(1) Number of pages 58

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TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

P.W DEPARTMENT

G.O. No. / B.P. No:	41 W	Press. / Mis.
Dated	8. 1. 1883	~~198~~

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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

General.
Establishment.

Nos. 44 & 45.

G.O., dated 8th January 1883, No. 41 W., Public Works.

Sanction is accorded to the formation, as a temporary arrangement, of two Sub-divisions in the Nilgiri Division. The Superintending Engineer, Fourth Circle, will report the sum required for appropriation during the current official year.

(True Extract.)

Captain, R.E.,
Ag. Under Secy. to Govt., P.W.D.

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

Exd. C. Howarth.
Spare Copies

GENERAL.
ESTABLISHMENT.

Govt. of {1883} Madras.

PUBLIC WORKS.

Dated January, 8th.

Recd. *Encl.*

G.O., 8th January 1883, No. 41 W.

JANUARY.

Nos. 44-45.

Nilgiri Division.

The formation of two temporary Sub-divi-
sions in the —, sanctioned.

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
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	
					1,75,000
Vayitri to Manantoddy.	(10.)	30	5,000	1,50,000	
					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 Nílgiris 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:—

	Rs.	Rs.
WORKS.		
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

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 moreover 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.

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.

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* Areacode 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 Laekadi, &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 Laekadi in 18 months after starting the works, *provided* the road were closed to traffic meanwhile.

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	55,33,056
Mangalore	69,323	29,97,857

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.

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.

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 Cholади 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 landslips; 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. Third, Ooty to Naduvatam	In perfect order.. ..	} 1,60,000	To complete it thoroughly.
Fourth, Naduvatam to Gúdalúr, 10 miles ..	Incomplete and impassable in wet weather.		
Fifth, Gúdalúr to Nadagani and on to the limits of district on Karkúr Ghât, 11 miles.	Passable at all seasons; wants metalling.	40,000	To make it a first-class road.
Sixth, Nadagani to Cholady, 21 miles ..	Passable at all seasons; wants metalling.	40,000	Do. do.
	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 Ghât	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 Ghât. 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 Ghât.

16. I observe that the Nilgiri 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

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 Nilgiri Planters' Association, but it is as well that His Excellency should be informed of the exact state of the case as soon as possible.

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 Nilgiri 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, Nilgiris.
,, ,, ,, ,, ,, Malabar.

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.

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 2½ 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 2½ 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.

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. 48,960.

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

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.

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	...	15-6	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.	

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 2½ 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	...	23-5½	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	...	26-2 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 ¼ 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.	

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 Kondótti 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 3 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 road-way to south of bridge for a length of 80 feet with average depth of 1 foot. The existing north abut-ment, 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 danger-ous 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 chu-nam; 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.	

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 other-wise 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 Nul-lah. 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 car-ried 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 trac-ing. Some of the joists are begin-ning 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 coun-try carts, it is very unsafe for any-thing 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 Edawanah 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.	
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.*

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* Arencode 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.	

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.	
11	...	24-3	One 6 feet do. do.	
12	...	26-3	Two 6 ,, do. do.	

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 6 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.			Total.		
			RS.	A.	P.	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 × ½ × 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			
	24-2	Converting 5¼ 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			
						170	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

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

Item Number.	Mileage.	Particulars.	Amount.			Total.		
			RS.	A.	P.	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.			Total.		
			RS.	A.	P.	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	...	
	50	Miles low country at Rs. 3,500 per mile ...	83,160 0 0 1,75,000 0 0	
				2,58,160 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	
		Converting a 9 feet do. do. Cost as above.	170 0 0	170 0
	24-2	Converting 5½ feet cover stone do. do. ...	...	170 0
		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	
		Converting 5 feet do. do. Cost as above ...	120 0 0	120 0
	27-5	Converting 2 vent 6 feet cover stone culvert into a 15 feet one span rail girder. Cost of		120 0
		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	
	26-6	Converting 10 feet one arch culvert into a rail girder—		427 0
		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	
		Converting 10 feet do. do. Cost as above.	200 0 0	200 0
	28-6	Converting 14 feet timber platform culvert into a one vent 24 feet span rail girder—		200 0
		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

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	
		267⅓ 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 ...	...	61,909 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 2 × 5 × 1,760 = 17,600 1 × 15 × 1,760 = 26,400 44,000 R. yards at Pies 3 ...	687	
		4 *miles tracing* at Rs. 100 per mile ...	400	10,917
		Earthwork 4 × 5,000 = 20,000 at As. 2	2,500	
		COMPENSATION FOR LAND. 32 acres at Rs. 100 per acre	3,200	
		6 small bridges between Calicut and foot of ghât at Rs. 300 each	1,800	6,100
24th	One 84	do. do. do. ...	1,800	1,800
28th	One 50	do. do. do. ...	2,100	
29th	One 21	do. do. do. ...	1,250	
36th	One 14	do. do. do. ...	525	
			350	
				6,025
		Add 10 per cent. for Superintendence ...	...	1,69,162
			...	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
		Add 100 per cent. for Superintendence ...	...	1,56,220
			...	15,620
		Total ...	...	1,71,840

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 Nilgiri boundary *via* the Karkúr Ghât	18,640	18,640
2	*Estimate of the* probable cost and completing road No. 5 from Calicut to Nilgiri 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— 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.	...	...	
52,800	For 40 miles of ballast complete ...	0 2 6	206 4 0	
105,600	*For* 80 miles of ballast complete ...	0 2 6	8,250 0 0	
		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	
5,640	For cost of one mile of permanent-way complete	151 0 0	7,097 0 0	
	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, 8 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 ⅓ 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
26	Spanners 2 × 13	1 12 0	91 0 0
26	Pinchbars with steel claw 2 × 13	0 8 0	13 0 0
52	Bill-hooks 4 × 13	3 0 0	78 0 0
52	Mamoties 4 × 13	1 4 0	65 0 0
13	Wooden lever 1 × 13	0 12 0	39 0 0
	Sets of light board	10 0 0	130 0 0
13	Lights 1 × 13	...	...
4	Trollies 4	2 0 0	26 0 0
4	Join crow 4	80 0 0	320 0 0
2	Racket screw jack 2 (6 ton)	50 0 0	200 0 0
13	Track gauge 1 ×13 (2 feet 6 inches)	40 0 0	80 0 0
1	Portable forge 1	5 0 0	65 0 0
13	Spirit level 1 × 13	65 0 0	65 0 0
13	Screw augur 1 × 13 (1″)	6 0 0	78 0 0
13	Do. do. 1 × 13 (¾″)	1 4 0	16 4 0
13	Do. do. 1 × 13 (1″)	1 8 0	19 8 0
1	One Engineer's or Line Inspector's trolly worked by levers and double crank axle	1 12 0	22 12 0
13	Adzes 13	560 0 0	560 0 0
2	Drill cramps 2	8 0 0	104 0 0
2	Crank brace 2	15 0 0	30 0 0
100	Bits 100	8 0 0	16 0 0
13	Axes 4 lb. 13	6 12 0	75 0 0
26	Sledge hammers steel faced 7 lb.	2 0 0	26 0 0
6	Racket brace...	2 8 0	65 0 0
		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

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 paits.	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.

CALICUT AND WYNAAD RAILWAY.

DETAILED ESTIMATE No. 6.

Construction Establishment for Calicut and Wynaad Railway, 120 miles.

Number.	Particulars.	Rate.	Amount.	Total.
		Rs.	Rs.	Rs.
1	Chief Engineer	1,200	1,200	
	Travelling allowance	150	150	
5	Assistant Engineers	600	3,000	
	Travelling allowance ... ... each	100	500	
5	Engineering Assistants ... ... „	100	500	
	Travelling allowance ... ... „	30	150	
10	Inspectors ... ... „	100	1,000	
	Travelling allowance ... ... „	30	300	
20	Sub-Inspectors ... ... „	45	900	
	Travelling allowance ... ... „	15	300	
12	Chief Engineer's Writers ... ... „	25	300	
4	Do. Accountants ... ... „	30	120	
1	Chief Storekeeper ... ... „	100	100	
1	Chief Engineer's Office Manager ... ... „	100	100	
25	District Writers ... ... „	20	500	
5	Do. Storekeepers ... ... „	40	200	
5	Cashkeepers ... ... „	40	200	
40	Lascars and Peons ... ... „	7	280	
	Total for 1 month ...	...	9,800	
	Total for 30 months ...	...	...	2,94,000

ESTIMATE No. 7.

Bridges on Wynaad Railway, 120 miles.

Item Number.	Particulars.	Rate.	Amount.	Total.
		Rs.	Rs.	Rs.
1	15 waterways each 30 feet in the clear at ...	2,000	30,000	
2	4 do. 40 „ „ „ ...	3,000	12,000	
3	4 do. 50 „ „ „ ...	6,000	24,000	
4	2 do. 60 „ „ „ ...	8,000	16,000	
5	2 do. 80 „ „ „ ...	11,000	22,000	
6	2 do. 100 „ „ „ ...	15,000	30,000	
7	1 do. 200 „ „ „ ...	30,000	30,000	
8	1 do. 250 „ „ „ ...	40,000	40,000	
				2,04,000
9	120 miles minor waterway at Rs. per mile ...	2,000	2,40,000	2,40,000
	Total ...	...	...	4,44,000
	Add for Sundries 10 per cent. ...	...	...	40,000
	Grand Total ...	...	...	4,84,000

DETAIL ESTIMATE No. 8 for one mile of road, Wynaad and Calicut Railway, 2 feet 6 inches gauge.

Particulars.	Rate.	Amount.	Total.
	Rs. A. P.	Rs.	Rs.
30 lb. steel rails 47 tons at £7-15-0 at £0-1-8 per ton	93 0 0	4,581	...
Fish-plates and bolts 2⅜ tons at £15 per ton ...	180 0 0	495	...
Dog spikes and farry bolts one ton at £18 ...	216 0 0	216	...
Casting up-country.			
Say for 50 miles Rs. 15 per ton stringing out and fitting together	15 0 0	200	...
Landing, say, Rs. 5 per ton	5 0 0	141	...
Freight and insurance	30 0 0	1,410	...
Sleepers 2,016 (jungle-wood) at	1 0 0	2,016	...
Total ...	...	...	9,059
	£ s. d.	£	£
One mile of Wood's patent steel sleepers at (2,000 each 23 lb. to the mile 20½ tons) at	0 2 10	289	...
Clip chains, say, 5 tons at	11 0 0	55	...
Freight 27½ tons at	2 10 0	68	...
289 + 55 + 68 × 12	...	...	4,944
8,000 keys at Rs. 3 per 100	...	...	260
Total ...	...	...	5,204

WYNAAD AND CALICUT RAILWAY.

DETAILED ESTIMATE No. 9.

Probable working expenses for a year.

Numbers.	Particulars.	Rate per Mensem.	Amount.	Total.
		Rs.	Rs.	Rs.
1	Manager and Chief Engineer at	1,500	1,600	
...	Do. travelling allowance at	100		
1	Locomotive Superintendent	850	950	
...	Do. travelling allowance	100		
1	Resident Engineer	850	950	
...	Do. travelling allowance	100		
1	Chief Accountant	600	600	
	Engineering Subordinate Establishment.			4,100
	Chief Engineer's and Agent Staff Office—			
1	Manager	100	100	
1	Accountant	50	50	
4	Do. Writers	20	80	
1	Storekeeper	50	50	
20	Writers	20	400	
4	Draughtsmen	30	120	
6	Peons	7	42	
	Resident Engineer Staff.			842
3	Inspectors	120	360	
6	Sub-Inspectors	40	240	
6	Writers	20	120	
6	Peons	7	42	
1	Cash-keeper	40	40	
60	Maistries Platelayers	7	420	
				1,222
240	Gang	6	1,440	1,440

Probable working expenses for a year—*cont.*

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

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

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 / Plain ... ... ,, 2 = 32	... ...	384	
	One and-a-half tons timber, say	...	50	
	Erecting	...	50	1,234
4	Twenty feet girders £ 40 / Two tons plain ,, 4			
	44 × 12	...	528	
	Masonry	...	750	
	Timber	...	60	
	Erecting	...	60	1,398
5	Thirty feet £ 80 / Four tons girder ,, 8			
	88 × 12	...	1,056	
	Plain timber	...	100	
	Erecting	...	150	
	Masonry	...	750	2,056
6	Forty feet girders £ 140 / 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

Probable working expenses for a year—*cont.*

Numbers.	Particulars.	Rate per Mensem.	Amount.	Total.
	Traffic Department.			
1	T. M. Inspector	RS. 100	RS. 100	RS.
	T. M. Office Establishment.			100
20	Clerks	20	400	
1	Accountant	40	40	
	First-class Stations.			440
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	
	Second-class Station.			466
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	
	Additional Staff.			268
15	Guards ... ... at	25	375	
20	Spare hands for marshalling trains and checking tickets, also available for Guards if needed ...	20	400	
	Locomotive Departments.			975
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 ... ... ,,	30	200	
2	Store-keepers ... ... ,,	7	60	
10	Watchmen	60	70	
	Audit Staff.			3,920
1	Office Manager	100	100	
20	Writers and Accountants	25	500	
4	Peons	7	28	
1	Travelling Inspector of Accounts	60	60	
	Total for 1 month ...	...	...	688
	Total for 1 year ...	...	...	14,461
		...	...	1,73,532

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

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 Plain ... ... ,, 2 32	32	...	384
	One and-a-half tons timber, say	...	50	
	Erecting	...	50	1,234
4	Twenty feet girders £ 40 Two tons plain ,, 4 44 × 12	... ...	...	528
	Masonry	...	750	
	Timber	...	60	
	Erecting	...	60	1,398
5	Thirty feet £ 80 Four tons girder ,, 8 88 × 12	... .	...	1,056
	Plain timber	...	100	
	Erecting	...	150	
	Masonry	...	750	2,056
6	Forty feet girders £ 140 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.

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	
	Platelayers' tools for 120 miles of track, 60 gangs—		12,75,565
	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

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 February1881.
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.

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.

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 Támrachéri 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.

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.

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 Ghát towards South-east Wynaad and the Nílgiris *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 [illegible] in the current year, we shall have exactly Rs. 78,121-12-8 [illegible]

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 Naduvatam 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.

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
Nílgiri ...				
Coimbatore		*Proposed.*		
	...	1	...	4
	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:—

1*st*—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.

2*nd*—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.

3*rd*—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.

4*th*—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.

5*th*—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.

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 Támrachóri 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 Nîlgiri 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 Nîlgiri 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 Nîlgiri 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
	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.

Exd. C. Howarth.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1882} Madras.

PUBLIC WORKS.

Dated June, 6th.

Read. *Encl.*

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 —.

No 41 W

Public Works Department.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Under date the 8th January 83

Read the following

Sanction is accorded to the formation, as a temporary arrangement, of two sub-divisions in the Nilgiri division - The Superintending Engineer Fourth circle will report the sum required for appropriation, during the current official year.

6/1/83

To The Superintending Engineer Fourth Circle
Accountant P.W. Accounts
despatched 13-1-83.

o. 1417. H 6 6 Kr

1/3
OH 871

Govt. of (1882) Madras.

PUBLIC WORKS.

Dated 1st

Rcd. Encl.

G. O. 6th Jany 1883. No. 41. W.

Nom: 4445-

Nilgiri Dist.

The formation of two temporary Sub divisions in the — Sanitary Board

Sir

I am directed by the Right Hon'ble