... ... ... ... | ... | 30,000 | |
| 8 | Bridge 250 feet clear waterway at King's Ferry ... | ... | 45,000 | 75,000 |
| | Total ... | ... | ... | 2,65,390 |
| | Add 10 per cent. for Superintendence ... | ... | ... | 26,530 |
| | Grand Total ... | ... | ... | 2,91,920 |

### Abstract Estimate No. 3.

| Number. | Particulars. | Amount. | Total. |
|---|---|---|---|
| | | Rs. | Rs. |
| 1 | *Estimate No.* 1—Making certain urgently required repairs to meet existing ordinary traffic on road from Calicut to Nílgiri boundary *via* the Karkúr Ghât ... ... ... | 18,640 | 18,610 |
| 2 | *Estimate of the* probable cost and completing road No. 5 from Calicut to Nílgiri boundary *via* Mungore and Karkúr Ghât as a first-class road having an 18 feet formation and 12 feet width of metalling 9 inches deep ... ... ... ... | 4,74,620 | 4,74,620 |
| 3 | *Estimate of the* probable cost of completing the existing lines of communication between Calicut and North and South Wynaad *via* Támrachéri Ghât—<br>1st Section, Calicut to Lackadi Section, detailed estimate No. 1 ... ... ... ... ... ... ... | 1,86,100 | |
| | 2nd Section, Lackadi to Manantoddy *via* Terriote, No. 2. | 1,71,840 | |
| | 3rd Section, Lackadi to Chundale *via* Meppádi No. 3 ... | 2,91,920 | |
| | | | 6,49,860 |
| | Calicut and Wynaad Railway. | | |
| 4 | Estimate of the probable cost of constructing a Railway line of 80 miles in length between Calicut and Devála and a broad line of 40 miles in length between Vayitri and Manantoddy as per estimate No. 4 ... ... ... ... ... | 36,29,185 | |

DETAILED ESTIMATE No. 1, CALICUT AND WYNAAD RAILWAY.

Showing approximate quantities and cost of works and materials required to complete the 120 miles of proposed railway between Calicut and Wynaad, Manantoddy, Devála.

| Quantity. | Particulars of Works. | Rate. | Amount. | Total. |
|---|---|---|---|---|
| | | RS. A. P. | RS. A. P. | RS. A. P. |
| Item No. 1. | *Sleepers*, best jungle wood ... | ... | ... | |
| No. | Sleepers 8 for 7 yards ... | ... | ... | |
| 2,016 | Each 5″ × 4″ × 7 for 1 mile ... | 1 0 0 | 2,016 0 0 | |
| 241,920 | Total for 120 miles ... | ... | ... | 2,41,920 0 0 |
| Item No. 2. | *Ballast* 6 feet wide and 1 foot thick = ⅔ c. yd. per yard run 1″—6″ collecting ... ... ... | ... | ... | |
| 1,320 C. yds. | For 1 mile of ballast 1 do. spreading. | 0 2 6 | 206 4 0 | |
| 52,800 | For 40 miles of ballast complete ... | 0 2 6 | 8,250 0 0 | |
| 105,600 | *For* 80 miles of ballast complete ... | 0 8 0 | 52,800 0 0 | |
| | Total for 120 miles ... | ... | ... | 61,050 0 0 |
| Item No. 3. | *Permanent-way.*—1st rails 30 lb. steel rails pieces quoted Middlesbro, 4th November 1881 ... | ... | ... | |
| 47 | Total for 1 mile ... | 93 0 0 | 4,371 0 0 | |
| | *2nd Fastening.*—Fish plates, fish bolts, nuts and spike, &c., landing transit up-country 150 miles and stringing out and fitting up in position allow at ... ... | 61 0 0 | 2,867 0 0 | |
| 47 | For cost of one mile of permanent-way complete ... ... | 151 0 0 | 7,097 0 0 | |
| 5,640 | Cost of 120 miles ... ... | 151 0 0 | ... | 8,51,640 0 0 |
| | *Add extra cost of Rack Railway.* | | | |
| 1,760 L. yd. | For 1 mile of do. complete ... | 15 0 0 | 26,400 0 0 | |
| 14,080 | Cost of 8 miles do. do. ... | 15 0 0 | ... | 2,11,200 0 0 |
| | Total Permanent-way ... | ... | ... | 10,62,840 0 0 |
| | *Earthwork*— | | | |
| 7,920 C. yds. | For 1 mile (1,760 × 3 × 1½) ... | 0 2 0 | 990 0 0 | |
| 253,440 | For 32 miles ... ... ... | 0 2 0 | 31,680 0 0 | |
| 112,640 | For 8 miles each at (1,760 × 4 × 2) ... ... ... ... | 0 4 0 | 28,160 0 0 | |
| 633,600 | *For* 80 miles each at (1,760 × 3 × 1½) ... ... ... ... | 0 4 0 | 1,58,400 0 0 | |
| | For 120 miles ... | ... | ... | 2,18,240 0 0 |

## WYNAAD-CALICUT RAILWAY.

DETAILED ESTIMATE No. 2 of rolling stock required for Calicut and Wynaad Railway, 120 miles.

| Quantity. | Description. | Rate. | Amount. | Total. |
|---|---|---|---|---|
| | | RS. A. P. | RS. A. P. | RS. A. P. |
| 18 | Locomotives ... ... each | 1,000 0 0 | 18,000 0 0 | |
| 15 | 1st-class carriage to hold, say, 16 passengers ... ... ... | 300 0 0 | 4,500 0 0 | |



Detailed Estimate No. 2 of rolling stock, &c.—*cont.*

| Quantity. | Description. | Rate. | Amount. | Total. |
|---|---|---|---|---|
| | | RS. A. P. | RS. A. P. | RS. A. P. |
| 12 | 2nd-class carriage to hold, say, 16 passengers ... ... each | 235 0 0 | 2,820 0 0 | |
| 30 | 3rd do. do. 24 do. ... ,, | 205 0 0 | 6,150 0 0 | |
| 10 | Horse-boxes ... ... ,, | 150 0 0 | 1,500 0 0 | |
| 8 | Carriage trucks ... ... ,, | 60 0 0 | 480 0 0 | |
| 200 | Goods wagons ... ... ,, | 73 0 0 | 14,600 0 0 | |
| 50 | Mineral and other high and low sided wagons ... ,, | 53 0 0 | 2,650 0 0 | |
| 30 | Cattle wagons ... ,, | 80 0 0 | 2,400 0 0 | |
| 25 | Break vans ... ... ,, | 165 0 0 | 4,125 0 0 | |
| | 10 per cent. for additional cost of rack wheel and gearing on each of the above engine 18,000 ... | 1,800 0 0 | 1,800 0 0 | |
| | Engine duplicates ... ... | ... | 1,000 0 0 | |
| 3 | Break down crane 5 tons... each | 300 0 0 | 900 0 0 | |
| | Engine stores, &c. ... ... | ... | 1,500 0 0 | |
| 80 | Spare wheels, axles, axle-boxes, &c. | ... | 1,920 0 0 | |
| 100 | Do. engines and carriage lamps, &c. | 2 10 0 | 250 0 0 | |
| Tons 700 | Freight and insurance ... ... | 2 10 0 | 1,750 0 0 | 66,345 0 0 |
| | Fitting up rolling stock, say, 10 per cent. ... ... ... | ... | ... | 5,634 0 0 |
| | Total ... | ... | ... | 71,979 0 0 |
| | Add for sundries 10 per cent. ... | ... | ... | 7,197 0 0 |
| | Grand Total ... | ... | ... | 79,176 0 0 |
| | | | | 12 0 0 |
| | Grand Total ... | ... | ... | 9,50,112 0 0 |

## CALICUT AND WYNAAD RAILWAYS.

DETAILED ESTIMATE No. 3 for 15 stations with buildings, &c., complete for Calicut and Wynaad Railways, 120 miles.

| No. | Particulars. | Rate. | Amount. | Total. |
|---|---|---|---|---|
| | | RS. A. P. | RS. A. P. | RS. A. P. |
| 11 | Stations each to have a through siding 300 feet long and on blind do. 150 feet long, or a total of ½ of a mile of road at ... | 9,060 12 0 | 755 0 0 | ... |
| 4 | Stations each to have a through siding 300 feet long and, say, 4 blind sidings each 150 feet long, or a total of ½ of a mile of road at | 9,060 6 0 | 1,510 0 0 | ... |
| 57 | Points and crossings at ... ... ... | 214 0 0 | 12,198 0 0 | ... |
| 15 | Wells ... ... ... ... ... ... | 300 0 0 | 4,500 0 0 | ... |
| 15 | Haggus's or Freedman's ejectors for watering engines in lieu of ordinary pump system at ... ... ... ... ... | 300 0 0 | 4,500 0 0 | ... |
| | *Buildings.* | | | |
| 11 | Goods sheds ... ... ... ... ... | 400 0 0 | 4,400 0 0 | ... |
| 4 | Do. ... ... ... ... ... | 700 0 0 | 2,800 0 0 | ... |
| 11 | Station-masters' houses ... ... ... | 300 0 0 | 3,300 0 0 | ... |
| 4 | Do, do. ... ... ... | 500 0 0 | 2,000 0 0 | ... |
| 11 | Booking office and waiting-sheds ... ... | 300 0 0 | 3,300 0 0 | ... |
| 4 | Do, do. ... .. | 500 0 0 | 2,000 0 0 | ... |
| 11 | Latrines ... ... ... ... ... | 200 0 0 | 2,200 0 0 | ... |
| 4 | Do. ... ... ... ... ... | 400 0 0 | 1,600 0 0 | ... |
| 11 | Platforms ... ... ... ... ... | 50 0 0 | 550 0 0 | ... |
| 4 | Do. ... ... ... ... ... | 150 0 0 | 600 0 0 | ... |

Division Estimate No. 3 for 15 stations with buildings, &c.—*cont.*

| No. | Particulars. | Rate. | | | Amount. | | | Total. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Special Buildings.* | RS. | A. | P. | RS. | A. | P. | RS. | A. | P. |
| 1 | Workshop ... ... ... ... | 20,000 | 0 | 0 | 20,000 | 0 | 0 | ... | | |
| 1 | Do. | 3,000 | 0 | 0 | 3,000 | 0 | 0 | ... | | |
| 1 | Central Office ... ... ... ... | 20,000 | 0 | 0 | 20,000 | 0 | 0 | ... | | |
| 15 | Engine-drivers' huts ... ... ... | 500 | 0 | 0 | 7,500 | 0 | 0 | ... | | |
| 3 | Waiting-rooms for 1st-class passengers with bed-rooms and cook-houses attached ... | 1,500 | 0 | 0 | 4,500 | 0 | 0 | ... | | |
| 4 | Engine sheds ... ... ... ... | 1,500 | 0 | 0 | 6,000 | 0 | 0 | ... | | |
| | Grand Total ... | ... | | | ... | | | 1,07,213 | 0 | 0 |

All the above-mentioned buildings, with exception of Workshops and Central Offices, are to be constructed after the ordinary style of native houses having mud walls, thatched roof, and all timber work in doors and windows, &c., to be of jungle wood.

The Workshop and Central Offices are to be built of laterite in chunam and have tiled roof.

ESTIMATE No. 4.

*Platelayers' tools.*

For 120 miles of track, 13 gangs.

| Quantity. | Particulars. | Rate. | | | Amount. | | |
|---|---|---|---|---|---|---|---|
| | | RS. | A. | P. | RS. | A. | P. |
| 52 | Pickaxes 4 × 13 gangs ... ... ... ... ... | 2 | 8 | 0 | 130 | 0 | 0 |
| 52 | Pick bratess 4 × 13 ... ... ... ... ... | 2 | 12 | 0 | 143 | 0 | 0 |
| 52 | Crowbars 4 × 13 ... ... ... ... ... | 1 | 12 | 0 | 91 | 0 | 0 |
| 26 | Spanners 2 × 13 ... ... ... ... ... | 0 | 8 | 0 | 13 | 0 | 0 |
| 26 | Pinchbars with steel claw 2 × 13 ... ... ... | 3 | 0 | 0 | 78 | 0 | 0 |
| 52 | Bill-hooks 4 × 13 ... ... ... ... ... | 1 | 4 | 0 | 65 | 0 | 0 |
| 52 | Mamoties 4 × 13 ... ... ... ... ... | 0 | 12 | 0 | 39 | 0 | 0 |
| 13 | Wooden lever 1 × 13 ... ... ... ... ... | 10 | 0 | 0 | 130 | 0 | 0 |
| | Sets of light board ... ... ... ... ... | ... | | | ... | | |
| 13 | Lights 1 × 13 ... ... ... ... ... ... | 2 | 0 | 0 | 26 | 0 | 0 |
| 4 | Trollies 4 ... ... ... ... ... ... ... | 80 | 0 | 0 | 320 | 0 | 0 |
| 4 | Join crow 4 ... ... ... ... ... ... ... | 50 | 0 | 0 | 200 | 0 | 0 |
| 2 | Racket screw jack 2 (6 ton) ... ... ... ... | 40 | 0 | 0 | 80 | 0 | 0 |
| 13 | Track gauge 1 ×13 (2 feet 6 inches) ... ... ... | 5 | 0 | 0 | 65 | 0 | 0 |
| 1 | Portable forge 1 ... ... ... ... ... | 65 | 0 | 0 | 65 | 0 | 0 |
| 13 | Spirit level 1 × 13 ... ... ... ... ... | 6 | 0 | 0 | 78 | 0 | 0 |
| 13 | Screw augur 1 × 13 (½″) ... ... ... ... ... | 1 | 4 | 0 | 16 | 4 | 0 |
| 13 | Do. do. 1 × 13 (¾″) ... ... ... ... ... | 1 | 8 | 0 | 19 | 8 | 0 |
| 13 | Do. do. 1 × 13 (1″) ... ... ... ... ... | 1 | 12 | 0 | 22 | 12 | 0 |
| 1 | One Engineer's or Line Inspector's trolly worked by levers and double crank axle ... ... ... ... | 560 | 0 | 0 | 560 | 0 | 0 |
| 13 | Adzes 13 ... ... ... ... ... ... ... | 8 | 0 | 0 | 104 | 0 | 0 |
| 2 | Drill cramps 2 ... ... ... ... ... ... ... | 15 | 0 | 0 | 30 | 0 | 0 |
| 2 | Crank brace 2 ... ... ... ... ... ... ... | 8 | 0 | 0 | 16 | 0 | 0 |
| 100 | Bits 100 ... ... ... ... ... ... ... ... | 0 | 12 | 0 | 75 | 0 | 0 |
| 13 | Axes 4 lb. 13 ... ... ... ... ... ... ... | 2 | 0 | 0 | 26 | 0 | 0 |
| 26 | Sledge hammers steel faced 7 lb. ... ... ... ... | 2 | 8 | 0 | 65 | 0 | 0 |
| 6 | Racket brace ... ... ... ... ... ... ... | 30 | 0 | 0 | 180 | 0 | 0 |
| | | | | | 2,637 | 8 | 0 |
| | Add 10 per cent. ... | ... | | | 263 | 0 | 0 |
| | For 30 miles R. S. ... ... ... ... ... ... | ... | | | 3,000 | 0 | 0 |
| | For 120 miles „ ... ... ... ... ... ... | ... | | | 12,000 | 0 | 0 |



3079/28

WYNAAD-CALICUT RAILWAY.

ESTIMATE No. 5.

Locomotive Workshop fittings for 120 miles.

| Quantity | Particulars. | Rate. | | | Amount. | Total. |
|---|---|---|---|---|---|---|
| | | £ | s. | d. | £ | £ |
| 2 | Horizontal engines and Cornish boilers, feed pump, and fittings with gun metal working parts. | 300 | 0 | 0 | 600 | ... |
| 2 | 3 inch shaftings 80 feet with wall bearings, brackets, &c. ... ... ... ... ... ... | 40 | 0 | 0 | 80 | ... |
| 2 | 16 inch lathes 5 feet centre self-acting screw cutting ... ... ... ... ... ... | 130 | 0 | 0 | 260 | ... |
| 2 | Do. 4 feet do. do. ... ... | 75 | 0 | 0 | 150 | ... |
| 2 | Radial drilling machine with drills, tools and tables complete ... ... ... ... ... | 115 | 0 | 0 | 230 | ... |
| 2 | Bench-drilling machine with fast and loose pulley. | 20 | 0 | 0 | 40 | ... |
| 2 | Steam hammer 8 cut ... ... ... ... | 125 | 0 | 0 | 250 | ... |
| 2 | Screwing machine ... ... ... ... ... | 50 | 0 | 0 | 100 | ... |
| 2 | Tube and bolt screwing machines with cutting off apparatus affixed to large machine up to 2 inch diameter with extra sets of dies complete ... | 35 | 0 | 0 | 70 | ... |
| 2 | Do. with adjustable dies up to 1½ inch diameter with extra sets of dies complete ... ... ... | 16 | 0 | 0 | 32 | ... |
| 2 | Sets of stocks and dies with worth threads fitted into case up 2 inch diameter taper, second master tap to each size in oak case ... ... ... ... | 47 | 0 | 0 | 94 | 1,906 |
| 2 | Vices, files and chisels, &c. ... ... ... ... | 35 | 0 | 0 | 70 | ... |
| 8 | Eight sets of smiths' tools and anvils ... ... | 15 | 0 | 0 | 120 | ... |
| 8 | Do. smiths' fires wrought iron with hoods ... | 16 | 5 | 0 | 130 | ... |
| 8 | Do. portable forges ... ... ... ... | 5 | 0 | 0 | 40 | ... |
| 2 | Hydraulic presses for wheels setting and unsetting. | 35 | 0 | 0 | 70 | ... |
| 2 | For smiths' use ... ... ... ... ... | 50 | 0 | 0 | 100 | ... |
| 400 | Four hundred feet of belting ... ... ... | 7 | 0 | 0 | 28 | ... |
| 2 | Slothing machine ... ... ... ... ... | 90 | 0 | 0 | 180 | ... |
| 2 | Planing machine ... ... ... ... ... | 80 | 0 | 0 | 160 | ... |
| 2 | Shaping do. ... ... ... ... ... | 15 | 0 | 0 | 30 | ... |
| 2 | Farwith driving drums and countershaft pipes, &c. ... ... ... ... ... ... ... | 60 | 0 | 0 | 120 | ... |
| 2 | Grindstones complete ... ... ... ... | 20 | 0 | 0 | 40 | ... |
| 2 | Mills for boring cylinders ... ... ... ... | 160 | 0 | 0 | 320 | ... |
| ... | Sundries ... ... ... ... ... ... | 300 | 0 | 0 | 300 | 1,708 |
| | Total for 30 miles of railway ... | ... | | | ... | 3,614 |
| | Total for 120 miles of railway 3,614 × 2½ ... | ... | | | ... | 9,035 |
| | | | | | | 12 |
| | | ... | | | ... | 108,420 |

There would be no need of a wheel lathe, as the 16-inch lathe would be sufficient for returning the wheels of maximum diameter, which at present are not to exceed 30 inches diameter.

Probable working expenses for a year—*cont.*

| Numbers. | Particulars. | Rate per Mensem. | Amount. | Total. |
|---|---|---|---|---|
| | *Traffic Department.* | RS. | RS. | RS. |
| 1 | T. M. Inspector ... ... ... ... ... | 100 | 100 | 100 |
| | *T. M. Office Establishment.* | | | |
| 20 | Clerks ... ... ... ... ... ... | 20 | 400 | |
| 1 | Accountant ... ... ... ... ... ... | 40 | 40 | 440 |
| | *First-class Stations.* | | | |
| 4 | C. in C. ... ... ... ... ... at | 60 | 240 | |
| 2 | Clerks ... ... ... ... ... ,, | 15 | 30 | |
| 1 | Signaller ... ... ... ... ... ,, | 15 | 15 | |
| 10 | Porters ... ... ... ... ... ,, | 6 | 60 | |
| 1 | Sweeper ... ... ... ... ... ,, | 5 | 5 | |
| 1 | Waterman ... ... ... ... ... ... | 4 | 4 | |
| 16 | Night Watchmen ... ... ... ... ... | 7 | 112 | 466 |
| | *Second-class Station.* | | | |
| 11 | C. in C. ... ... ... ... ... at | 20 | 220 | |
| 1 | Clerk and Signaller ... ... ... ... ,, | 15 | 15 | |
| 4 | Porters ... ... ... ... ... ,, | 6 | 24 | |
| 1 | Sweeper ... ... ... ... ... ... | 5 | 5 | |
| 1 | Waterman ... ... ... ... ... ... | 4 | 4 | 268 |
| | *Additional Staff.* | | | |
| 15 | Guards ... ... ... ... ... at | 25 | 575 | |
| 20 | Spare hands for marshalling trains and checking tickets, also available for Guards if needed ... | 20 | 400 | 975 |
| | *Locomotive Departments.* | | | |
| 1 | Foreman ... ... ... ... ... at | 250 | 250 | |
| 18 | Drivers ... ... ... ... ... ,, | 80 | 1,440 | |
| 20 | Foremen ... ... ... ... ... ,, | 15 | 300 | |
| 4 | Felters ... ... ... ... ... ,, | 100 | 400 | |
| 20 | Do. ... ... ... ... ... ,, | 40 | 800 | |
| 20 | Odd hands ... ... ... ... ... ,, | 20 | 400 | |
| 10 | Writers ... ... ... ... ... ... | 20 | 200 | |
| 2 | Store-keepers ... ... ... ... ... | 30 | 60 | |
| 10 | Watchmen ... ... ... ... ... ... | 7 | 70 | 3,920 |
| | *Audit Staff.* | | | |
| 1 | Office Manager ... ... ... ... ... | 100 | 100 | |
| 20 | Writers and Accountants ... ... ... ... | 25 | 500 | |
| 4 | Peons ... ... ... ... ... ... ... | 7 | 28 | |
| 1 | Travelling Inspector of Accounts ... ... ... | 60 | 60 | 688 |
| | | | | 14,461 |
| | Total for 1 month ... | ... | ... | 1,73,532 |
| | Total for 1 year ... | ... | ... | |

| | RS. | RS. |
|---|---|---|
| Total as per above ... | 1,73,532 | |
| ... ... | 65,700 | 2,39,230 |
| Cost of working 15 trains per day at Rs. 12 per train ... ... ... | ... | 60,000 |
| Add for coaching, merchandise, collects and delivery of materials 25 per cent. ... ... ... ... ... ... ... ... ... | ... | 29,000 |
| Add contingencies 10 per cent. ... ... ... ... ... | ... | 3,28,900 |
| Grand Total ... | ... | |

3079/30



## CALICUT-WYNAAD RAILWAY.

### DETAILED ESTIMATE No. 10.

Of bridges for various spans. Average height of masonry will be about 18 feet above foundation and will amount to about 150 cubic yards in each bridge.

| No. | Particulars. | Rate. | Amount. | Total. |
|---|---|---|---|---|
| | | RS. | RS. | RS. |
| 1 | Five feet opening 50 cubic yards at ... ... | ... | ... | |
| | Girders at ... ... ... ... ... ... | ... | ... | |
| | Fitting and erecting ... ... ... ... | ... | ... | |
| 2 | Ten feet 70 cubic yards at ... ... ... ... | ... | ... | |
| | Girders ... ... ... ... ... ... | ... | ... | |
| | Erecting ... ... ... ... ... ... | ... | ... | |
| 3 | Masonry 150 cubic yards at ... ... ... | 5 | 750 | |
| | Fifteen feet span girders £ 30<br>Plain ... ... ,, 2 } 32 | ... ... | 384 | |
| | One and-a-half tons timber, say ... ... ... | ... | 50 | |
| | Erecting ... ... ... ... ... ... | ... | 50 | 1,234 |
| 4 | Twenty feet girders £ 40<br>Two tons plain ,, 4 | | | |
| | 44 × 12 ... ... ... | ... | 528 | |
| | Masonry ... ... ... ... ... ... | ... | 750 | |
| | Timber ... ... ... ... ... ... | ... | 60 | |
| | Erecting ... ... ... ... ... ... | ... | 60 | 1,398 |
| 5 | Thirty feet £ 80<br>Four tons girder ,, 8 | | | |
| | 88 × 12 ... ... .. | ... | 1,056 | |
| | Plain timber ... ... ... ... ... | ... | 100 | |
| | Erecting ... ... ... ... ... ... | ... | 150 | |
| | Masonry ... ... ... ... ... ... | ... | 750 | 2,056 |
| 6 | Forty feet girders £ 140<br>Plain ,, 14 | | | |
| | 154 × 12 ... ... ... | ... | 1,848 | |
| | Seven tons timber ... ... ... ... ... | ... | 150 | |
| | Erecting ... ... ... ... ... ... | ... | 200 | |
| | Masonry ... ... ... ... ... ... | ... | 750 | 2,948 |
| 7 | Fifty feet girder with cross girder £350 + 34 = 384 × 12 ... ... ... ... | ... | 4,608 | |
| | Seventeen tons timber ... ... ... ... | ... | 250 | |
| | Masonry ... ... ... ... ... ... | ... | 1,000 | |
| | Erecting ... ... ... ... ... ... | ... | 510 | 6,368 |
| 8 | Sixty feet span cross girder .. ... ... ... | ... | ... | |
| | Twenty-five tons and main girder £500 + 50 = 550 × 12 ... ... ... ... ... ... | ... | 6,600 | |
| | Timber ... ... ... ... ... ... | ... | 300 | |
| | Masonry ... ... ... ... ... ... | ... | 1,000 | |
| | Erecting ... ... ... ... ... ... | ... | 750 | 8,060 |

## WYNAAD-CALICUT RAILWAY.

ESTIMATE No. 11.

Telegraph line or 120 miles girth complete with their terminal stations and 12 intermediate.

| Particulars. | Rate. | Amount. |
|---|---|---|
| | RS. | RS. |
| Wires and insulators 120 miles at ... ... ... ... ... | 90 | 10,800 |
| Magnetic dial instruments for 12 intermediate stations ... ... | 500 | 6,000 |
| Do. ink recording Seemen's patent for three terminal ... | 680 | 2,040 |
| Tools for erecting ... ... ... ... ... ... ... | ... | 750 |
| Spare materials ... ... ... ... ... ... ... | ... | 1,200 |
| Iron posts 120 miles ... ... ... ... ... ... ... | 420 | 50,400 |
| Erecting 120 miles ... ... ... ... ... ... ... | 75 | 9,000 |
| Cartage, &c., 120 miles ... ... ... ... ... ... | 50 | 6,000 |
| Clearing land, say, 20 miles at 1 chain = 160 acres at ... ... | 20 | 3,200 |
| Total ... | ... | 89,390 |

I believe timber post could be got at Rs. 6 each or Rs. 120 per mile delivered on the ground.

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ABSTRACT ESTIMATE.

Showing approximate quantities and cost of works and materials required to complete the 120 miles of proposed railway between Calicut, Wynaad, Manantoddy, Devála.

| No. | Particulars. | Amount. | Total. |
|---|---|---|---|
| | | RS. | RS. |
| 1 | Sleepers—best jungle wood for 120 miles ... ... ... | 2,41,920 | |
| 2 | Ballast for 120 miles ... ... ... ... ... | 61,050 | |
| 3 | Rails and fastenings for 120 miles ... ... ... ... | 8,51,640 | |
| 4 | Extra cost for rack railway ... ... ... | 2,11,200 | |
| | Total for Permanent-way ... | ... | 13,65,810 |
| 5 | Earthwork for 120 miles— See detailed estimate No. 1 ... ... ... ... | 2,18,240 | |
| | Rolling stock for 120 miles— See detailed estimate No. 2 ... ... ... ... | 9,50,112 | |
| | For 15 stations with buildings for 120 miles— See detailed estimate No. 3 ... ... ... ... | 1,07,213 | |
| | | | 12,75,565 |
| | Platelayers' tools for 120 miles of track, 60 gangs— See detailed estimate No. 4 ... ... ... ... | 12,000 | |
| | Locomotive Workshop fittings for 120 miles— See detailed estimate No. 5 ... ... ... ... | 1,08,420 | |
| | Construction establishment for 120 miles— See detailed estimate No. 6 ... ... ... ... | 2,94,000 | |
| | Bridges— See detailed estimate No. 7 ... ... ... ... | 4,84,000 | |
| | | | 8,98,420 |
| | Grand Total ... | ... | 35,39,795 |
| | Cost per mile of furnished road ... ... ... ... | ... | 29,233 |
| | Add cost of telegraph line complete as per estimate No. 11. | ... | 89,390 |
| | Grand Total for 120 miles complete ... | ... | 36,29,185 |

3079/31



No. 43-A.

READ—the following letter from the Secretary of State for India, to His Excellency the Most Honorable the Governor-General of India in Council, dated India Office, London, 9th February 1882, No. 8, and Endorsement by Major G. R. GIBBS, Officiating Assistant Secretary to the Government of India, dated Simla, 19th April 1882 :—

From the Proceedings of the Madras Government noted in the margin, which have lately been forwarded to me in connection with the improvement of the roads leading to the Wynaad Gold Fields, on which subject I had occasion to address that Government in my Public Works Despatch, No. 3, of 27th January 1881, I learn that your Excellency's Government has declined to grant a contribution from Imperial Funds towards the maintenance of the road leading from Ootacamund to Naduvatam in the Wynaad District.

Nos. 299-300, dated 21st February 1881.
No. 490, dated 22nd March 1881.
No. 764, dated 2nd May 1881.
No. 2190 W., dated 5th September 1881, (Public Works Department.)
No. 2821 W., dated 14th November 1881, (Public Works Department.)

2. I also remark that discussions have arisen on the general subject of road communication between the Wynaad and the Western Coast, and if, as may be concluded from the papers forwarded for my consideration, the existing resources of the local and provincial Funds are inadequate to meet the cost of maintaining the roads in a proper state of efficiency, I should wish your Excellency to consider what are the best means of placing and maintaining the main lines of communication in a suitable condition, to provide for the increased traffic that may be expected from the attempts now being made to develop the gold mining industry in the districts in question.

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Endorsement, No. 138 C.

Forwarded to the Government of Madras in the Public Works Department, with the request that it may be stated what has been done, or what is now proposed, in the way of improving communications in the Wynaad.

(By Order.)
(Signed) G. R. GIBBS, Major,
Offg. Asst. Secy. to the Govt. of India.

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No.

READ—the following Note on the Railway portion of the proposals for opening up Wynaad, embodied in Proceedings of Government, No. 319, dated 1st April 1882, Financial.

The only railway scheme alluded to in these papers is a proposal for a line, on a gauge of $2\frac{1}{2}$ feet, from Calicut to Manantoddy and Devála, *via* the Támracherí and Terriote Ghâts. Beyond the fact that the cost of the line has been estimated at Rs. 36,29,000, no detail whatever respecting it is given. It is not even stated whether the line has been surveyed, and its assumed length is not known.

2. Two somewhat similar proposals, having for their object the connection of Wynaad with the Western Sea-board by a line of rail, have recently been under the consideration of Government, the first being brought forward by the Wynaad Planters' Association, and the second by Messrs. Burchells of London. To neither of those proposals was this Government able to accord its unqualified approval.

3. While fully recognising the importance of bringing Wynaad into connection with the railway system of India, it would in my opinion be at present premature to encourage, the construction of the line recommended by the Local Fund Board of Malabar.

4. In the first place the proposed gauge of $2\frac{1}{2}$ feet is a mistake. In view of the certainty that any line which may be constructed to link Wynaad with the West

Coast, will ultimately be extended to join existing and proposed lines in Mysore and in the Nílgiri District, there can be no reasonable doubt that the adoption of the metre gauge is obligatory.

5. In the second place there is nothing on record to show that the country has been thoroughly examined, and that the best line has been selected. Looking to the difficulties inseparable from the nature of the tract to be traversed, a thorough examination of all possible routes is essential, before the construction of an expensive line of rail can be undertaken. There are at least six possible routes which a railway between Wynaad and the coast might take:—

(1) The Karkúr Ghât.
(2) The Tholadi Ghât.
(3) The Támrachéri Ghât.
(4) The Terriote Ghât.
(5) The Kutiadi Ghât.
(6) The Periar Ghât.

Of these, the Karkúr Ghât may probably be struck out; partly on account of the large quantity of bridging which would be necessary, and partly because its construction would serve only a limited portion of Wynaad. There remains however a great extent of difficult country to be examined before the best line for a railway can be even approximately fixed.

6. In the third place there is nothing on record to show what ratio the probable traffic receipts would bear to the cost of construction. On this point there are some pertinent remarks in the Resolution of the Board of Revenue, paragraphs 15 to 19.

7. After careful consideration I am of opinion that the right course at present, is to encourage the extension of the Mysore Railway to some large traffic centre in Wynaad, such as Ganipativatam or Gúdalúr. The result of my recent visit to Wynaad, in company with the Right Honorable the Governor, was to satisfy me that Gúdalúr, from its importance in connection with both the coffee planting and the gold mining industries, should be made an obligatory point in any line of railway that may be projected to serve Wynaad.

8. The Mysore Railway is now open throughout between Bangalore and the town of Mysore, a distance of 85¾ miles; and I understand that its extension to Gundalpet, a further distance of about 35 miles, is under consideration.

In the probable event of this extension being constructed, there would remain a distance of about 28 miles to be got over, in order to bring Gúdalúr into connection with the Indian Railway System. Taking an average outlay of Rs. 50,000 per mile, the cost of this little extension would probably amount to about Rs. 14,00,000.

9. I am of opinion that, in such manner, all existing legitimate claims of Wynaad in this matter would be fully met, as it would obtain the advantages of railway communication at a minimum of cost. After the line has been opened to Gúdalúr, a short experience of the development of traffic will render it comparatively easy to determine the necessity for further extensions, and their directions.

10. In dealing with this question there is one argument, which, from an Imperial point of view, would seem to favor the connection of Wynaad with Mysore, rather than with the Western Sea-board. A line from Mysore, through Gundalpet, to Wynaad, would without doubt throw traffic on to the Madras Railway, and would serve as a feeder to it; whereas a line connecting Wynaad with the West Coast would unquestionably be soon extended to join the Mysore Railway, and would then be able to compete at great advantage with the Madras Railway, a guaranteed line which has never yet earned its dividend.

Before recommending that the State should incur great expense in encouraging the construction of a rival line, the necessity for it should, in my opinion, be more clearly proved than has yet been done.

27th April 1882. (Signed) J. SHAW-STEWART, Colonel, R.E.,
Consg. Engineer for Railways.

3079/32



No. 43-C.

From R. W. BARLOW, Esq., President, Local Fund Board, Nílgiris, to the Chief Engineer, Public Works Department, dated Ootacamund, 22nd May 1882, No. 2.

In reply to your letter, No. 117, dated 17th instant, I have the honor to state that no Local Fund money was spent on the road from Ootacamund to Naduvatam and Gúdalúr during 1879-80, 1880-81 and 1881-82, as stated by the Local Fund Engineer in his letter, No. 186, dated 15th March last. The Engineer seems to have been under the impression that the assignments in the Local Fund Budget for the maintenance of the Circle roads are all Local Fund money. Whereas though the ghât roads in the district are under the superintendence of the Circle Board, they are maintained by Provincial grants given by Government every year.

2. During 1880-81, owing to the bad state of the road from Ootacamund to Naduvatam, a special Provincial grant of Rs. 20,000 for 1880-81 and 1881-82 was given—*vide* G.O., No. 299, dated 21st February 1881. Under Government Order quoted above a contribution of Rs. 30,000 was contemplated to be provided in the Chinchona Budget for 1881-82, and liabilities have been incurred by the Local Fund Engineer in anticipation of such grant being made. No such grant was however provided in the Chinchona Budget, but a further sum of Rs. 20,000 from Provincial funds was allotted at the close of the past official year for the road in question—*vide* G.O., No. 204, dated 4th February 1882.

3. The following sums were allotted to the road from Ootacamund to Naduvatam and Gúdalúr:—

| — | Yearly Provincial Grant. | Special Provincial Grant. | Total. |
|---|---|---|---|
| | RS. | RS. | RS. |
| In 1879-80 ... ... ... ... ... ... | 6,160 | ... | 6,160 |
| „ 1880-81 ... ... ... ... ... ... | 3,590 | 10,000 | 13,590 |
| „ 1881-82 ... ... ... ... ... ... | 3,080 | 30,000 | 33,080 |
| Total ... | 12,830 | 40,000 | 52,830 |

Of which the yearly Provincial grants were spent on the whole line from Ootacamund to Naduvatam and Gúdalúr in each of the above years. The Special Provincial grants, Rs. 40,000, were only for the construction of the portion from Ootacamund to Naduvatam.

4. Rs. 25,878-3-4 were spent on the Naduvatam road from the Special Provincial grants up to the end of 1881-82, thus leaving an opening balance of Rs. 14,121-12-8 available for expenditure in 1882-83.

5. The grant of Rs. 10,000 said by you to have been made in the Public Works Department, quoted in the latter portion of paragraph 1 of your letter, seems to be the grant given in G.O., No. 2821, dated 14th November 1881, for repairing the communications leading to Wynaad Gold Fields. Only a portion of it, Rs. 4,500, was given for the repairs of the roads of this district.

6. The following summary will give you the particulars of the grants available for expenditure, on the road in question, during 1882-83:—

| | RS. | A. | P. |
|---|---|---|---|
| Available balance of the special grants on the 1st of April 1882 ... ... ... ... ... ... ... ... | 14,121 | 12 | 8 |
| A portion of the grant, Rs. 10,000, given for repairing roads. | 4,500 | 0 | 0 |
| Amounts contemplated to be given in paragraph 3 of your letter under reply ... ... ... ... ... ... | 64,000 | 0 | 0 |
| Total ... | 82,621 | 12 | 8 |
| Add maintenance grant for 1882-83 ... ... ... | 3,080 | 0 | 0 |
| Grand Total ... | 85,701 | 12 | 8 |

No. 43-D.

From R. W. BARLOW, Esq,, President, Local Fund Board, Nilgiris, to the Chief Engineer, Public Works Department, dated Ootacamund, 23rd May 1882, No. 3.

In continuation of my No. 2, dated 22nd instant, I have the honor to forward a copy of the Local Fund Engineer's letter, No. 13, dated 21st instant, on the same subject, for your information.

2. The Engineer in paragraph 2 of his letter states that Rs. 4,500 allotted by the Superintending Engineer, Fourth Circle, for the repairs of the communications leading to Wynaad Gold Fields was subsequently withdrawn; but he is not aware that the Circle Board have, on the instruction of the Accountant-General, taken credit for this amount into their accounts from Provincial Funds.

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ENCLOSURE.

From J. O'SHAUGHNESSY, Esq., C.E., Local Fund Engineer, Nilgiri District, Ootacamund, to the President, Local Fund Board, Nilgiris, dated Ootacamund, 21st May 1882, No. 13.

In reference to your endorsement, dated the 20th instant, on letter No. 117 E., dated the 17th idem, from the Chief Engineer, Public Works Department, to your address, I have the honor to report that the figures given in my letter, No. 186, dated 15th March 1882, do *not* include the promised grant of Rs. 30,000 from Chinchona Funds in 1881-82. There were some liabilities incurred in anticipation of this grant, but they have been cleared off by the grant of Rs. 20,000 sanctioned in G.O., Financial Department, dated the 4th February 1882, No. 204.

2. The grant of Rs. 10,000 made by the Public Works Department in the last official year and referred to at the conclusion of paragraph 1 of the Chief Engineer's letter under reference is, I think, the special grant for the repair of the road from the head of the Támrachéri Ghât towards South-east Wynaad and the Nilgiris *vide* G.O., dated the 14th November 1881 W. The Superintending Engineer, Fourth Circle, allotted Rs. 4,500 of this grant to the portion of that road that is in this district. This allotment was subsequently withdrawn; there was no portion of it utilized in this district, and I have received no intimation that it will be available for expenditure in this official year (1882-83).

3. The figures given in my letter of the 15th March last, No. 186, and referred to in the Chief Engineer's letter under reply, include a Provincial grant of Rs. 6,160 for the ordinary upkeep of the road by the Public Works Department in 1879-80. This amount should not, I think, be included in grants for completing the formation of the road which is virtually a new work. If this amount is excluded, as I think it should be, the grants up to date amount to Rs. 40,000 as follows:—

G.O., Financial Department, dated 21st February 1881, No. 299—

| | Rs. | A. | P. |
|---|---|---|---|
| For expenditure in 1880-81 ... ... ... ... ... | 10,000 | 0 | 0 |
| Do. in 1881-82 ... ... ... ... ... | 10,000 | 0 | 0 |
| Total ... | 20,000 | 0 | 0 |

G.O., Financial Department, dated 4th February 1882, No. 204—

| | | | |
|---|---|---|---|
| For expenditure in 1881-82 ... ... ... ... ... | 20,000 | 0 | 0 |
| Total Grant ... | 40,000 | 0 | 0 |
| The expenditure in 1880-81 was ... ... ... ... | 2,369 | 14 | 1 |
| Do. in 1881-82 was ... ... .. ... | 23,508 | 5 | 3 |
| Total expenditure to end of 1881-82 ... | 25,878 | 3 | 4 |

leaving Rs. 14,121-12-8 of existing grants available for expenditure in 1882-83.

Adding to this the grants of Rs. 64,000, which the Chief Engineer hopes to assign in the current year, we shall have exactly Rs. 78,121-12-8 for expenditure on the road in question in

3079/33



1882-83, and if the Superintending Engineer, Fourth Circle, reallots Rs. 4,500 out of 10,000, sanctioned in G.O., dated the 14th November 1881, No. 2,821 W., the total amount available for expenditure in the current year will be Rs. 82,621-12-8.

It will be difficult to collect the labor required for the expenditure of this large amount on the road from Ootacamund to Naduvatam, but if I am assured that the money shall be forthcoming I will undertake to do it if desired. It might, however, be better to distribute it among several necessary works; and if this proposal is approved, I would recommend the following distribution:—

| | Rs. |
|---|---|
| Road from Ootacamund to Naduvatam ... ... ... ... | 50,000 |
| Do. from Nàduvatam to Gúdalúr ... ... ... ... ... | 12,000 |
| Do. from Nadgani to Devála ... ... ... ... ... | 10,500 |
| Do. from Kótagiri to Mettupálaiyam ... ... ... ... | 10,000 |
| Total ... | 82,500 |

I beg to suggest that this proposal be submitted to the Chief Engineer.

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No. 43-E.

From Lieutenant-Colonel H. R. MEAD, R.E., Superintending Engineer, Fourth Circle, to the Chief Engineer, Public Works Department, dated Ootacamund, 24th May 1882, No. 12-C E. W.:—

With reference to G.O., No. 1190 W., dated 10th May 1882, I have, as requested in paragraph 6 of the Order, the honor to report that I consider without some rearrangement of divisions and charges I cannot recommend that the Public Works Department should undertake the works proposed to be carried out on the Nílgiris.

2. At present the Executive Engineer has charge of the South Canara, Malabar and Nílgiri Districts, his headquarters are at Calicut. It takes him two days to go from there to Ootacamund, and to visit the stations on the coast he has, as a rule, to go by steamer. As this is the case he cannot give that attention to the works on the Nílgiris that is advisable, and I would deprecate any more work being added to his charge, as, of course, working them entirely through a Sub-officer is very unsatisfactory.

3. I would recommend that a new division consisting of the Nílgiri District and the Wynaad should be formed, and that the present West Coast Division be made a third-class one. This arrangement would be the most satisfactory, but it is one that, I fear, Government will not consent to, as the present number of divisions is, I believe, a final settlement of the establishment.

4. As this is the case I can only propose a rearrangement of the charges of the present divisions, and although I regret it much I have no course to follow but to recommend that that the present West Coast Division be made the Nílgiri Division, to consist of the Nílgiri District and the whole of the Wynaad including that attached to the Malabar District, and that the remainder of the Malabar District and South Canara District be attached to the Coimbatore Division.

5. If this is done, as in the Coimbatore District there are many important irrigation works, it will be necessary for the Executive Engineer to be relieved of all personal charge and for the entire division to be worked through Sub-officers.

6. The office, at present a second-class one, should be made a first-class one. The new Nílgiri office can however be made third-class in place of the West Coast second-class office; the cost of this is but small; it is the difference of 2 at Rs. 253 or Rs. 506 against Rs. 298 + Rs. 220 or Rs. 518, or Rs. 12 per month Rs. 144 per year. Besides this I think it will be necessary for an Assistant Accountant to be attached to the Coimbatore Division, as the account work in it will be enormously increased.

7. With regard to establishment the following show what I would propose; the differences are but small:—

| Divisions. | Sub divisions at present. | Establishment. | | |
|---|---|---|---|---|
| | | Executive Engineers. | Assistant Engineers. | Upper Subordinates. |
| West Coast ... ... ... ... ... | 3 | 1 | 2 | 12 |
| Coimbatore ... ... ... ... ... | 2 | 1 | 1 | 5 |
| Total ... | 5 | 2 | 3 | 17 |
| *Proposed.* | | | | |
| Nilgiri ... ... ... ... ... .. | ... | 1 | ... | 4 |
| Coimbatore ... ... ... ... ... | 5 | 1 | 3 | 12 |
| Total ... | 5 | 2 | 3 | 16 |

*Note.*—One Upper Subordinate is to be employed in North Arcot Division where, owing to the abandoned taluks being taken up, six in place of five Upper Subordinates are absolutely necessary.

I do not consider the Nílgiri Division will require a Sub-division, and four Upper Subordinates should be ample even with the extra work proposed to be taken up. At present there is a Sub-officer and two Upper Subordinates.

The five sub-divisions in Coimbatore would be as follows:—

*1st*—Mangalore, in charge of an Assistant Engineer and one Overseer. As this station is to cease to be a Military Cantonment, there will be but little work. As, however, the Executive Engineer can only visit it once a year, and as it is cut off during the monsoon from headquarters, an Assistant Engineer should be in charge.

*2nd*—Cannanore, in charge of a Military Upper Subordinate with 1 Overseer. The chief work will be the Military buildings and occasionally Civil buildings; the sub-division will be made smaller than at present, as the Wynaad will not belong to it.

*3rd*—Calicut, in charge of an Assistant Engineer with three Upper Subordinates. This charge is the headquarters of the Revenue Department; there are three Military Stations in it—Calicut, Malapuram, and Quilon—and many Civil buildings; it will be a most important sub-division.

*4th*—Coimbatore, an Upper Subordinate in charge of the sub-division with two Overseers; it will include the station of Coimbatore, the Nóyil and Amarávati Upper Irrigation.

*5th*—Erode Sub-division, Assistant Engineer in charge with three Overseers. This will be a most important sub-division comprising the Satyamangalam channels, the Kalingaroyen, the Pogalur, many large tanks, and the whole of the Cauvery river works both in Salem and Coimbatore Districts.

8. Should the above proposals be approved, I think the best time for the changes to be made would be early in July, as then both in the West Coast and in Coimbatore most of the works are stopped owing to the monsoon.

9. I have to point out the absolute necessity for allowing some hill allowances to the clerks employed at Ootacamund, and would urge that they should be allowed the privilege given to Government Clerks in paragraph 664 of the Code; unless this is done, it will be impossible to obtain the services of good men at Ootacamund where the cost of living is great.

10. In conclusion I have to call attention to my Notes of Inspection, dated 22nd May 1882. It will, I have but little doubt, be necessary for the estimates sanctioned by the Local Fund Board for the road from Ootacamund to Gúdalúr to be thoroughly revised and remade, and but little credit given for the work done. It is, I believe, the intention and wish of Government that this road should be made a first-class line of communication, and judging from the work done in the first three miles this most certainly is not being done.

11. I would also ask that the question of the advisability of the road from the foot of the Nílgiri Ghât to Ootacamund being placed under charge of this department being considered, I think the whole line from the foot of the ghât to Ootacamund to Gúdalúr and eventually to Devála and Lackadi to the foot of the Támrachéri Ghât should eventually be a Provincial line under charge of the Department of Public Works, and that this line should be made first class throughout; for this of course extra establishment will hereafter be required, but not much; for the present the road from the foot of the Nílgiri Ghât to Gúdalúr might be taken up for that portion from the foot of the ghât to Ootacamund. At present a large Government grant is given; the cost of this, therefore, if the proceeds of the tolls are taken over with road, would be little or nothing.

3079/34



No. 44.

ORDER—dated 6th June 1882, No. 1416 W., Public Works.

In his memorandum, dated 23rd January 1882, the Chief Engineer submits a comprehensive scheme of communications for the Wynaad, the estimated cost of which, distributed over 5 years, is roughly calculated at 18¼ lakhs of rupees; and the Consulting Engineer for Railways submits a note, under date the 27th April 1882, on the proposals embodied in G.O., No. 319, dated 1st April 1882 (Financial), for opening up the Wynaad by means of railways.

2. These papers will be recorded, and copies furnished for the information of the Government of India with reference to their endorsement, No. 138 C., dated 19th April 1882, on a despatch* from the Secretary of State inquiring the best means of placing and maintaining the main lines of communication of this district in a suitable condition, to provide for the increased traffic that may be expected from the attempts now being made to develop the gold mining and planting industries.

* No. 8, Public Works, dated 9th February 1882.

3. As regards the proposed railway development, the Right Honorable the Governor in Council concurs generally in the views of the Consulting Engineer for Railways as to the direction which any new lines should take. There is no prospect of Provincial Funds being in a position to meet, the cost of the extension of the existing line from Mysore to Gúdalúr, though if the Mysore Government see fit to construct the portion within their own territory, to the frontier near Tippakadu, this Government would be prepared to give the subject their most serious consideration.

4. So far as can be forecasted at present Provincial aid must be restricted to the completion of the Ootacamund, Naduvatam and Gúdalúr road, with eventual extension to the heads of the Karkúr and Támrachéri Ghâts. Fairly large sums have already been granted for this work, and during the current official year large assignments have either been made or promised.

5. It would appear that there is at present available with the Local Fund Board an unexpended balance from previous grants of ... ... Rs. 14,122
that the Financial Department have assigned from Provincial Funds to the Nílgiri Circle a sum of ... ... ... ... ... ... ,, 50,000
and that a further contribution of ... ... ... ... ... ... ,, 40,000
was recently promised by the Public Works Department, making a total of ... ... ... ... ... ... ... ... ... ,, 1,04,122
for expenditure during the current official year.

6. It is clear from recent correspondence that the Local Fund Agency is inadequate to execute work to this extent. The proposal of the Superintending Engineer, Fourth Circle, that the main line of communication from Mettupálaiyam to Gúdalúr, should be resumed by Government, will therefore be carried into effect at once. The assignment of Rs. 50,000 made in the Financial Department will be reserved for this purpose, and the unexpended balance of Rs. 14,122 in the hands of the Local

Fund Board will be similarly employed. The sum available for immediate expenditure on this main line of communication for original works will thus be Rs. 64,122.

7. Seeing that labor has to be organized and a new division to be formed as sanctioned below, it will not probably be practicable to utilise a larger sum. The grant of Rs. 40,000 held in reserve in paragraph 6 of G.O., 1190 W., dated 10th May 1882, will therefore now be resumed. An appropriation of Rs. 10,000 is however made from the Provincial Reserve for the Kotagiri Ghât road to be expended by either the Local Fund Board, or by the Public Works Department, as may be decided by the Chief Engineer.

8. The arrangements sanctioned above will necessitate the reorganization of the West Coast Division, at all events for the present. That portion of the division comprising the Nílgiri District, and the whole of the Wynaad including that attached to the Malabar District, will in future constitute a separate division, to be called the Nílgiri Division. The remainder of the West Coast Division will be added to the Coimbatore Division, and the West Coast Division itself will be abolished. The Superintending Engineer will distribute the officers and subordinates as proposed in paragraph 7 of his letter, No. 12-C E.W., dated 24th May 1882. The Coimbatore Division will be raised from the second to the first class, and the Nílgiri Division will be allowed an establishment at the special rates of pay shown below :—

| | | Rs. |
|---|---|---|
| One Clerk, 3rd class, 2nd Grade, | 60 | 60 |
| One " 4th " 1st " | 40 | 40 |
| Two " 4th " 2nd " | 30 | 60 |
| One Draftsman, 1st class | 50 | 50 |
| One " 2nd " | 35 | 35 |
| One Messenger | 9 | 9 |
| One " | 8 | 8 |
| | Total ... | 262 |

9. The proposal of the Superintending Engineer to grant a special batta allowance to this establishment, equivalent to three-tenths of their pay, is inadmissible, but the regular rates of pay of the Divisional establishment have now been specially fixed with reference to the peculiar circumstances of the locality.

10. The Superintending Engineer will carry out the details of the arrangements so as to take effect not later than the 1st August 1882.

(Here enter No. 1417 W., dated 6th June 1882.)

(True Extract.)

(Signed) R. H. SANKEY, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Superintending Engineer, Fourth Circle.
" Consulting Engineer for Railways.
" Examiner of Public Works Accounts.
" Financial Department.
" Chief Engineer, Public Works Department.

No. 44-A.

ENDORSEMENT—No. 1417 W., dated 6th June 1882, Public Works.

Copy of the above forwarded to the Government of India, with reference to their endorsement, No. 138 C, dated 19th April 1882, and No. 407 R.C., dated 6th May 1882.

(Signed) R. H. SANKEY, Colonel, R.E.,
Secretary to Govt., P.W.D.

Ed. C. Howarth.
Sp are Copies

3079
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BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1882} Madras.

PUBLIC WORKS.

*Dated June, 6th.*

*Recd.*

G.O., 6th June 1882, No. 1417 W.

JUNE.

Nos. 43—44-A.

**Wynaad Communications.**

Passing orders on Notes by the Chief Engineer, Public Works Department, and Consulting Engineer for Railways, on the subject of improvements to the —.

Esqrs Office Ootacamund
30/36
Mr Garrett was then on Special duty. his pay was charged to the D Project.

In the present case, if the staff of the Nilgiri Dn were strong enough to undertake the work, the proposed road surveys in the Wynaad would doubtless have devolved on it. It is submitted therefore that the pay &c of the Nordmann & his establt might fairly be charged against the Nilgiri Division.

A
24/10

Yes. I think this may be done. Draft order accordingly — and submitted to Govt for approval.

CJ
24/10.

S.A.W.

How was the Establishment employed in getting up the Patinghy Ghât project & the estimates ? charged ? Are the items in this minute shown in any of the annual —

Cif
16/10.

D.W.

The Patinghy Ghât project, now after it was started, appears to have been considered as a detached "Range" or Sub-division of the Vizagapatam Division, & the cost of the establishment was of course charged to that Division —

In October 1882, Mr. Garrett was deputed, when in charge of the Project Dn., to take Levels & Surveys in connection with the Peryar Project. Mr. Bruce, Nilgiri Dist., was one of those sent down for the purpose, & I have

P. W. DEPARTMENT.

3079/37

No. 395 E dated 26th. September 1883.

MEMORANDUM.

Mr. K.F.Nordmann, Executive Engineer 2nd. grade, having been appointed to the special duty of road surveys in the Wynaad, will be furnished with the recorded papers on the subject, and, after making himself acquainted with the views of Government, of the local planters, and of others interested in the development of communications, will proceed to lay out a programme of operations; submitting at the same time an estimate of the cost of the establishment which will be necessary to aid him in the work.

2. The papers recorded with Proceedings of Government 1416 W dated 6th. June 1882 contain a comprehensive scheme of communications for the development of the Wynaad District, with approximate estimates of the cost. As however several years must elapse before the extended series of works there contemplated can be taken up with any prospect of funds being available for their execution, survey operations should for the present be confined to the most urgent requirements.

3. From the letter from the Wynaad Planters' Association printed with No. 311 E dated 27th. August 1883, it would appear that, in the opinion of the Association, the road of the greatest

greatest importance to the District is that from Calicut to Vytheri, 43 miles. The approximate cost of this line as estimated by General Sankey is Rs.370,500 while the Local Fund Engineer sets the cost down, at Rs.186,000. It will require detailed surveys to arrive at any thing like precise results. This work should accordingly be arranged for to start with, and a detailed estimate prepared.

4. Mr. Anderson's estimate makes no provision for shelter for establishments, while the cost under this head in the Chief Engineer's approximate estimate may perhaps be susceptible of reduction. The reasonable comfort of the staff who will be required to work in this notoriously unhealthy locality must however be kept in view. The item "compensation for land" should also be strictly investigated so far as means allow; and the provision for "supervision" carefully worked out,- details of the staff to be employed being given in support of the figures which may be adopted.

5. As regards the route which the line should take, it would appear, from para 4 of the Chief Engineer's Memorandum recorded with Proceedings of Government 1416 W dated 6th. June 1882, that on the section from Calicut to Malapuram the line now used via Puddanellum to Tamracheri has extremely bad gradients, owing to which traffic is diverted to the more circutous though flatter road via Challaye. The merits of both roads should be investigated.

6. From Malapuram to Vayitri, the Tamracheri Ghât is traversed. The rquisite improvements to render this properly serviceable for cart traffic should be provided for.

The

3079/38

7. The estimates should allow for a metalled roadway of 12 feet throughout. Should this be found insufficient for traffic, it can be widened hereafter.

8. Mr. Nordmannwill organise his arrangements with the least practicable delay. Should the estimates be sufficiently advanced to admit of work being commenced in 1884-85, the Government will endeavour to make a moderate provision in the Provincal Budget of that year.

(By Order)

C. Anderson. Major R.E.

Under Secy. to Govt. P.W.D.

To

K.F.NordmannEsqre.
Ex.Engr.2nd.Grade with
G.O.2821 W dated 14th.Novr.1881
G.O.1416 W dated 6th.June 1882
No.311 E dated 27th.August 1883

Supg.Engr.Fourth Circle
Examiner P.W.Accts.
Financial Dept.
Consg.Engr for Rys.
with No.311 E dated 27th.august 1883.

" 838 6/17-3-73
" 839 6/— " —
" 9230/25-3-73
" 11580/22-4-73
" 85590/24-10-82
" 14170/6-6-82
395 E 0/26-9-83

[Exr. Wks. Form No. 111.]

Mr. Ch. 8915

3079/39

GOVT. OF MADRAS. 1883. P. W. DEPT.

EXAMINER, P. W. ACCOUNTS.

Madras, 13th October 1883.

Rec'd 15

OFFICE NOTE No. 735.

To

W.

Encs: —

with reference to memo No. 395 E. dated 26th. September 1883 appointing Mr. K. F. Nordmann to the special duty of road surveys in the Wynaad, please favor me with orders as to how the pay of Mr. Nordmann and his Establishment for the period he is employed on the special duty, should be charged.

C.

13/10.

25/10

207 SW.

F WITH Genl. No.

18 .

No 3079 W PUBLIC WORKS DEPARTMENT.

3079/40

# PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 31st October 1883

READ the following

Office Note from the Examiner Public Works Accounts } M. E. No: 735 of 13th October 1883.

The pay of Mr. Nordmann and his establishment, while engaged on the special duty of road-surveys in the Wynaad, will be charged to the Nilgiri Division

Cr. Dr. Est. 25/10

27-10-83

Superintending Engineer
Fourth Circle
Examiner Public Works Accts.

1H/
3079

0915

Govt. of [1883] Madras.

PUBLIC WORKS.

Dated 7/11.

Rect.

Read.

G.O. 31 October 1888, No. 3079

Nos.

Mr F. J. Nordheimer

To pay £ —

this Establishment while employed on road duty in Upper Nilgiri Dist.

H5

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