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(1) Number of pages 326

(2) Date of repair 30.4.87

(3) Initials of the Referencer [illegible]

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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 Malaparam ...	30	5,000	1,50,000	
	(2.) Malaparam 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

Through Line.	Items as above.	Miles.	Rate.	Total.	Grand Total.
		RS.	RS.	RS.	RS.
Vayitri viâ Sultan's Battery to Mysore Frontier.	(8.) From 4 miles north-east of Vayitri to Mootycherra.	10	6,500	65,000	
	(9.) Mootycherra to viâ Sultan's Battery to Mysore Frontier	20	5,500	1,10,000	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 Nilgiris at Rs. 350 per mile	42,350
Total per annum ...	63,050

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.
Original—	WORKS.		
(a.)	Reformation or completion of 173 miles of road.	10,00,000	
(b.)	Buildings	1,97,000	
(c.)	Compensation for land	1,00,000	
		12,97,000	
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 moveover but few members specially qualified for the work. I am now, however, engaged in making the needful inquiries regarding the establishment, and in the meanwhile the general character of the scheme as above sketched, and the incidence of the charge may, if thought desirable, be considered by Government.

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

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

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

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

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	54,33,056
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 *vid* Coonoor, Ootacamund, Naduvatam, Gúdalúr, Nadagani, Devála, Pandaloor, and on to the limits of the district near Cherambádi.

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

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

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

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

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

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

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

9. Section 5, the road from Gúdalúr to Nadagani, 8 miles, and the portion of the Karkur Ghat in this district, beyond Nadagani, 3 miles,—total 11 miles—was made by me in 1865 ; all the culverts except two are of masonry abutments and arches. The only large bridge, the Seepatty, 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, 202 miles, are mere dry-weather roads, unmetalled and incomplete; as regards width and formation, they have mostly all been made during the last fifteen years in a hurried and inexpensive a manner as possible to meet the wants of the numerous plantations scattered far and wide apart throughout the district. They are kept in fair order for dry-weather traffic, and there have been no complaints lately of their condition; when they can be made into first or even second-class roads it is impossible to say.

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

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, Coty to Naduvatam	In perfect order.. ..	}	
Fourth, Naduvatam to Gúdalúr, 10 miles ..	Incomplete and impassable in wet weather.	} 1,60,000	To complete it thoroughly.
Fifth, Gúdalúr to Nadagani and on to the limits of district on Karkúr Ghát, 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 Ghát	A fair-weather road ..	1,00,000	To make it a second-class road.
	Total ..	6,00,000	

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

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

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

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

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

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

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

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

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

(True Copies and Extract.)

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

To the Chief Secretary to Government, Financial Department.
Copy to the President, Local Fund Board, 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 metalled and finished, only widened out, sectioned and side drained; and from time to time since opening traffic, boulders, pebbles, broken stone and gravel have been thrown down indiscriminately patches, on the portions that suffered most, during heavy rains in the hopes of getting a 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 diameter standing about 2 to 3 inches above the road surface in a manner that is very trying 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 2 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 Culvert.	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. do.

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

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

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

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

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

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* Arcakode. 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, Poodcopady, 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	...	15-0	A good quarry might be opened for metal. If necessary, it could be supplied at about Rs. 1-8-0 per cubic yard laid into work for any distance up to two miles.	

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* Arecode. Notes on this section are appended.	
25	...	17-1	Two 4 feet arch, ring 1½ feet thick, in good order.	
26	...	17-4½	Two 3 feet flat covered culvert, cover stone 10 inches thick, all in good order.	
27	...	17-5½ to 17-5¾	Rising grade of 1 in 18, road surface in good order.	
28	...	17-7½ to 18-0	Falling grade of 1 in 18.	
29	...	18-1½	Two 4 feet flat covered culvert, cover stones 9 inches thick, in good order.	
30	...	20-3½	One 6 feet arch, ring 1½ feet thick, in good order.	
31	...	20-7½	A good stone metal quarry could be opened, and would cost probably 12 annas, broken into cubes 1½ inches at quarry site.	
32	...	21-6½	One 4 feet arch, ring 1½ feet thick, in good order.	
33	...	22-0	One 9 feet arch (ring 2¼ feet thick), in good order; parapet walls want raising. This culvert is an old structure, and has been built very irregularly, it is, however, still well suited to carry ordinary traffic of, say, up to 2 tons per axle for years to come. It is considered necessary a light rail girder, capable of carrying heavier loads, could be erected at a cost of Rs. 500.	
34	...	22-3	A good metal quarry might be opened.	
35	...	22-0 to 22-3½	A rising grade of 1 in 16; road in good order.	
36	...	22-3½ to 25-5½	Falling grade 1 in 16, in good order.	

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

Item Number.	Date.	Miles from Calicut.	Notes and Remarks by District Engineer.	Remarks of Sub-Divisional Officers or Overseers.
37	...	23-3	One 6 feet arch, ring 1 foot thick, in good order.	
38	...	23-5¾	Two 6 feet arch, ring 1½ feet thick, in good order.	
39	3rd Nov. 1881.	...	Road No. 56, portion of Gold Road. Inspected road and bridges from 23-2 to Manjeri.	
40	...	23-7	One 4 feet arch, ring 1 foot thick, in good order.	
41	...	24-2	One 5½ feet flat covered culvert, cover stones two; in thickness, one 7 inches and the other 4 inches thick, or a total of 11 inches thickness. This bridge will do well enough for ordinary traffic, but with the occasional heavy loads now brought upon it must soon collapse. This culvert is, from its position, altogether unfit to be on a main road, and it is a puzzle to me how it can so long have existed without an accident happening. It is situated at a sharp bend, or rather an angle formed by the road as it leaves the hill-side with a falling gradient of 1 in 16 on to a paddy flat, over which the road aligns to the north, forming an angle of some 60 degrees with the road running down through the wood on the hill-side. The roadway between parapets is only 10 feet wide. This bridge must be replaced by an iron rail girder bridge if heavy traffic of 3 tons and upwards per axle is to continue.	
42	...	25-2 to 25-5	There is a rising grade of 1 in 15 and a falling grade from 25-5 to 25-7. These could be altered to grades of 1 in 20, or 1 in 30 by a new trace that could easily be got along the opposite side of valleys.	
43	...	22-0 to 25-7	The road could be altered to more suitable gradients by trace and construction of probably not more than 4½ miles of new road.	
44	...	26-6 to 27-0	Rising grade of 1 in 15.	
45	4th Nov. 1881.	27-1 to 27-4	Falling grade of 1 in 12.	
45A	...	26-6 to 27-4	These grades could be altered at the cost of new trace and construction of about ¾ of a mile to grades of about 1 in 20.	
46	...	27-5	Two 6 feet flat cover culvert, cover stones 1 single stone 12 inches thick, all in good order.	

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 roadway to south of bridge for a length of 80 feet with average depth of 1 foot. The existing north abutment, which consists of 3 courses of laterite stone in chunam, rests on very hard laterite rock at 3 feet below the present and proposed girder bed level. The new south abutments would have to be carried down 2 feet below pukka bed, or a total depth of 8 feet below girder bed level.	
51	...	...	At junction of Areacode road there is an unprotected well close up to side of road; it is in a most dangerous condition. Overseer has been ordered to raise a parapet wall 3 feet high and 1½ feet thick all round it.	
52	...	29-6 to 30-2	There is a rising grade of 1 in 18; road surface in good order. This grade might be eased between the points named if a new trace were made up the other side of a valley. The trace and construction would not be very heavy, and the whole cost would probably not exceed Rs. 3,500.	
53	...	30-6 to 30-7½	There is a falling grade of 1 in 15, and here again an alteration for the better could be effected by a new trace and construction of ¼ of a mile of new road at a cost of, say, Rs. 3,000, including land charges, &c.	
54	...	31-6	Two 6 feet arch, ring 1½ feet thick, all in good order.	
55	...	33-4	Road No. 5, Gold Road proper; two 10 feet semi-circular arch, wing 1½ feet thick, masonry laterite in chunam; half of this bridge was only very recently rebuilt. The whole structure is in good order.	
56	...	34-1	Two 6 feet arch, ring 1½ feet thick, all in good order.	

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

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

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

Item Number.	Date.	Miles from Calicut.	Notes and Remarks by District Engineer.	Remarks of Sub-Divisional Officers or Overseers.
			platform joists and roadway planking should be renewed at an early date even for carrying ordinary country cart traffic. The bridge as it now exists might be allowed to carry loads of 2·5 tons per axle up to 5 tons on 2 axles, and if wheel tracks and additional beams were laid over the present joists and planking immediately over the main or stringer beams as per plans to be sent in.	
60	...	37-1	One 25 feet semi-circular arch (ring 2¼ feet thick), has two very slight cracks running whole length of soffit under spandril walls. The cracks are not serious, but to prevent any further disturbance I have ordered 3 tie rods to be fixed from the outside of each wall under the roadway, and thus brace them securely together.	
61	...	38-2	Two 56 feet iron Warren girders. This bridge is in very good order, and up to a load of 2·0 tons per axle, or a total load of any one carriage at centre of span not exceeding 5 tons.	
62	...	40-2	Two 2 feet flat covered culvert, stones 11 inches thick, in good order.	
63	...	41-2	Two 3 feet flat covered culvert, stone 10 inches thick, in good order.	
64	...	41-7	Two 4 feet flat covered culvert, stone 11 inches thick, in good order.	
65	...	...	Road and grades from 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.	

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

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

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

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

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 1¼ 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				
3	...	17-0 to 18-4	Grade rises about 1 in 18.	
4	...	18-4 to 19-6	Grade falls in 1 in 13 to 15.	
		19-6 to 21-7½	There is a succession of short rising and falling grades of 1 in 15 to 1 in 20.	
5				
6	...	21-7½ to 23½-0	Falling grade of 1 in 18.	
7	...	23-1½	Two 8½ feet arches, ring 1½ feet thick in good order.	
8	...	23-2	One 15 feet arch, ring 1½ feet thick, in good order.	
		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 5 feet do. do.	
19	...	31-4	One 4 feet arch, ring 1½ feet thick, in good order and up to any weight.	
20	...	32-5	One 12 feet arch, semi-circular, ring 1½ feet thick in good order.	
21	...	...	The section from Kondótti to Edawanah cannot at present be used by traffic coming from Karkúr Ghât on account of break in this line of communication at 23-3, but even before the bridge was destroyed the heavy through traffic has at all times followed the Manjeri route since it was opened. The road covering of this section is not suitable for carrying a heavy traffic even during dry weather, as it consists for the most part of a very friable and poor class of laterite stone nearly devoid of all binding properties. To alter the present steep gradients into grades suited to quick and heavy traffic, say not exceeding 1 in 20, a new trace and construction of some 3 miles of new road would have to be made. The present road at the worst places—heaviest gradients—is aligned along the side of an abruptly rising hill. This section *viâ* Areacode is some 3 miles shorter than *viâ* Manjeri, but it is not I think nearly such an important road, and taking into account the additional cost of new bridge at 23-3, the alteration of road grades, and the want of or difficulty in getting good metal covering to carry heavy traffic, I am of opinion that the present route *viâ* Manjeri should be adhered to.	

Calicut,
19th December 1881.

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

ESTIMATE No. 1.

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

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

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

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

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

ESTIMATE No. 2.

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

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

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

Item Number.	Mileage.	Particulars.	Amount.			Total.		
			RS.	A.	P.	RS.	A.	P.
		64 *Miles Metalling Roadway* with 9″ broken stone and 1½ blinding 4 yards broad including sectioning and clearing side drains at Rs. 3-6-0 a yard						
	14	Miles ghât and high land at Rs. 5,940 per mile	83,160	0	0			
	50	Miles low country at Rs. 3,500 per mile ...	1,75,000	0	0			
						2,58,160	0	0
	22	Converting a 9 feet one arch culvert into a rail girder—						
		Cost of rails including carriage and fixing ...	80	0	0			
		40 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot	70	0	0			
		For removing arch and sundries	20	0	0			
						170	0	0
		Converting a 9 feet do. do. Cost as above.	170	0	0			
						170	0	0
	24-2	Converting 5½ feet cover stone do. do. ...						
		Cost of rails including carriage and fixing ...	60	0	0			
		24 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot	42	0	0			
		For removing covering stones and sundries ...	18	0	0			
						120	0	0
		Converting 5 feet do. do. Cost as above ...	120	0	0			
						120	0	0
	27-5	Converting 2 vent 6 feet cover stone culvert into a 15 feet one span rail girder. Cost of rails including carriage and fixing	300	0	0			
		60 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot	105	0	0			
		For removing covering stones and sundries ...	22	0	0			
						427	0	0
	26-6	Converting 10 feet one arch culvert into a rail girder—						
		Cost of rails including carriage and fixing.	100	0	0			
		42 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot ...	73	8	0			
		For removing arch and sundries	26	8	0			
						200	0	0
		Converting 10 feet do. do. Cost as above.	200	0	0			
						200	0	0
	28-6	Converting 14 feet timber platform culvert into a one vent 24 feet span rail girder—						
		Cost of rails including carriage and fixing ...	300	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			
		267½ cubic feet timber for joists and planking at Rs. 1-12-0 per cubic foot	468	2	0			
		For removing old work and sundries	181	14	0			
						9,750	0	0
	39-2	Strengthening a 2 vent 56 feet span girder bridge—						
		By adding a new girder to each existing girder and renewing all the cross girders and for planking with 2½″ planks 16 tons new girder including carriage to site and erection at Rs. 350 per ton	5,600	0	0			
		300 cubic feet timber for planking at Rs. 1-12-0 cubic foot	525	0	0			
		For removing and altering existing works and sundries	1,075	0	0			
						7,200	0	0
	43-7	Converting a 4 vent bridge timber Howe trusses into a wrought-iron girder Whippte Murphy Type with joists 7″ × 10″ × 2½ planking 72 tons girder including carriage to site and erection at Rs. 350 per ton	25,200	0	0			
		1,306 cubic feet timber for planking and joists at Rs. 1-12-0 per cubic foot	2,285	8	0			
		For removing old work and sundries	214	8	0			
						27,700	0	0
	52-2	Converting 6 feet cover stone culvert into rail girder—						
		Cost as for 24	120	0	0			
						120	0	0
	57-4	Converting 4 feet timber platform do.—						
		Cost of rails including carriage and fixing ...	40	0	0			
		21 cubic feet timber for planking and hand rails at Rs. 1-12-0 per cubic foot	36	12	0			
		For removing old work and sundries	13	4	0	90	0	0
	58-4	Converting 9 feet do. do. Cost as for 22 nearly	160	0	0	160	0	0
	58-7	Converting 4 feet do. do. Cost as for 57-4 ...	90	0	0	90	0	0
	59-4	Converting 6 feet do. do. Cost as for 52-2 ...	120	0	0	120	0	0
	60-3	Converting 6 feet do. do. Cost as above ...	120	0	0	120	0	0
	61-1	Converting timber platform into a rail girder— Cost as above	120	0	0	120	0	0
	7-2	Constructing a bridge across the Beypore river at Ferroke Ferry of 5 spans of 100 feet ...	75,000	0	0	75,000	0	0
		Total ...	...			4,12,711	0	0
		Add 15 per cent. for Superintendence ...	...			61,909	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 1½ 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	10,917
		4 *miles tracing* at Rs. 100 per mile	400	
		Earthwork 4 × 5,000 = 20,000 at As. 2	2,500	
		COMPENSATION FOR LAND.		
		32 acres at Rs. 100 per acre	3,200	6,100
		6 small bridges between Calicut and foot of ghât at Rs. 300 each		
24th	One 72 feet span bridge of timber at Rs. 25 per foot		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 1½ 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 1½ inches blinding 4 yards broad including sectioning and clearing side drains at Rs. 6,710 per mile	53,680	53,680
		3 *miles widening* 3 × 1,760 × 2 = 21,120 cubic yards at 3 annas	3,960	
		Blasting rock	240	4,200
		11 culverts to be reconstructed at Rs. 300 each ...	3,300	3,300
			...	1,56,220
		Add 100 per cent. for Superintendence ...	...	15,620
		Total ...	...	1,71,840

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

ABSTRACT ESTIMATE No. 3.

Number.	Particulars.	Amount.	Total.
		RS.	RS.
1	*Estimate No.* 1—Making certain urgently required repairs to meet existing ordinary traffic on road from Calicut to Nílgiri boundary *via* the Karkúr Ghât	18,640	18,640
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 = ¾ c. yd. per yard run 1″ — 6″ collecting	...	...	
1,320 C. yds.	For 1 mile of ballast 1 do. spreading.	0 2 6	206 4 0	
52,800	For 40 miles of ballast complete ...	0 2 6	8,250 0 0	
105,600	*For* 80 miles of ballast complete ...	0 8 0	52,800 0 0	
	Total for 120 miles ...	...	...	61,050 0 0
Item No. 3.	*Permanent-way.*—1st rails 30 lb. steel rails pieces quoted Middlesbro, 4th November 1881 ...	...	...	
47	Total for 1 mile ...	93 0 0	4,371 0 0	
	2nd Fastening.—Fish plates, fish bolts, nuts and spike, &c., landing transit up-country 150 miles and stringing out and fitting up in position allow at	61 0 0	2,867 0 0	
47	For cost of one mile of permanent-way complete	151 0 0	7,097 0 0	
5,640	Cost of 120 miles	151 0 0	...	8,51,640 0 0
	Add extra cost of Rack Railway.			
1,760 L. yd.	For 1 mile of do. complete ...	15 0 0	26,400 0 0	
14,080	Cost of 8 miles do. do. ...	15 0 0	...	2,11,200 0 0
	Total Permanent-way ...	...	...	10,62,840 0 0
	Earthwork—			
7,920 C. yds	For 1 mile (1,760 × 3 × 1½) ...	0 2 0	990 0 0	
253,440	For 32 miles	0 2 0	31,680 0 0	
112,640	For 8 miles each at (1,760 × 4 × 2)	0 4 0	28,160 0 0	
633,600	*For* 80 miles each at (1,760 × 3 × 1½)	0 4 0	1,58,400 0 0	
	For 120 miles ...	...	...	2,18,240 0 0

WYNAAD-CALICUT RAILWAY.

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

Quantity.	Description.	Rate.	Amount.	Total.
		RS. A. P.	RS. A. P.	RS. A. P.
18	Locomotives ... ... each	1,000 0 0	18,000 0 0	
15	1st-class carriage to hold, say, 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
				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 ¼ of a mile of road at	9,060 6 0	1,510 0 0	...
57	Points and crossings at	214 0 0	12,198 0 0	...
15	Wells	300 0 0	4,500 0 0	...
15	Haggus's or Freedman's ejectors for watering engines in lieu of ordinary pump system at	300 0 0	4,500 0 0	...
	Buildings.			
11	Goods sheds	400 0 0	4,400 0 0	...
4	Do.	700 0 0	2,800 0 0	...
11	Station-masters' houses	300 0 0	3,300 0 0	...
4	Do. do.	500 0 0	2,000 0 0	...
11	Booking office and waiting-sheds	300 0 0	3,300 0 0	...
4	Do. do.	500 0 0	2,000 0 0	...
11	Latrines	200 0 0	2,200 0 0	...
4	Do.	400 0 0	1,600 0 0	...
11	Platforms	50 0 0	550 0 0	...
4	Do.	150 0 0	600 0 0	...

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

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

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

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

ESTIMATE No. 4.

Platelayers' tools.

For 120 miles of track, 13 gangs.

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

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	...
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 ... ... each	600	3,000	
	Travelling allowance ... ... „	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 2¾ 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.
		RS.	RS.	RS.
	Traffic Department.			
1	T. M. Inspector	100	100	100
	T. M. Office Establishment.			
20	Clerks	20	400	
1	Accountant	40	40	
				440
	First-class Stations.			
4	C. in C. ... ... at	60	240	
2	Clerks ... ... ,,	15	30	
1	Signaller ... ... ,,	15	15	
10	Porters ... ... ,,	6	60	
1	Sweeper ... ... ,,	5	5	
1	Waterman	4	4	
16	Night Watchmen	7	112	
				466
	Second-class Station.			
11	C. in C. ... ... at	20	220	
1	Clerk and Signaller ... ... ,,	15	15	
4	Porters ... ... ,,	6	24	
1	Sweeper	5	5	
1	Waterman	4	4	
				268
	Additional Staff.			
15	Guards ... ... at	25	575	
20	Spare hands for marshalling trains and checking tickets, also available for Guards if needed ...	20	400	
				975
	Locomotive Departments.			
1	Foreman ... ... at	250	250	
18	Drivers ... ... ,,	80	1,440	
20	Foremen ... ... ,,	15	300	
4	Felters ... ... ,,	100	400	
20	Do. ... ... ,,	40	800	
20	Odd hands ... ... ,,	20	400	
10	Writers ... ... ,,	20	200	
2	Store-keepers	30	60	
10	Watchmen	7	70	
				3,920
	Audit Staff.			
1	Office Manager	100	100	
20	Writers and Accountants	25	500	
4	Peons	7	28	
1	Travelling Inspector of Accounts	60	60	
				688
	Total for 1 month ...	...	...	14,461
	Total for 1 year ...	...	...	1,73,532

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

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 $85\frac{3}{4}$ 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.

23

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 Ghât towards South-east Wynaad and the Nilgiris *vide* G.O., dated the 14th November 1881 W. The Superintending Engineer, Fourth Circle, allotted Rs. 4,500 of this grant to the portion of that road that is in this district. This allotment was subsequently withdrawn; there was no portion of it utilized in this district, and I have received no intimation that it will be available for expenditure in this official year (1882-83).

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

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

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

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

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

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

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

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
		Proposed.		
Nílgiri	...	1	...	4
Coimbatore	5	1	3	12
Total ...	5	2	3	16

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

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

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

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 Támrachéri Ghâts. Fairly large sums have already been granted for this work, and during the current official year large assignments have either been made or promised.

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

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

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

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

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

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

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

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

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

(True Extract.)

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

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

No. 44-A.

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

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

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

Exd. C. Howarth.
Spare Copies

BUILDINGS AND ROAD
CIVIL WORKS.

Govt. of {1882} Madras.

PUBLIC WORKS.

Dated June, 6th.

Recd. *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 —.

PUBLIC WORKS SECRETARIAT

Remarks on proposed scheme of
Wynaad Communications.

The road between Calicut and Vythery is seldom in bad condition at any time of the year - To correct the heavy gradients on the 18 miles nearest Calicut would entail heavy Compensation, but there would be no cause of Complaint if the Cattle employed to draw the Carts were well cared for, or of a stronger description - the Cart owners persist in using Cattle weak bullocks, and expect a thing as four bullocks to draw a Cart is never seen - From the 8th mile to the foot of the Ghaut there is only one heavy gradient and that might without difficulty be eased. There are but 3 bridges between Calicut and the foot of the Ghaut - they are of timber, quite adequate for all ordinary traffic - the beds of these 3 streams are hard (sand and shingle), the banks low, and except during floods never have more than from 18 inches to 2 feet depth of water, they offer not the slightest obstacle to the passage of any

any kind of traffic. Floods never continue more than 3 or 4 days at a time, seldom so long.

On the Ghaut there is no bridge or culvert that would not bear the heaviest traffic. Between the top of the Ghaut and Vythery there is one bridge that I would hesitate trusting a cart on heavily loaded, but at a cost of 20 or 30 Rupees, it could be supported up to meet any temporary extraordinary traffic.

Beyond Vythery there is a bridge of 3 forty feet span known as Koonuk bridge which requires a new superstructure - though to meet any extra load it too could be cheaply made to bear it, by temporary expedients, but I certainly think the present superstructure should be refitted, and while about it I would raise it some 6 feet both because I know the water to reach within 9 inches of the flooring, & because raising the bridge would do away with the objectionable gradient of the approach eastwards.

The roadway between Vythery and the bifurcation of the two roads at Chundely requires thorough reforming, it gets into very bad condition during the monsoon for material except stone is procurable. River sand and small shingle crushed has been used in place of gravel and answers tolerably well. From Chundale to Cherubady the road has never been properly formed, it was traced and made entirely by planters interested, and at their own expense - it gets into very bad condition during the monsoon. I was asked to take over the maintenance but as I found the landowners objected to concede sufficient land to allow the construction of catch drains &c. and the Local Fund Board would not find money to build places of shelter for the departmental Executives I was obliged to decline. Owing to the presence of the Planters cultivating to the very edge of the roadway all the loose earth hoed up in weeding is washed down from above, chokes up the side drainage and covers the roadway with mud, while on the lower side it gets continually washed away and narrowed. I would strongly recommend that before any scheme is sanctioned that a stringent condition should be insisted on for the concession of a certain width of land throughout, either free of compensation, or else at a fixed rate: if there is the smallest loophole left in such agreement any expenditure has

has taught me that advantage will be taken of it, and much trouble given. The margin or rather lotal width taken up by me on all the roads condemned by me was 30 feet on each side of the centre of the roadway. I fancy since I left Wynaad there has been a good deal of encroachment on that margin, especially in the neighbourhood of Sultan's Battery.

There is very little traffic at any time between North and South Wynaad, each subdivision draws its supplies from the Coast and Mysore by different routes. I am disposed to think that so far as South Wynaad is concerned the road from Vythery via Culpatty to the Mysore frontier is of far more importance than that through Manantoddy as almost all the Rayy supply comes along the former, and this is the staple food of the Canarese Coolies. If the Bazaars at Culpatty Vythery are kept well supplied there is not much difficulty in the way of the Coolies about Mayadi and further getting all they require. They get paid on Saturdays and invariably take Sunday & Monday as holidays so have plenty of time to come to Vythery or Culpatty - if the grain were supplied from the estate stores [illegible]

would still take their two days. On these grounds I would recommend the through line as the one of much consequence. The Local Fund Executive ought to be able easily to keep the other practicable until it is its turn can be taken up.

The Road from Vythery via Servioke to Manantoddy is one that requires a great deal of retracing; before I left Wynaad I had rectified some of the heavy gradients, and had cast out traces for all with one exception which was about 3 miles from Vythery I allude to the part between Vythery and Servioke - beyond Servioke and towards Manantoddy I also retraced, though I had no funds to cut and the line at its worst place close to Servioke. If that were done there would remain only one bad gradient on that side namely about 3 miles from Manantoddy and that could be rectified without any deviation - Tolerably good material for surface is to be found at various places along this road, & between Vythery until within 6 miles of Manantoddy the road runs through a country where the soil is very favorable, & the surface can be easily kept in good order, such as it runs between the Ghaut ridge, and

the river which takes all the drainage of the Eastern face of the Ghauts it crosses a great number of streams several of which are of considerable size - It also has to cross 2 large Rivers - Noulbapandy and Manantoddy the former rises at times 40 feet and the latter over 30 feet - the Noulbapandy has a good ford - that over the Manantoddy River is deeper and rocky with uneven bottom - a causeway is made over it during the fine weather but the approaches are bad traffic on the pass between Semole and Nykery during the monsoon is almost nil - food supplies being obtained either from Manantoddy or the Cottaddi Ghaut; latter is not fit for Cart traffic -

Coolly pay should never exceed 5 annas for a man and 3 for a woman - 12 annas per cubic yards was what I used to pay for broken stone - 2 annas per cubic yards for earth work, 3 annas for embankments - Rs 1/4 to 1 Rs for daily hire of a Cart - Rs 1 per day for bricklayers and Carpenters -

Sd/ R. B. Kennedy -

March 25th 1882 -

Hin W. Hudleston
Rd from the Secretariat
C. No: 2505
" " 1882
Forwarding

Ino G.O. Dt. 1st April 1882 No 319 Financial Certain railway and road schemes in connection with the Wynaad have been referred for consideration in this Department

My memorandum dated 23d Jan: 1882 dealt as fully as circumstances admitted with the roads which it seemed desirable to adopt or remake from Provincial or Imperial Funds, and Colonel Stevenson's memorandum dated 27th April 1882 deals with the Railway question

Briefly stated the results arrived at were that to turn the existing lines into cart roads suitable for numerous traffic about 173 miles will have

I enclose Col. Stevenson's views on the R. question I make the link from Sultan's Battery to Gundulpet from Govt. funds is in my opinion quite out of the question.

I have examined the question of the roads & on this my opinion is that Govt. aid must for years be restricted to the completion of the Govt. Roads in progress & the Govt. Engineer & Surveyor of the Coorg & Canara districts

For this work considerable grants have already been made - & further grants I believe provided for in the

Cir. 3.5.82

to be dealt with
at an outlay of 17¾
Lakhs of Rupees - This
amount would cover
Establishment charges
and all but indirect
charges, and would be
expended under suitable
arrangements in 5 years

The lines selected to be
being dealt with are
(1) the trunk road
via Ootacamund by
Sundakoor to Vythery
and the Zamboanga
Mount to Calicut (-113 miles)
(2) a branch from the
latter line near Vythery
through Sultans Battery
to the Mysore frontier
in the direction of Pundul
-putt ---------- 30 miles
(3) another branch from
near Vythery to Manan
-toddy ---------- 30 miles

No (1) is by universal
consent admitted to
be of primary impor-
-tance, and should be
railways be extended

current years budget.
but I am not aware
of the amt. The G.I.
have expressed their will-
-ingness to contribute
towards the cost
of this Road by Rs the
C. plantrs are to much
benefited - & I should
know that the Estates Dy
pay the L. F.d Land Cess
(under the act. as they
certainly ought

= Rs 20. Mr. Shaw
knows more on this point
than one else
(in Rs ! 2. I think)

The Govt of the
Nilgiri L. F.d are
to be authorised
to pay that Rs aid
from any property
to be given for it. But
there is a limit but
only to the capacity

of the Govt. means. but
also to the legitimate
claims of the Districts
& I am by no means
sure that more can
be given this year than
has already been
provided. I have asked
in Mr. Jones Statt. of
the Govt amt. - I think
it must be 9 or 10 Rs. -
9 or 10 Rs. - If any addn
is made I think it shd
be restricted to Rs. 10,000
urgently required for the
Kotagiri Ghat.

Rs 6 or 8 000 are said to
be needed to make the
Govt Kedrs road passable
in all weathers - I do
think the bulk of this might
be provided from the Grants
already made to the Nilgiri
L. F.d for the current
year. I do not consider

as suggested from Mysore
via Sundalpatti to
Sudalur that portion
of the road lying between
the latter place and
Ootacamund, 27 miles,
(ie to the head of the lake)
should be first taken
up

In his memorandum
Colonel Shaw - Stewart
shows that it would be
undesirable to do more
in the matter of Railway
construction than to
extend the Mysore
line through Sundalpatti
to Devarshola to Sudalur
The distances are 35
miles from Mysore to Pundal
-putt and 28 to Sudalur
which at the rate of
Rs 50,000 for a metre
gauge line (which is the
only one possible under
all the circumstances)
would bring the total
cost to 31½ Lakhs

To provide transport
for a any complete system
of both roads and
railways, during all the

the administrative and commercial requirements (leaving out of account the network of minor roads devolving on D.F. Boards for maintenance) the total costs would be as follows

To 173 miles of temporarily metalled monsoon roads	Rs 17,75,000
To 63 miles metre gauge railways ———	31,50,000
Total Rs	49,25,000

Deduct - say 50 miles of railway the cost of which would fall on Mysore (i.e. the Mysore to Zipsa ordon) ——— Rs 25,00,000

Total grant required from Provincial or Imperial Rs 24,25,000

to which must be added 5 crores to execute.

I should like to see the whole matter taken into consideration by the Hon'ble the President in Council.

Let us first make the line from Coimbatore to Gudalur as it should be. That will be a great step in advance. Then let us go on steadily towards the improvement of the Nilgiris as our means may permit. If the Wynaad portion of Mysore Commission obtains the said money contribution cheaply the said line may be made by speculation

Kartimdaimbadiem Ghat.

1/5/82

that Govt. can afford to make any more grants to the Nilgiris. The D.F. is very healthy owing to its own resources. It has surplus funds which could usefully be spent on the Nilgiris. Let it first provide for its own requirements & funds in hand. Govt. should not be asking for more grants.

4/5/82

37

Note by the Honorable W. Studdert.

I concur in Colonel Shaw Stewart's views on the Railway question. To make the link from Gudalur to Gundal-pet from Provincial Funds is in my opinion quite out of the question -

There remains the question of the roads and on this my opinion is that Provincial aid must perforce be restrict-ed towards the completion of the Coim-batore and Mediatum and Gudalur road with eventual extension to the heads of the Nankur and Sauzachenni Ghats.

For this work considerable grants have already been made and fur-ther grants I believe provided for in the current year's budget, but I am not sure of the amounts - The Govt of India have refused the contributions sought from Cinchona income towards the cost of this road by which the Cinchona Plantations are so much benefitted - and I do not

Record

Know that the Estates never pay the Local Fund Land Cess under the Act. as they certainly ought to do. altho' I have more than once asked for information on this point (in Fund. Dbt Statt).

The circumstances of the Nilgiri Local Fund are so exceptional that Provincial aid may very properly be given to it. but there is a limit not only to the Capacity of the Provincial means, but also with reference to legitimate claims of other districts and I am by no means sure that more can be given this year than has already been provided. I have asked in Fund for a statement of the whole amount. I think it must be 80,000 or 90,000 Rs. If any addition is made I think it should be restricted to the Rs 10,000 urgently required for the Nilagiri Ghat.

Rs 60,000 are said to be needed to make the Avalanche Declivities Road passable in all weathers. I should think the back of this might be provided from the grants already made to the Nilgiri Local Fund for the current year.

I

33

I do not consider that Provincial can afford to make any more grants to the Malabar Local Funds. The District is very wealthy and must develope its own resources. It has in past years received vastly more than its fair proportion of expenditure from General sums and like all spoilt children is always asking for more.

Cutch W.A.

4 Feb 82

4 Feb 82

Note by H.E. the Governor.

I should like to see the replies to the Honble Mr Sudlestone's Queries. Let us first make the line from Cotacammund to Cudalur all it should be. That will be a great step in advance. That done let us go on steadily towards the Karkur and Tambacherry ghats improving the roads as our means may permit. If the byroad prosperis and money continues cheap the railway will be made by speculators.

(Sd) W.L.D.
May 8/82

Ex Ed.

Nor
to
to make
Road p
should p
be provided
Made to the
for the Cur

Note in the
Financial Dept. 10.5.82.

In G.O. No. 2502 of 22nd December 81, a special grant of Rs 50,000 was made for Nilgiri communications; and it was lately under consideration in the Public Works Dept to assign a sum of Rs 40,000 from the P.W. grant, for the Wynâd road i.e. from Kotacammnd to Gudalur.

The Financial Dept. have not yet supplied the information called for by the H.M. in regard to the Land Cess payable by the Cinchona Plantations. A reference to the L.I. Bd. is being made.

RS
10.5.82

C A W

It is desirable to clear up the question of assessments to the Coty - Neddemutten & Andalusia road

Mr O'Leary's survey gives a ~~Statement~~ (which must not be modified) in his No 186 of 15 March in which it would appear that the following were sizes

	272 P.' Rs	Added Prod
in 79-80 —	6,160	6,160
80-81 —	13,590	10,000
81-82 —	33,080	30,000
		46,160

From this must be deducted as having been refused by the Govt. & Grant to the Cinnamon Plantation — 30,000

16,160

Add a General Grant in last Govt year of — 10,000

Total 26,160

Mr is not clear whether

whether the whole amount of this has been devoted to the road in question or if any portion there is an unexpended amount of opening balance for current year

The presumption is that so far from there being a balance in hand the 27 B's incurred liabilities of the Rs 30,000 grant and have there and to meet

Under G.O. Fin. Dept. 22/12/81 No 2502 para 32, Rs 5,000 has been given to Nilgiri Communications Annually

If this amount as stated in the Hon'ble mover's note of the 4th inst. Rs 10,000 is to be devoted to the Kotagiri Road leaving Rs 40,000 for other roads

It is no where shown by Mr. O'Shaughnessy that the requirements of the 32 miles between Ootacamund and Kotagherry actually exist and will be maintained at allowing Rs 500 per mile the amount will be Rs 16,000 deducting which for Rs 40,000 leave Rs 24,000 for the Ootacamund-Nedivattam Road

So that if the proposed grant of Rs 40,000 in the PW Provl Budget be added the 27 B's should have in all Rs 64,000 to spend on this line in current year, exclusive of such portion sums as they can spare from the Local Funds

In view of the matter it would be as well to ask the Govt. 27 B's in the earliest possible information on the above points

15-5-82

From W. Hamilton
Ex. R. for the Govr.

For order

Ten annexed communication from the Supt. Engineer 4th Circle deals with the question of reorganizing the works of the West Coast and Coimbatore Division on a better basis than at present

The subject is one involving a good deal of detail which cannot well be enclosed but in its general features it may be said to remove the charge of all the works along the littoral of the west coast from the Ex Engineer who has also charge of the Nilgiri & Wynaad districts, and to place them under the Ex. Engineer of the Coimbatore Division

On these proposals generally I have had to

Do. sanction the proposals tentatively suggested from the Govt. to the Ry Com be instructed

J.B.
28/5/82

to point out to you any
serious inconvenience
of having the Head Quarters
of the West coast division
at Calicut which was
selected in obedience to
the orders of the late the
Duke of Buckingham
Late occurrences at
Ostacamund have shewn
how impossible it is for
the Officer in charge of
the enormous division
to devote the requisite
attention to the works
at that place, and
as it is now contemplated
to bring over to this
Dept. not only the large
drainage works in the
town but also the road
from Ooty to Mettapolliam
(and possibly from
Mettapolliam) and perhaps
to improve the Port
Office at Stone house,
build Clerks houses,
&c. it is not too much
to say that unless the
Department re-distributes

If changes be made
there must be an
inevitable collapse
From the experience
gained since the Service
upon normal scale in
the Dept. I am quite
of the same opinion as the
Supt. Engineer that the
West. coast including
all work extending from
Mangalore to Cochin
would be more economically
executed if formed into
a division by itself, but
aware as I am of the
difficulties which would
in all likelihood be
raised to this proposal
by the S of S and the only alter-
native which can be
suggested is that now
proposed -

The changes it will
be observed involve
practically no increase
in the aggregate of the
present Sanctioned
Engineers & Upper Sub.
ordinates in the two

Divisions immediately concerned, there being in fact a nature decrease of 66 instead of 17 as now debited.

But there is one limit in which the Subst. Inspectors keep much closer (see para 9 of his letter) viz: the monthly inspection of pay to the clerks of the 3d. Class Br. Office which he proposes to the reformed Nilgiri Div. with Head Quarters at Ootacamund — The mode of remuneration laid down in para 664 of the Code has lately been superseded by the Revised Rules which abolish the addition of 1/10 of salary as before, and increased allowances are drawn in all cases by those whose head quarters are stations, and who are deputed on tour to distances, and who are deputed on tour to extra distance —

But the Government are on the other hand anxious to create an Office with a special agency, and this it will be observed from the annexed Statement A I would suggest should be done — By adopting this arrangement and fixing a 3d. Class Br. Office in the Nilgiris the whole cost to the entire extra cost would be Rs 237 per annum — Work of the whole will of course be more efficiently done and we save the first [illegible] Extra D. 7 D. 2 Asst. Clerks [illegible] from a clerk [illegible]

H°

C A W

I have no further remarks to offer on memo Col S-S; Col Heath, and Mr Do. — I do not find letter in mail carrying Collector's and the whole Court for final issue

A H

24/6/82

I do saw

I have seen that this is carefully disposed of. As was ordered the

Proposed rearrangement of the West Coast Division.

Present Scale.

West Coast. 2° Class Div.

1	Clerk 3° Class 2° Grade	60	60	
1	" 4th " 2° "	30	30	
2	" 4th " 3° "	20	40	
1	Draftsman 1st Class	50	50	
1	" 3° "	20	20	
1	Messenger	7	7	
1	"	6	6	
			213.	

Proposed Scale.

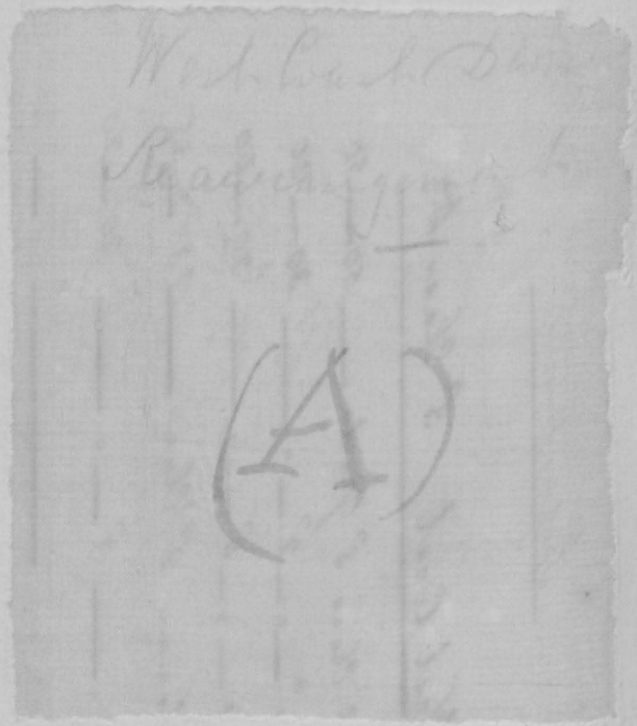
West Coast. 3° Class Div.

1	Clerk 3° Class 3° Grade	50	50	
1	" 4th " 2° "	30	30	
2	" 4 " 3° "	20	40	
1	Draftsman 2° Class	35	35	
1	" 3° "	20	20	
1	Messenger	7	7	
1	"	6	6	188.

Nilgiris. Special Div.

1	Clerk 3° Class 2° Grade	60	60	
1	" 4th " 1st "	40	40	
2	" 4th " 2° "	30	60	
1	Draftsman 1st Class	50	50	
1	do 2° "	35	35	
1	Messenger	9	9	
1	"	8	8	262
				450
				213
	Increase Rupees.			237

Vide R. 1/27 S. 87.



42

Hon W Hudleston
Hon the Governor

For order

This file deals with
1st the general question
of Wynaad Communication
2d the actual appoint-
-ment of Provincial
funds to commence
I was in hopes of being
enabled to draft the
order on the 1st head
before this, but as I
am given to understand
that the Supreme Govt
would not be indisposed
to continue the
present railway on the
metre gauge from Beypore
to the Wynaad frontier
it would appear premature to pass
order before knowing
their precise views on

I suppose the proposed
Ist is for the ground Govt
for the 1st 50 miles.
at 8th. But think
the 50000 Rs. I
from Govt was intended
solely for the Govt
Road. This is however
however by it should
be kept separate.
I am disposed to think
it will be better Govt
to resume charge of
the Rock line from
Beypore to Pundalur
if he can find the

the subject. ——

Col Sconce - stated
in I believe in d/o
correspondence with the
Govt in the subject
and sufficient may
soon be known to
admit of a definite
decision

2. If the Assam
Govt. as suggested in
my note of the 1st
inst. ille undertakes
to make the line as
far as Zilpemendoro
or to the frontier
(some 2 miles on this
side) all that Madras
would have to make
is the Railway to
Sudalovor would apparently
be 5½ or 6 Lakhs
on account - so small
that the Govt
may be disposed to

Equivalent agency. Our
total grant are for
a larger that it seems
probable he will contr
the Estimate.

I don't think the
question for Govt
N. Sudalvor to the
Khyem Frontier is
of discussed. We
have left the arrange
for Sudalvor

S.D.
25/5/12

43. to be the matter in
Simons consideration

As regards the 2nd
and the assistance
to be made this year
towards the obtained
Nedanvatum road
and the Kotagherry Ghat
I may observe that
from the latest information
that out of assign-
ments made in the
appropriation for the first
named road in the
last two Fin. years
Rs 80,000 and
Rs 25,878 were expended
under the agency of
the Local Fund Board
leaving an opening
balance of Rs 14,122
available for outlay
during the current
year (See attached
letters from the President
L.F.B.). The

ans Special reference to the annotation 2 raising to 1st. Class of the road between Palamcottah & Nedumaltam, and was no reference to the ordinary repair & maintenance grants made to the through line from Satankulam

Under G.O. Fin. & Dept. 22nd. Sept. 1881 No 2502 para 32 a further sum was assigned of Rs 50,000 for Provincial & the same road, and again in the late distribution of the Reserve in this Department (See GO 10th May 1882 No 1190 W paras 1 & 6) a further grant of Rs 60000 was (in ignorance of the action taken in the Finance Dept.) recommended in the same line

As matters stand therefore the Actual & Estimated amounts to the current year stand as follows

(1) To unexpended balance of previous Grants ..... ※ 14,122

(2) Assignment from Provl. in the Finance Dept. 50,000

(3) Proposed drawal from Provl Reserve in P.W.D. 40,000

Rs 1,04,122

It is not quite clear how the late reappointment of the 2.7.B[d] agency is inadequate to execute work to this extent, but from the report of the Supdg Engineer herewith submitted that it is undesirable to continue this agency in the work

The proposals now duly submitted for taking over the work as part of the Provincial recognised P.W.D.

※ The amount of Rs 4500 which it was taken for granted (para 6 of GO No 1190 W) was also available is not so as will be seen from Mr. Barlow's letter No 2 of 23rd Jany/82

※ See linked file

In the Nilgiris and the Wynaad with I am of opinion admit. Petty works long carried out in the most satisfactory manner but as time will be needed to set all into working order and to raise the needful amount of labour I beg to suggest that a modification be made in the programme for the current year

With the balance in hand and the assignment in the Fmd. dep. above the amount available for expenditure is Rs 64,122 which I should consider ample

As regards the Kotagiri Road for which the H.E. desires to see a grant of Rs 10,000 that amount can be

45 taken from the Rs 40,000 assigned in S.O. 1190 W and the balance Rs 30,000 resumed

This latter sum is I may say my request wanted for improving the Provincial Store at Stone house and other engineering work I would therefore move with the assent of Govt.

(1) allow the grant in the Fmd. dep. to stand

(2) assign Rs 10,000 for the Kotagiri road

(3) Resume Rs 30,000 to Provincial Reserve for urgent demands

27.5.92

Sold 4b

C. No: 2617.

The subject of the Wynaad Roads is under consideration (C. No: 2505). It worked yesterday on the Railway respecting [illegible] of the case.

R. S
29.6

16th

I don't think [illegible] notice of this Excell[illegible]

CXVII

Thus much
by way of
introduction
to readers
in my Digest
who have
not the
treatise in which
about to

H.C. 48.

These papers are to be sent to press at once to be printed on emergency.

The proof with complete file to be sent to me for transmission to Adjt Gen

Read 5th 65 / 5/16/62

I don't think [illegible] notice of this Execution

Intention to Issue Sentence of Death

Sent to Gov. Pierpont

Gov. has Life Returned

Sentence 6/6.

Ja W 6 Wes

The papers will have to be printed

Com. Hay to send to Sheriff "might be submitted

Copy 21/6

C. A. W. 49

Herewith for W's approval, proof of G.O. in re Wynaad Communications, &c

The papers were very badly arranged in the proof we have received from Press. Those you will find them all right now.

The Press Gee have printed all the estimates framed by the Malabar L.F. Engrs. - Dare not more wholetter this was intended?

C. No 1805 is not recorded in the G.O. - It was put into type, but I have excluded it from the proof as I don't think

The Sheriff might be sent

O/

...notice of this proceeding

it was intended
to print it with the
other papers. Was
perhaps be recorded
separately?

CG
21/6/82.

51

52

50

Class. P.S. INDIAN TELEGRAPH. Local No. 889

To (Station) Queenscund From (Station) Mat. ashtheem

Words.	Day.	Hour.	Minute.	Official Instructions.
15	22	16	45	Urgent

To (Person) Chief Assistant P.W. Secretariat From (Person) Asst Assistant

1 Wynaad	2 roads	3 Roof
4 dispatched	5 yesterday	6 by
7 Conroy	8	9
10	11	12
13	14	15
16	17	18

Rec'd. from L. N. At Hrs. Mts., By

Sent to L. N. At Hrs. Mts., By

OOTACAMUND 22-6-82 Telegraph Master.

Traffic Code Form C. I. S. P. No. 499.—26-9-81.—500000.

it was inte
to print it
other subject
perhaps be
separately

51

For

CAW

Accompanied
by nine
[illegible]
Ten $50 bills
Signed
Communication

[signature]

3/16/02

Please see reply - [illegible] of this Excellency

Received last night.
The Bangby has not
yet arrived.

R.S.
23/6.

C.A.W.

Arrival Enquiry

To W

Submitted. It
is doubtful whether
the Estimates are
required to be
printed.

R.S.
24/6.

97 91

Following Memorandum by the Chief
Engineer, P.W. Dept.

Having had the
honor of accompanying
His Excellency the
Governor on his Lake
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 coun-
try to which so much
attention has lately
been drawn.

The facts brought
under the immediate
notice of His Excellency

either by personal ex-
perience 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 com-
munications for in
any proper sense
meeting the present
needs of Wynàd.

2. Suffice it to say
that with the exception
of the Tamrachèri
Ghaut, 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 indif-
ferently 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
Meade'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 Wynàd 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 Vythery
by the Tamarachéri
Ghaut.

(2) Do from Vythery
by Lyidatlir Ghaut
to Cotacamund.

(3) Do from the bifur-
cation about 4 miles
out of Vythery to
Sultans Battery.

(4) From Vythery
to Manantoddy.

4. The further
examination of most

of these lines has prac-
tically suggested little
change in the scheme
as a whole, though for
the sake of convenience
I shall pin the follow-
ing remarks adopt
a somewhat altered
classification based
on the requirements
so far as ascertained
of each portion.

(1) <u>Calicut to Mala-
puram.</u> The
main line now used
by Puddamelloors
as far as Tamrachéri
though pin its early
portion with a hard
gravel (laterite) sur-
face, has extremely

bad gradients; owing to the latter defect traffic it is understood even now seeks the somewhat circuitous though flatter road via Chalayé to Tamrachéri 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 shew 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 Vythery. Practically this is the Tamrachéri short, 13 miles. Some widening and flattening

7 gradients required throughout with re-metalling of the whole surface 6 inches in consolidated depth say at Rs: 6000 per mile.

(3) Vythery to Koperiad

Much of this line has only been sin-differently 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 shirked south. On the whole I should assign Rs: 6,500 per mile for completion of these 20 miles.

(4) Koperiad to 3 miles west of Lyndalur. All this portion will apparently have to be retraced and worked out as the present line, running close by Lyndalur and Devala, hugs too closely the spurs range and counts 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 Nellyalum along the old line which passes the dispensary south of the "Needle rock" and thence towards Gudalur.

Part of this would be new and could hardly cost on an average less than 9000 Rupees per mile for the distance say 20 miles.

(5) From 3 miles west of Gudalur to Gudalur.

To this imperfectly worked out portion

may be assigned Rs: 6000 per mile.

(6) Gudalur to Nadukattam.

This which is practically the Gudalur Pass may be taken at 9 miles in which the rise is not less than 2000 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: 7000 is the leach that can be estimated as required per mile.

(7) Nadunatani to the bund at end of the Dotacamund 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: 4000 per mile would probably meet the

requirements of the 10 miles in length measured up to the Lake at Dotacamund.

(8) From 4 miles North East of Vythery to Moolycherra.

This which may be called the first half of the Vythery-Sultans 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 Rupees 6,500 per mile.

(9) From Mooty cherra
via Sultans Battery
to the Moogoo or the
boundary streame
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 diffi-
culties backward
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.

59 46

10. Vythery 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
Calicut via Vythery & Gudalur to Ootacamund	(1) Calicut to Malliporam	30	5,000	150,000	
	(2) Malliporam to Vythery	13	6,000	78,000	
	(3) Vythery to Moopeniad	20	6,500	130,000	
	(4) Moopeniad to 3 miles west of Gudalur	30	9,000	180,000	
	(5) 3 miles W of Gudalur to Gudalur	3	6,000	18,000	
	(6) Gudalur to Ned Divattum	9	7,000	63,000	
	(7) Ned Divattum to Ootacamund	18	4000	72,000	6,91,000
Vythery via Sultans Battery to Mysore frontier	(8) From 4 miles NE of Vythery to Mooty cherry	10	6,500	65,000	
	(9) Mooty cherry to via Sultans Battery to Mysore frontier	20	5,500	1,10,000	1,75,000

(Continued)

Through line	Items as above	Miles	Rate	Total	Grand Total
Vythery to Mannitoddy	(10)	30	5,000	1,50,000	1,50,000
			Total Rupees		10,10,000

Say 10 Lakhs

5. The approximate sums given above would provide for fully formed and metalled roads. Except on the ghaut and near Calicut where laterite is readily procured, metal is extremely scarce and gravel if it is to be free 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, [illegible]

are and generally quite able to bear weights of 1½ tons per wheel - Some will probably have to be removed at once and others replaced, as pucka[illegible] showed itself from the subsequent maintenance allowances.

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 through

throughout without altering
the existing abutment which
though only rough stone
at dry are generally soundly
constructed.

X. As the cost of the works
as above roughly estimated
must be added that of
the foundations of the
original Establishment &c
I probably five years would
be needed for preparation
estimation and execution
of the works, and as till
lately there were Executive Engineers
Superintendents, 10 Officers
Subordinates and an
adequate Medical staff
with
until offices, considering
the unhealthiness of the
country throughout most of

of the working season, the
cost, (taking into account
special Wynaad Allowances
to which all the members
of the Dept 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 Establish-
ment is also an indis-
pensable necessity for
preservation of health not
only as regards the
European Officers & Subordinates
but for the fixed Establish-
ment of coolies & 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:-

Executive Engineer's Office at Thomas probably at Vythery	}	Rupees 15,000
5 Inspection Bungalows at various points about 30 miles apart @ 6,000 Rs each	}	30,000
12 houses for Upper Subordinates 10 to 15 miles apart @ 2000 Rs each	}	24,000
2 — do — for Hospital Assts — do —		4,000
24 cooly lines for a Mate & 10 coolies each @ from 5 to 7½ miles apart @ 1000 Rs	}	24,000
Total Rs		1,37,000

12. Tools and Plant annually

be taken at the usual amount viz: 2½ per cent on cost of works.

13. It must further be borne in mind that no sooner has any portion of road been finished there 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 @ Rs 250 per mile	}	7,500
22 miles Tamrachèri and Gudalur Ghats @ Rs 600 - do -	}	13,200
121 miles in Wynad and Nilgiris @ Rs 350 - do -	}	42,360
Total per annum Rs		63,060

15. Taking into account the comparatively small proportion of this ultimate

amount which will be required during the first 5 years it will suffice to allow an all round average of 15,000 Rupees per annum or 75,000 Rs for maintenance during this period. To this should be added Rupees 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 building; for quarries for stone, metal, or gravel; for brickfields; for widening

portions of old and forming new roads &c. Notwithstanding the strongly expressed desire on the part of owners of Estates to meet the Government in the most liberal spirit in regard to this question, demands of this character must be expected and will have to be provided for; but it would be impracticable here to attempt any detailed calculation for the probable cost. There can be little doubt that in the aggregate the charge must be considerable, and it would therefore be well

to put down 1 Lakh
on this account.

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

Works

Original	(a) Reformation or completion of 173 miles of road	Rs 10,00,000
	(b) Buildings	1,37,000
	(c) Compensation for land	1,00,000
		12,37,000
Repairs	to roads & Buildings	1,00,000
	Total Works - Rupees	13,37,000
Establishment (calculated @ 30 per cent)		4,01,100
Tools & Plant (calculated @ 2½ per cent)		33,425.
	Grand Total Rs	17,71,425

say in round numbers
17 3/4 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 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 17¾ 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:-

1882-83	half year)	Rs 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)	3,00,000
	Total Rs	17,75,000.

20 For Administrative purposes it will be necessary to form the whole into a separate charge (under the Superintending Engineer 4th Circle) which might be designated the "Wynad Road Division."

21. The present arrangements for maintaining the existing roads through

Agency of the Local Fund Engineer need not be disturbed till such time as the Establishment of the new P.W. Division is in a position to take over the work of complete reconstruction in any particular portion, and the grant in-aid as now given by Govt 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 of
the present P.W. 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 enquiries 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 accom-
-panying map the

66 1875
proposed roads
are shown in green

A. R. Sankey
C.S.E.

23 Jan: 1883

if money were forthcoming we might I think
accept the outlines of the scheme just as they stand
but there is not the slightest chance of our
being able to spend 17 lacs or the upward even
of that sum the Railway from Calicut or Beypore
is brought to Gudalur, the Plant from that
place to Nedivattum drawn by one metre gauge
road to Nedivattum shall connected with
Ootacamund by a motor, we shall have
I think done as much as we may of large
works for that district as it has any right
to hope for. I think this can be the outcome of
our Conversations in Council, but I put my views
that the Department so understand it
writing for further & better assurance

March 2/82

67 816

1st April 1882, No. 319, Financial.

GOVERNMENT OF MADRAS.

FINANCIAL DEPARTMENT.

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

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

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

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

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

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	1,32,355	53,33,056
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.

89 1818

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 Ghât, 3 miles	11
6th.—Nadagani to Cholady 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 ghât 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 opened 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 how 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 Cinchona 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 Cinchona 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 Ghât), 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 Ghât 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 Ghât at Nadagani with the head of the Támrachéri Ghât 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 Ghât 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 Ghât, 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 Kotagiri and the very large number of plantations in that part of the district. It was damaged very seriously by the storm of the 21st November last (1881), when two bridges were carried away and great lengths of the road blocked and destroyed by land-slips; the obstructions to traffic were removed in a few days at a cost of Rs. 806-12-0. The estimate for reconstructing the bridges and restoring the road amounts to a further sum of Rupees 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, Ootz to Naduvatam	In perfect order	1,60,000	To complete it thoroughly.
Fourth, Naduvatam to Gúdalúr, 10 miles	Incomplete and impassable in wet weather. Passable at all seasons; wants metalling.	40,000	To make it a first-class road.
Fifth, Gúdalúr to Nadagani and on to the limits of district on Karkur Ghât, 11 miles.	Passable at all seasons; wants metalling.	40,000	Do. do.
Sixth, Nadagani to Cholady, 21 miles	A track made by Planters	2,00,000	For an entirely new road of the first class and allowing for portions of present track that may be utilised.
Road from Mysore portion to the Devála Gold Fields, portion from Kuckanulla to Gúdalúr, 15 miles.	Passable for any load at all seasons, wants remetalling and the renewal of two small bridges.	60,000	To make it a first-class road.
Kótagiri 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 Karkur 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 cost at least ... ... Rs. 1,500 A. 0 P. 0 per mile.
Culverts and bridges at least ... ... Rs. 1,500 0 0 „
Metalling at 1,450 cubic yards at Rs. 5 ... ... Rs. 7,250 0 0 „
Rs. 10,250 0 0 „
Add for supervision and sundries at 25 per cent. ... Rs. 2,562 8 0 „
Total ... Rs. 12,812 8 0 „

and this estimate makes no allowance for rock, which is almost invariably met with in 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 Nílgiri District which are used by the Gold Mining Companies.

(True Copies and Extract.)

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

To the Chief Secretary to Government, Financial Department.

Copy to the President, Local Fund Board, 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.)

Acting Chief Secretary.

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

Exd. J. Wright.

G.O. 570 R. - 1-9-81
" 49 R. 31-1-82
B.E. 1442 A. 2-7-81
" 2083 A. 22-8--
G.O. 2821 A 4-11-81
Memo 490 C - 22-2.82.
B.E. 619 A. 10.- 3-82
G.O - 682.A - 3-82.

Govt. of [1882] Madras
FINANCIAL

Order, dated 1st April 1882, No. [illegible]

Local Funds—Roads—Communicating to the Public Works Department Proceedings of the Board of Revenue regarding the state of the roads leading to the Wynaad gold fields and considering in connection with the above the connecting the gold fields with Calicut and for constructing a railway from Beypore to Gudalur with extension to Mysore.

No: 3-5-82
dy 22/4

No 1 — 22.

Gold Road
Calicut to South East Wynaad 71
Special Inspection in accordance with instructions of G. O. No. 1192 Rev. dy 27th June 1881

Items No:	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks of Sub Divisional officers or Overseers
1	26-10-81		Left Calicut & proceeded to Rammad 7th 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 ft: and has a flood water level of some 10 ft: above this or a total mean depth of water at highest floods of 22 ft: approximately.	

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks by Sub Divisional Officers or Overseers
4		7/12	4-4 ft. arch openings all in good order.	
5		5/8	2-6 ft. arches — ring 1½ ft. thick in good order	
6	28-10-81		Ramnad to Condolly 16± Miles - Inspecting road & bridges	
7		9/4	2-4 ft. arch openings ring 1½ ft. thick in good order	
8		9/4½	2-4 ft. arch openings ring 1½ ft. thick in good order	
9		9/7	1-6 ft. arch - ring 1 ft. thick in good order	
10		10/2	2-4 ft. arch - ring 1 ft. thick in good order	
11		10/3	1-4 ft. arch ring 1 ft. thick in good order	
12		10/7	1-4 ft. arch - ring 1½ ft. thick - in order	

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks by Sub Divisional
			13	
13		11/2½	2-4 ft. arch - ring 7½ ft. thick in good order	
14		12/3½	1-4 ft. arch ring 1½ ft. thick in good order	
15		13/6	1-4 ft. arch - ring 1 ft. thick in good order	
16		14/3	3-1½ flat-top stone cover 6" thick in good order.	
17		14/3½	3-6 ft. arch - rings 1½ ft. thick in good order.	
18		15/2	1-3 ft. arch - ring 1 ft. thick in good order.	
19		15/2½	1-6 ft. arch - ring 1½ ft. thick in good order	
20		15/6	A good quarry might be opened for metal. If necessary it could be supplied at about 1-8 per C byd. laid into work for any distance up to two miles.	

Item No.	Date	Miles from Colombo	Notes and Remarks by District Engineer	Remarks by Sub Divisional Officers or Overseers
			14	
21			The whole section of road between Ramnad and Condolly is in very good order & Road covering consists of laterite 4 to 6 inches thick & fit to convey a heavy traffic during dry weather.	
22			The average width of roadway is about 15 ft., on banks through paddy fields it is about 12 ft. & on side long ground is 18 ft.	
23			The gradients are easy & there is no portion of the road that is likely to interfere with either quick light or slow heavy traffic	
24	2.11.81		From Condolly to Manjeri via Road No 6. This route is now used by the whole traffic between South East Wynaad & the Coast instead of the section of No 5 road between Edavanah & Condolly via Areacode Notes on this section are appended.	
25		17	2–4 ft. arch–ring 1½ ft. thick Good order	

Item No.	Date	Miles from Calicut	Notes, and Remarks by Distrct Engineer	Remarks of Sub Divisional Officers or Overseers
				75
26		~ 17/4½	2-3 ft. flat-covered culvert- Cover stone 10" thick-all in good order	
27		17/6½ to 17/6¾	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	2-4 ft. flat-covered culvert- Cover stones 9" thick in good order	
30		20/8½	1-6 ft. arch-ring 1½ ft. thick in good order.	
31		20/7½	A good stone metal quarry could be opened & would cost probably 12 annas broken into Cubes 1½" at Quarry-site	
32		21/0½	1-4 ft. arch-ring 1½ ft. thick in good order.	
33		22/0	~~(Road 14/1056)~~ Portion of Gutol Road. 1-9 ft. arch (ring 2½ feet thick) in good order Parapet- walls want raising. This	

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks of Sub Divisional Officers or Overseers
			culvert is an old structure & 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.	TL
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 22/5½	Falling grade 1 in 16 in good order.	
37		23/3	1-6 ft. arch-ring 1 ft. thick in good order.	
38		23/3½	2-6 ft. arch ring 1½ ft. thick in good order.	
39	3-11-81.		Road No 56 - Portion of Gold Road Inspected Road & bridges from 23/2 to Munyeri.	

No.	Date	Miles from Calicut	Notes, and Remarks by District Engineer	Remarks of Sub Divisional Officers or Overseers
				17
40		23/7	1-4 ft. arch ring 1 ft. thick in good order	
41		24/2	1-5½ ft. flat covered Culvert cover stone two in thickness one 7" & the other 4" thick or a total of 11" 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 & 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 thro the wood on the hill side. The roadway between parapets is only 10 ft. wide. This bridge must be replaced by an Iron rail girder Bridge if	

Date	from Cabinet	District Engineer	Sub Divisional Officers or Overseers
		heavy traffic of 3 tons & upwards per axle is to continue	
42	26/2 to 25/5	There is a rising grade of 1 in 15 & 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 & construction of probably not more than 4½ miles of new road	
44	26/6 to 27/0	Rising grade of 1 in 15	
45 4-1181	27/1 to 27/2	Falling grade of 1 in 12	
45a	26/6 to 27/2	These grades could be altered at the cost of new trace & construction of about ¾ of mile to grades of about 1 in 20	
46	27/5	2 - 6 ft. flat-cover culvert - cover stones 1 single stone 12" thick all in good order	

Item No.	Date	Miles from Calicut	Notes and Remarks of District Engineer	Remarks of Sub Divisional Officers or Overseers
47		27/6	1-10 ft. arch (ring 2½ ft. thick) This bridge shews 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, & I consider the bridge to be quite unsafe for any thing over ordinary country Cart traffic. The abutments are I believe very light only 1½ ft. thick. The bridge should be removed & a rail girder bridge should be erected. Plans & Estimates for proposed new bridge will be sent in shortly. This Bridge has only 9 ft. width of roadway between parapets & it together with the Culvert at 24/2 goes far to prove that in most cases our bridge roadways might be reduced to a 9 ft. width throughout except where a large bridge adjoins a town & where there would be at all times of the day a constant flow of traffic in both direction. A reduction to width of 9 ft. or 10 ft. would on many of our bridges allow of a large saving in cost of construction as also in Maintenance.	

No.	Date	Miles from Calicut	Notes & Remarks by District Engineer	31 Remarks of Sub Divisional Officer or Overseers &c
48		27/6	The roadway should be raised for a length of 50 ft. on both sides of Bridge as the sudden dips in both sides makes it a very trying for heavy traffic. This Bridge is situated in a very nasty & 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 & the sharp alignment of road from bridge makes the place decidedly dangerous for heavy traffic. The new alignment for road between 27/6 & 28/0 must be South round hill side thro cultivated terraced lands. The new trace might be made almost level with scarcely any increase of length of road & at a very small cost as the cutting would be in side long ground.	
49a			The road surface between Condotty & Kuttery is in very good order & capable of carrying heavy traffic during dry weather. The covering consists of 6 inches of broken laterite stone	

No.	Date	Miles from Calicut	Notes and Remarks of District Engineer	82	Remarks of Sub Divisional Officers or Overseers 81
50	5-11-81	28/6	Munperi to Edavanah Over Road No. portion of Gold Road 24 ft. span plain wooden beams 12" x 10" No. 3 Girders in width of roadway at 6 ft. 3 in centres. This bridge is all in good order & up to any weight. The water way is insufficient & an additional span should be added or a clear opening of 24 ft. width & 6 ft. clear height to under side of girder is required. During heavy floods the water rises over the roadway to South of bridge for a length of 80 ft. with average depth of 1 foot. The existing North abutment which consists of 3 courses of laterite stone in chunam rests on very hard laterite rock at 3 ft. below the present and proposed girder bed level. The new South abutment would have to be carried down 2 ft. below nullah bed or a total depth of 8 ft. below girder bed level.		
51			At Junction of Areacode road there is an unprotected well close up to side of road, it is in a most dangerous condition. Overseer		

Item No.	Date	Miles from Calicut	Notes and Remarks of District Engineer	35	Remarks of Sub Divisional Officers or Overseers
					87
			has been ordered to raise a parapet wall 3 ft. high & 1½ ft. thick all round it		
52	5-11-81	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 & construction would not be very heavy & the whole cost would probably not exceed Rs 3500.		
53		30/6 to 30/7½	There is a falling grade of 1 in 15 & here again an alteration for the better could be effected by a new trace ~~7 construction 7½ of a mile of new road~~ at a cost of say Rs 3000 including land charges &c.		
54		31/6	2-6 ft. arch - wing 1½ ft. thick - all in good order		
55		33/2	Road No 5 Gold Road proper 2-10 ft. semicircular arch wing 1½ ft. thick - Masonry laterite in chunam, half of this		

No.	Date	Miles from Calicut	Notes and Remarks of District Engineer	Remarks of Sub Divisional Officers or Overseers
	7	7	16 Head bridge was only very recently re-built. The whole structure is in good order.	7
56		34	2-6 arch ring 1½ ft. thick. All in good order	
57		35	1-25 ft. arch semicircular ring 2½ ft. thick ~~strengthen~~ This bridge shows a crack right-along longitudinal centre line. The crack was first discovered about 9 months ago & 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 thro the spandril walls & this will be sufficient to prevent any further damage. Bridge is otherwise in good order & up to any weight under 20 tons.	
58		37/3	Edawana to Nelamboor Section 1-15 ft. arch ring 1½ ft. thick all in good order	
59		38/8	Emgothoodoo Bridge This Bridge consists of three wooden trusses each of 31 ft. clear span & height of road way above Nullah	

No	Date	Miles from Calicut	Notes and Remarks of District Engineer	Remarks of Sub Divisional officer or overseer
38/8			Bed at highest Pier is 30 ft. With the exception of some pretty repairs there has been nothing done to this bridge since it was built 10 or 12 years ago. There are three trusses carrying roadway in each span. The ends of the trusses carried by piers resting 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 up stream side in No. 1 span. The main or stringer beam & the distance pieces between ends or toes of struts are very much decayed & the heavy traffic should be confined to two wheel tracks laid along on both sides of the centre trusses in each span. Plan & estimate 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 sap wood portions of ~~the column~~ the beam No. 1 pier is 30 ft. in height & requires diagonal bracing. Some of the joists are beginning to show signs of dry rot.	

Items No.	Date	Miles from Calicut	Notes and Remarks by District-Engineer	Remarks by Sub Divisional Officers or Overseers
				85
	38/0		The roadway planking is all very much decayed on under side of planks & although suited to carry the ordinary loads of Common country Carts it is very unsafe for anything heavier than 1½ tons per axle. On the whole I consider that the Platform joists & 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 25/100 tons per axle, with wheel tracks & if additional beams were laid over the present joists & planking immediately over the Main or stringer beams as per plans to be sent in Special trucks should be constructed with 4 axles & kept at this bridge for loads of 5 tons and upwards but not exceeding 10 Tons
60	37/1		1-25 ft. Semicircular arch (ring 2¼ ft. thick) has two very slight cracks running whole length of soffit under Spandril Walls The cracks are not serious but to prevent any further

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	37	Remarks of Sub Divisional officer or Overseer
					86
			disturbance I have ordered 3 tie rods to be fixed from the outside of each wall under the roadway & thus brace them securely together		
61		38/2	2-56 ft. Iron Warren girders. This bridge is in very good order and up to a load of 20 tons per axle or a total load of any one carriage at centre of span not exceeding 5 tons ~~if carried on four inch wheels~~ as per drawing in the [illegible]		
62		40/2	2-2 ft. flat-covered culvert stones 11" thick in good order		
63		41/2	2-3 ft. flat-covered culvert stone 10" thick in good order		
64		41/4	2-4 ft. flat-covered culvert stone 11" thick in good order		
65			Road and grades from Edavanah to Pelumboor are in good order. There are five rising & falling grades of 1 in 15 to 1 in 180 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		

Item No.	Date	Miles from Salient	Notes and Remarks by District Engineer	Remarks by Sub Divisional Officer or Overseer
			of a sharp friable laterite stone that yields to weathering influence & after a shower of rain becomes little better than mud.	
66		4 3/7	Karampoya Bridge is a wooden structure consisting of four spans of Howe trusses 61 ft. in the clear 866 ft. over all with an effective depth of 11 ft. The roadway is carried on joists 8 x 5" placed at 2 - 6" centres & have an effective span of 15 ft. The road way is formed of 2½ inch jungle wood planks placed diagnally. This bridge is now very unsafe 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 case very badly affected with dry rot the worst of them have been strengthened by placing new rough	

Items No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks by Sub Divisional Officers or Overseers
				88
			rough jungle wood forest 6 x 4 along side of them. The bridge is now up to loads of 1.5 tons per axle & any thing heavier says up to but not exceeding 2.5 tons per axle should be carried on permanent wheel tracks laid down upon the centres of each span to distribute the load over two or more forest. The maximum loaded of any one Carriage to be allowed on this bridge should not exceed 5 tons on two axles. thing over 5 tons should be carried on a special bogie truck with 4 axles as per accompanying plan & run across the bridge by means of power applied by ropes from the roadways at back of abutment	
67	44/3		1-4½ ft. flat-covered culvert stone 10" thick in good order	
68	45/4		1-4 ft. flat-covered culvert stone 10" thick in good order.	
69	48/1		2-4 ft. flat-covered culvert stone 9" thick in good order.	
70	48/3		1-6 ft. flat-covered culvert stone 9" thick in good order.	

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks of Sub Divisional Officers or Overseers
71			Road surface from Nelumbur to Edakara in fairly good order with exception of portions of 4 7th & 4 9th Miles. The whole of the covering Materials of this section is bad but the Sub-soil 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 good quality at a quarry some 2½ miles off or by laying down a plank roadway. Estimate for both will be made out & forwarded shortly.	
72	50/0		Iron Bridge of one span 96 ft. in the clear all in very good order & up to a load of 8 tons per axle & a load on any one carriage not exceeding 12 tons at the centre of span	
73	51/7		1-4 ft. flat culvert cover Stone 9th thick in good order	

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks by Sub Divisional officers or Overseers
				90
74		57/2	1-4 ft. flat-culvert-cover stone 9" thick in good order	
75		57/3	2-4 ft. covered culvert stone 9" thick in good order.	
76		57/2	1-6 ft. covered stone 6" thick in good order	
77		58/0 via Annecode	Ghat-Road begins	
78		56 8/4 via Irungeri	The Road between Edakerra & Foot of Ghat is in very bad order & the rains of ~~last~~ last 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 ~~small~~ 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 & the money expended has simply been thrown away.	

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks by Sub Divisional Officers or Overseers
				90
74		57/2	1-4 ft. flat-culvert-cover stone 9" thick in good order	
75		57/3	2-4 ft. covered culvert stone 9" thick in good order.	
76		57/2	1-6 ft. covered stone 6" thick in good order	
77		53/0 via Avencode	Ghat-Road begins	
78		56 ft / via Manjeri	The Road between Edakerra & Foot of Ghat-is in very bad order & the rains of ~~past two~~ last 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 ~~small~~ 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 & the money expended has simply been thrown away.	

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks Sub Div. Officers
79.	53/0 to 61/0		Ghat-road is in very bad condition throughout- the surface is now very much cut-up & rutted while in many places the boulders & broken stones that have been thrown down from above- a hard bottom have become exposed in a manner that is certainly dangerous & must be very trying to traffic. There are several very narrow lengths of road - under 12 ft. width - that should be widened out. The whole length of Ghat up to Nilgherry boundry should be resectioned, proper side drains formed & metalled throughout for a full width of 12 ft. with broken Stone 9" thick, unless this work is carried out it will simply be impossible to maintain this section in anything like good order	
80	56/62		14 ft. wooden Culvert- timbers all in good order	

Item No.	Date	Miles from Calicut	Notes and Remarks by District Engineer	Remarks Sub Asst Engineer 92
81		57/4	1-4 ft. wooden Culvert timbers all in bad order must be removed at once, have ordered Overseer to put the work in hand	
82		57/6	1-4 ft. wooden culvert in good order.	
83		57/4	1-9 ft. 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 struts to be put in between abutments	
84		58/7	4-ft. wooden culvert in bad order. Estimate you will be sent in for repairing this at an early date.	

Item No.	Date.	Miles from Calicut-	Notes and Remarks by District Engineer	Remarks of Sub Divisional Officer or Overseer
				93
85		59/4	1-6ft. 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	1-6ft. Wooden Girder Beams in bad condition must be removed at once & replaced by new ones. Overseer has been instructed to get this done	
87		61/2	1-6ft. Wooden culvert- Timber showing signs of dry rot. Overseer has been ordered to send in plan & Estimate for work required to be done.	
88		64	A land slip has occured. The road has been temporarily protected & the Overseer is now engaged collecting Material to rebuild revetment- 40 ft. high	

Item No.	Date	Miles from Culvert	Notes and Remarks by District Engineer	Remarks by Sub Divisional Officers or Overseers
			& for a length of 15 ft.	94
89			The work required to be done in clearing out the Ghat road to an average width of 15 ft. would necessitate cutting of about 1/2 miles in length 2 yards wide & 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 & 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 & quick traffic. The cost of carrying out this work would be about Rs 2000.	W. Anderson 2.8.15 District Engineer Malabar Canal Trunk Department

Gold Road

Appendix

Road No 5 Condotty to Edawanah Section

95

Item No.	Date	Miles from Colombo	Inspection Notes & Remarks by District Engineer	Remarks by Sub Divisional Officers or Overseers
1	29-10-81	17 to 23 1/2	6 Minor Culverts and tunnels of 4 to 6 ft. waterway all in good order and up to 25 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 21/7 1/2	There is a succession of short rising & falling grades of from 1 in 15 to 1 in 20.	
5		21/7 1/2 to 23/0	Falling grade of 1 in 18	
6		23/1 1/2	2 - 12 ft. arches ring 1 1/2 ft thick in good order	
7		23/2	1 - 15 ft. arch ring 1 1/2 ft. thick in good order	
8		23/3	At Kadangaloor river or backwater about 100 ft. wide - The bridge over this river was destroyed in 1877 during a very heavy flood. Under ordinary circumstances during highest floods the waterway would be	

No	Date	Miles from Calicut	Inspection Notes and Remarks by District Engineer	Remarks by Sub Division Officer or Overseer
			be sufficient, but on the occasion referred to a large quantity of newly felled timber that had been left lying unsecured at the side of the river was carried on to the bridge & piled up against it, so that the timber piers colapsed. The water-way required will be 100 ft. width with clear height to under side of girders not less than 30 ft. above lowest Nullah Bed. The old site of foundation of South abutment should be used as it appeared for probably that the soil at and immediately around the old site was very firm & compact at a depth of 3 ft under lying 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 ft. North of centre of waterway to North abutment under lying a silt deposit of 3 to 4 ft. in thickness. Screw pile piers & Iron girders would probably be the best and cheapest durable class of bridge that could be erected over this river & would cost from Rs. 9000. to Rs. 10000	96

Item No.	Date	Miles from Calcuit	Inspection Notes & Remarks by District Engineer 48	Remarks by Sub Division Officers or Asst
9		23/5	2-6ft. arch-ring 1½ ft thick all in good order excepting a small portion of flooring that must be repaired at once.	
10		24/2	2-6ft. arch-ring 1½ ft thick- all in good order	
11		24/3	1-6ft. arch-ring 1½ft. thick- all in good order.	
12		26/3	2-6ft. arch-ring 1½ft. thick all in good order	
13		27/2	2-6ft. arch-ring 1½ft. thick all in good order	
14		27/5	1-6ft. arch-ring 1½ft. thick all in good order	
15		29/3	1-15ft. arch-ring 1½ ft. thick. in good order.	
16		29/7	1-36ft. arch in progress. Masonry up to springing & now stopped for revised estimate and plan above springing line. I think a light girder would save a lot of money & time in finishing this work in lieu of the arch plan now in progress.	

Item No.	Date	Miles from Calicut	Inspections Notes and Remarks by District Engineer	Remarks by Sub Divisional Officers or Overseers
17		30/11	2-6 ft. Arche-ring 1½ ft. thick- all in good order.	49
18		31/1	2-5 ft. arch-ring 1½ ft. thick- all in good order	
19		31/4	1-4 ft. arch-ring 1½ ft. thick- in good order & up to any weight.	
20		32/5	1-12 ft. arch semicircular ring 1½ ft. thick in good order	
21			Inspection from Condotty to Edawanah cannot at present be used by traffic coming for Harkoor that because of gap in the communication at	
23/3			but even before the bridge was destroyed the heavy thro' traffic has at all times followed the Munjeri 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 & poor class of laterite stone nearly devoid of all binding properties. To alter the present steep gradients into grades suited to quick & heavy traffic.	

say

No.	Date	Miles from Calicut	Inspection Notes and Remarks by District Engineer	Remarks by Sub Divisional Officers or Overseers
			say not exceeding 1 in 20 a new trace & 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 via Kreacode is some 3 miles shorter than via Munjeri, but it is not I think nearly such an important road & to King into account the additional cost of new bridge at 23/5, the alteration of road grades & the want of difficulty in getting good Metal covering to carry heavy traffic I am of opinion that the present route via Munjeri should be adhered to.	29 50

W. Roderick M.
District Engineer & Mala
Local Fund Depart

Calicuts
19th December 1881

Malabar Distt. Engineer's Office
L.F. Department Calicut 17th December 1860

No. 100 AP 57

From

The District Engineer
Malabar L.F.D.

To

The President L.F.Bd.
Malabar

Sir,

In accordance with your instruction
appended to Board of Revenue's Proceedings - No. 1
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
Calicut to South East Wynaad via Mungeri
and Karkur ghat, as also the section of Road
No. 5 Condotty to Edavannah, via Areacode
which is a portion of the direct road for
but this is now closed to through traffic
Owing to a break at the Kodinhgalore river
Midway between Condotty and Edavannah

2. The route from Calicut to Nadugan
via Mungeri is 89 miles against 86 via Ko
=kode

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
ained and has a dressing of broken laterite stone
thick that is capable of carrying the present
ing traffic during fair weather, but should
same heavy traffic continue throughout the
hole year and during heavy Monsoon weather
road will most certainly be cut up and
ffer severely.

4. From the 58½ to 64th Mile the road-
face is in very bad condition and after a
mmer of rain becomes heavy and trying to all
asses of wheeled and pack traffic. There is
o wearing material proper throughout the whole
f the last 16 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 ~~soddening~~ wearing qualities of the materials
employed in levelling and giving a temporary
wearing to the road Surface it is now a-
undulation of small mounds and ruts and
jun

in many places it is Studded (10) with large Stone
4" to 6 & 8 inches in diameter Standing about
2 to 3 inches above the road Surface in a manner
-ner 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 re-
-moved and broken up into 1½" cubes and
again relaid.

6 The gradients throughout the whole length
of road between Coliault and Neilgherry bound-
-ary 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 ft. throughout — on banks through fairly
flats 12 ft. and on Side cutting 18 ft. Clear width
which is Sufficient for the present traffic —
The only alteration that is now needed is the
widening of a few narrow portions and
12 ft. width on the flat amounting in all
about 1½ Miles in length for a width of 2
and 3 yards height.

8. All Bridges and Culverts with excep

of Trade mentioned in the following table and in
para 10 are now up to loads not Exceeding 10 tons
one Carriage with maximum load not Exceeding
tons on any one axle. For loads greater than
tons the additional axles required must have
centres not less than 6 feet apart.

Table Shewing Culverts to be Reconstructed.

Description of Culverts	Necessity for carrying out alterations forpoled
1–9 ft. Arch ring 2½ ft. thick	On account of arch being unsafe for loads over 2·0 tons per axle
1–5½ ft. flat Covered	On account of dangerous por
1–10 ft arch ring 2½ ft. thick	This bridge is unsafe for loads over 1½ tons per axle
1–4 ft. Wooden Culvert	Beams decayed and unsafe for present traffic.
1–7 ft Wooden culvert	Beams too light for present traffic
1–4 ft Wooden culvert	Beams decayed and unsafe for present traffic
1–6 ft Wooden Culvert	Beams decayed and unsafe for present traffic
1–6 ft Wooden Girder	Beams decayed & unsafe for present traffic
1–6 ft Wooden Culvert	Beams decayed & unsafe for present traffic

The above named Culverts should be re
aired at an early date to meet requirements of

of present Ordinary traffic and will cost
about Rs.

10 The three large Bridges at [illegible] 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 6 tons on 2 axles
at not less than 6 ft. centres, wheel tracks
should be laid over the joists for the purpose
of distributing the wheel loads. The cost of
these works would be Rs 1100–0–0.

11. To convert the above mentioned bridges
into Structures capable of carrying loads
over 5 tons on any one vehicle say up to
10 tons on 4 axles would require a sum of
Rs 43,950–0–0.

12 The enclosed Estimate No 1 gives the
approximate cost – Rs 18640 – 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 & 43/4 and of 10 tons on all other structures.

13. In the case of all loads over 2·5 tons & up to 5 tons they must be carried on 2 axles at centres not less than 6 ft. 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 ft. throughout

16 The tracing and construction of about 5 1/2 miles of new road to bring the existing

heavy) grades (on the 18. 23. 26. 27. 28. 30. 45 and 47 miles) down to 1 in 20, the greater portion of the work would be in easy side cuttings

17 Metalling with 9" of broken Stone 12 ft. wide throughout the length of 64 miles of road

18 The removal of present Trussed and girders at 38/0, 38/2 & 43/4 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 £4,74,620 for details of which see approximate Estimate No 2.

21. It would not I think be advisable to alter the present through route via Mumjeri to the shorter line via Breakdale 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 easing gradients and constructing bridges

material should be adopted and insisted upon being carried Out. For loads over 12 tons there should be not less than ~~three~~ 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. 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 Feroke 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

hardly be advisable in any interest of the Boards or of the District generally to recommend the altering of the Karkur Ghat route to Wynaad into a first class road having an 18 ft. formation, with 12 ft. 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 £474,620 - 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 Naduvany at the head of the Ghat is 69 miles via Munserry and to Devallah 73½ miles, it touches the villages of Condotty, Munjery, Idawannah Nellambur and Tapioca Devalah and Onchterlony 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

of the Wynaad, and between Wynaad and the coast is undoubtedly the one from Calicut to North and South East Wynaad via Tamarcherry Ghat. This road enters the plateau at Lackady 35 miles from Calicut.

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

31 From Lackady to Devalah is 41 miles or a total distance of 76 miles from Calicut as against 73½ miles to Devalah via Karkur Ghat.

32 These lines of communication pass through the following villages 1st Section Karkandur, Tamberchirky, Pookoopady, Achoor, Terriote and Manantoddy, and on the 2nd Section it touches the villages of Thirunelly, Maipady, Chembrambady, Pandalur and Devalah.

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" thick and 12 ft wide.

34. The road between the Coast and foot of Ghat has some severe gradients, about 1 in 16 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 ft. 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 3 large bridges on the Lackady 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 Estimate No. 3, item No. 3, at Schedule rates appended.

38. 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 advis=-able to substitute as far as possible mechan=-ical 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 pro=cured. The rollers would carry the Stone breaking Machines from place to place as re=-quired and it could also be employed in hauling out the broken metal for distribution along the road. An eight ton roller would give 224 lbs 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 lbs to the raised portions of the metal that have been left un=-touched between the cart wheel tracks and thus ensure the surface covering being thoroughly Consolidated and free from any chance of dis=-turbance under even the heaviest traffic.

39. The cost of a Roller and Stone breaker com=-plete delivered in this country would be about

about Rs 11280 and the working expenses per day would be Rs 5 to Rs 7 equal to Rs 0-1-3 per Cyd: of Stone broken. The quantity capable of being turned out is about 100 Cyds per day.

40 I propose to use for Bridges having one or more Spans up to 30 ft: 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.

41. It may be mentioned that the present Main=-tenance allotments are only fit for keeping up Such unfinished roads as we have on the Carcoor Ghat, Samberchery Ghat, Lachady Man=-antoddy and Lachady to Devalah Sections as fair weather roads. The Maintenance rates for first class roads on the Western Ghats Konkan and Bombay District and Ceylon Hill roads ranges from about Rs 600 to Rs 1200 and even Rs 2000 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

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 substituted 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 Capitalized be equal to 12 to 13 lacks or one third of the sum required to complete the whole 120 miles of proposed Railway

I inspected somewhat hurriedly the country between Peralah and Mannakkady via Vythery 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 Lackady the present road might be followed and where wide enough Say 20 ft and otherwise suitable, the Railway might be laid down on the one or other Side of it and thus as far as possible utilize a valuable property which if the line is once constructed will certainly be but little used except by a small and unimportant local traffic between villages and Homesteads Situated between Stations

The whole of existing gradients between the Coast and foot of Ghat might be altered to give ruling gradient of 1 in 50 by new alignments that would necessitate the Construction of Say 9 miles of new Cuttings and banks with average height of 3 ft. and 9 ft. formation

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

Name of Section	No of Waterways required over & off up Span	Clear Water Way	Remarks.
Calicut	2	60 ft.	1 has abutments built in rubble chunam
Lackady	6	30 ft.	
	4	50	
Lackady	2	40 ft.	1 has abutments built in
Manantoddy	2	100 ft	rubble and chunam
Section	6	30 ft.	1 has abutments built in
	1	200 ft.	rubble and chunam
	1	250 ft.	
Lackady	3	30	1 has abutments built in
Devalla -	2	40	rubble and chunam
Section	2	80	
	1	200	Piers and abutments built in

all other waterways would cost about Rs 2000 to Rs 3000 per mile.

The Sambercherry Ghat 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 Riggenbachs latest types of rack locomotives similar to those used on the Rorschach 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

loads 4½ times their own weight up Grade of 1 in 15 at 4 miles per hour.

The curves on this Ghat are capable of being utilized and but little alteration, would be required if the whole Ghat is given up entirely to the Railway which it is believed might readily 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 Railway might be carried out within a year and the whole section up to Lackady might be completed and opened for traffic within 18 Months, if this Concession of closing the road were granted. – after first starting of works –

It would be a short sighted 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 earth works of the Ghat Section of this Railway would form and also the fact that only a small and unimportant

important section of the Community would likely to suffer inconsequence of the road ing closed to Ordinary traffic

There are at present 6 Zig-zag's the Ghat which could be worked by reversing tions but two or three of these might be altered putting in short Curves of 1½ chain radius th Grades of 1 in 10 to 1 in 6.

New cuttings to ease curves would have to be carried out at various points inting in all to say about 1 Mile with average width of 4 yards and a height yards as per appended Estimate No

Four bridges each of 50 ft. Span uld have to be constructed upon the at for the purpose of easing Curves at sp. re-entering angles

The Cost of the main line Devalah and the branch to Manantoddy uld be Rs 36,29,075 as per approximate timates Nos 12 & 13 and Cycloid Rly appended.

The probable working Expenses ed are given in Estimate No. 9 + amount Rs 3,28900

The Estimate for Railway Plant 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

W Henderson

No 3 Estimate No 1 111 Ap 62 No 3

Estimate of the probable cost of making certain urgently required repairs to meet existing ordinary traffic on road from Calicut to Nilgiri boundary via the Karkoor Ghaut.

Item No	Mileage	Particulars	Amount Rs As P
1		2½ Miles Metalling roadway (on the worst portions of road) with 6" broken stone & 1½" blinding 4 Yards broad including sectioning & clearing drains at Rs 2-6- per Rg Yd, or Rs 4,180 per mile	10450 - - 10450
2		½ Mile Widening 2640 x 2 x 3 = 15840 Cyds at - - 3 - -	2970 - -
		Side Drains 2640 x ¼ x ½ = 330 - - - - at - - 1 - 6	30 15 -
		Sundries	29 1 - 3
3	22/6	Converting a 9 ft cart track culvert into a rail feeder	
		Cost of rails including carriage and fixing	80 - -
		Carried Over	80 - - 13309

			Particulars		Amount	Total
			Brought forward	80 "	"	1360 "
			40 Cft Timber for planking and			
			hand rails at Rs1-12- Cft	70 "		
			For removing Arch & Sundries	20 "		170 "
24/2			Converting 5½ ft Cover stone	Do		
			Do Do			
			Cost of rails including Carriage			
			and fixing	60 "		
			24 Cft Timber for planking and			
			hand rails at Rs1-12- per Cft	42 "		
			For removing Cover stones & Sundries	18 ½ "		120 "
27/6	10/2		10 ft one Arch	10/2	10/2	
			Cost of rails including			
			Carriage & fixing	100 "		
			42 Cft Timber for planking			
			and hand rails Rs1-12-	Do	73 8	
			For removing Arch & Sundries	26 8 "		200
57/4	10/2		4 ft Timber platform over			
			Cost of rails including			
			Carriage & fixing	40 "		
			Carried over	40 "	"	1370 "

			Particulars		Amount	Total
			Brought forward	40 "	"	1370 "
			21 Cft Timber for planking and			
			hand rails at Rs1-12- Cft	36 12 "		
			For removing old work & sundries	13 4 "	90 "	
58/4			Converting 4 ft Timber platform			
			into a rail girder			
			Cost as for that on 22/0 nearly	160 "	"	160 "
58/7			Converting 4 ft Do Do			
			Cost as for that on 57/4	90 "	"	90 "
59/4			Converting 6 ft Do Do			
			Cost of rails including			
			Carriage & fixing	60 "		
			24 Cft. Timber for planking and			
			hand rails at Rs1-12- per Cft	42 "		
			For removing old work & sundries	18 "	"	120 "
60/3			Converting 6 ft Do Do			
			Cost as above	120 "	"	120 "
61/2			10/2 6 ft Do Do			
			Cost as above	120 "	"	120 "
			Carried Over			1467 "

Mem. No.	Miles	Particulars	Amount	Total
		Brought forward		1654 -
		Cost of 1 Bogie Carriage		
		115½ Cft Teak timber at Rs 3/Cft	346 - -	
		4 Axles with Wheels Rs 50 each	200 - -	
		Cost of 2	546 - -	1092 -
38	0	Planks on Bridges for wheel track		
		2 - 100'x15"x4" = 250/6 = 83⅓ Cft at Rs 3	250 - -	250 -
38	2	10 do 10 do		
		2 - 112'x15"x4" = 280 = 93⅓ at Rs 3 Cft	280 - -	280 -
43	1	12 do 3 do		
		2 - 260'x15"x4" = 650 = 216⅔ Cft at Rs 3	650 - -	650 -
		Total Rupees		1654 -
		Add 10 per cent for superintendence		165 -
		Grand Total Rupees		1819 -

If the Board agree to any proposal to reduce maximum load to 5 Tons on one vehicle with load distributed as specified in Rule then the Bogie Carriage amounting to Rs 1092 should be omitted.

W. Rudduck

Estimate No 2

Estimate of the probable cost of forming & completing Road No 5 from Kachcheri to Nilgiri boundary via Muniyari & Gurvoor Thaut as a first class Road having an 18ft formation & 12 ft width of metalling 9" deep.

Mem. No.	Miles	Particulars	Amount	Total
1		64 Miles Widening		
		50 x 1760 x 1 x 1½ = 132000 Cyd @ Rs 2	1650 - -	
		14 x 1760 x 1 x 1½ = 36960 " " 2	690 - -	
		Side Drains		
		30 x 1760 x ¼ x ½ = 6600 Cyd @ Rs 1	6 6812 -	
		New Cutting (on new trace)		
		6 x 1760 x 7 x ½ = 36960 Cyd @ Rs 2	690 - -	
		Cost of tracing 6 miles at 50 per mile	300 - -	
		Sundries at 2 per cent	62 40	31400 -
		64 miles Metalling Roadway with 9" broken stone and 1½ Blinding 14ft broad including rectifying & cleaning side Drains @ Rs 3 6 . a yard		
14		Miles Thaut & high land @ Rs 5940 per mile	83160 - -	
50		" low Country @ Rs 3500 do	175000 - -	258160 -
22		Converting a 9 feet one arch Culvert into a rail girder		
		Cost of rails including carriage Rs 50 - -		
		" " 40 Cft Timber for planking & hand rails at Rs 1 12 - per Cft	70 - -	
		For removing arch & Sundries	20 - -	140 -
		Converting a 9 ft do do		
		Cost as above	140 - -	140 -
24	7	Converting 6½ ft Culvert Stone do do		
		Cost of rails including Carriage @ Rs 10	60 - -	
		Carried Forward	60	290400 -

	Brought forward	60	- -	29040 -
	24 Cft Timber for planking & hand rails at Rs 1.12 - p Cft	112	- -	
	For removing covering stones Sundries	18	- -	130 -
	Converting 5 ft do do Cost as above	120	- -	130 -
27/5	Converting 2 Vent 6 ft Cem Stone Culvert into a 16 ft one Span rail girder Cost of rails including Carriage & fixing	300	- -	
	60 Cft Timber for planking & hand rails @ Rs 1.12 per Cft	105	- -	
	For removing Covering Stones Sundries	22	- -	427 -
27/6	Converting 10 ft one arch Culvert into a rail girder Cost of rails including Carriage & fixing	100	- -	
	42 Cft Timber for planking & hand rails @ Rs 1.12 per Cft	43 8	- -	
	For removing Arch & Sundries	26 8	- -	
	Converting 10 ft do do Cost as above	200	- -	200 -
28/6	Converting 12 ft Timber platform Culvert into a one Vent 24' span rail girder. Cost of rails including carriage & fixing	500	- -	
	132 Cft Timber for planking joists & hand rails @ Rs 1.12 per Cft	231	- -	
	Rough Stone in Chunam abutment 48 Cft @ Rs 20 - - per 100	9 97	- -	
	For removing old abutment platforms and Sundries	33 65		774 -
28/11	Converting 3 Vent 31' span Trestle bridge into single 96 ft vent Lattice girder Cost of girders including carriage to site and erection 26 Tons @ Rs 350 per Ton	9100	- -	
	Carried forward	9100	- -	29034 -

	Brought forward	9100	- -	29034 -
	376/12 Cft Timber for posts & planking @ Rs 1.12 - per Cft	462	2 -	
	For removing old work & Sundries	184 12	- -	9750
39/2	Strengthening 1 span out 56 ft Span girder Bridge By adding a new girder to each existing girder & removing all the cross girders & for planking over 2½" planks 16 Tons New girder including Carriage to site & erection at Rs 350 p Ton	5600	- -	
	300 Cft Timber for planking @ Rs 1.12½ Cft	535	- -	
	For removing & altering existing work & Sundries	1075	- -	7900 -
42/7	Converting a 4 vent Bridge Timber Cross girders into a wrought Iron girder Multiple Murphy Type with joists 7" x 10" x 2½ planking 72 Tons girder including Carriage to site and erection @ Rs 350 per Ton	25200	- -	
	306 Cft Timber for planking & joists @ Rs 1.12 - Cft	1285 8		
	For removing old work Sundries	2148	- -	29048 -
57/2	Converting 6 ft Cover Stone Culvert into Rail girder Cost as for 7 ft	120	- -	120 -
57/4	Converting 4 ft Timber Platform do Cost of rails including Carriage & fixing 20 - -			
	24 Cft Timber for planking & hand rails @ Rs 1.12 - Cft	26 12	-	
	Carried forward	76 12	- -	37102 -

Brought forward ... 76 12 ... 83708

For removing old work & Sundries ... 13 4 ... 90 ...

6¾ Converting 9 ft — do — do
Cost as for 22 nearly ... 160 ... 160 ...

58 Converting 11 ft — do — do
7 Cost as for 5½ ... 90 ... 90 ...

59 Converting 6 ft — do — do
4 Cost as for 5½ ... 120 ... 120 ...

60 Converting 6 ft — do — do
3 Cost as above ... 120 ... 120 ...

61 Converting Timber platform into a
rail girder
Cost as above ... 120 ... 120

1/2 Constructing a Bridge across
the Belfort River, Span of 6
spans of 100 ft ... 4500 ... 4700

Add 10 per cent for superintendence ... 470

... 5170

W. Rudland
Col

115

Estimate of the probable Cost of putting in order for Ordinary traffic the Road from Calicut to Tuckady via Tamberchery Ghaut.

Item No.	Miles	Particulars	Amount	Total
		27½ Miles — Metalling roadway with 9" broken stone 1½" thickness 4 Yards broad including sectioning and clearing side Drains at Rs 2 per Rd yds = Rs 5520 per Mile	96,800 ...	96,800 ...
		8 Miles — Metalling as above the Tamberchery Ghaut at Rs 5940 p Mile	47,520 ...	47,520 ...
		15 Miles Widening 15 × 1760 × 1 × 5/2 = 39600 Cu yds at Re 1 - 2 - per C yds	4950 ...	
		2 Miles Do On the Ghaut 2 × 1760 × 2 × 3 = 21120 C yds at Re 1 - 4 -	5280 ...	
		20 Miles Clearing side Drains 2 × 5 × 1760 = 17,600 1 × 15 × 1760 = 26400		
		44,000 Rd yds at Re - 2 -	687 ...	10917
		4 Miles Tracing at Re 100 per Mile	400 ...	
		Earth work 4 × 5000 = 20000 @ Re 0 - 2 -	2500 ...	
		Compensation for Land 32 Acres at Re 100 per Acre	3200 ...	6100
		6 Small Bridges between Calicut and foot of Ghaut at Rs 200 — each	1800 ...	1800
		Carried forward		163,137

Chainage	Particulars				Amount	Total
	Brought forward					163137
24°	1 - 7½ ft Span Bridge of Timber at Rs 25 .. .. per ft.				1800 ..	
27°	1	84	do	do	2100 ..	
28°	1	50	do	do	1250 ..	
29°	1	21	do	do	525 ..	
36°	1	14	do	do	350 ..	6025
	Rupees					169162 ..
	Add 10 per Cent for Superintendence					16916 ..
	Total Rupees					186100 ..

W Lindesay
District Engineer L & S Division

Estimate No 3 Detail No 2

07

Estimate of the probable cost of putting in proper order for ordinary traffic the road from Luckady to Devala via Chandale and Maipady

116

Item No.	Mileage	Particulars	Amount	Total
		16 Miles Metalling roadway with 9" broken stone & 1¼" blinding 4 yds broad including sectioning & clearing side drains at Rs 5940 .. per mile	95040 ..	95040 ..
		8 Miles Metalling with 6" boulders 3" broken stone 1¼" blinding 4 yds broad including sectioning & clearing side drains at Rs 6710 .. .. per mile	53680 ..	53680 ..
		3 Miles Widening 3 x 1760 x 2 x 2 = 21120 Cyds at 3as	3960 ..	
		Blasting rock	240 ..	4200 ..
		11 Culverts to be reconstructed at Rs 300 each	3300 ..	3300 ..
		Rupees		156220 ..
		Add 10 per cent for Superintendance		15620 .. 1580 ..
		Total Rupees		171840 ..

W Lindesay
District Engineer

Estimate. No 3. Detail. No 3. 117 66

Estimate of the probable Cost of putting in proper order for ordinary traffic, road from Kuckady to Canantotty via Seebo

No.	Particulars	Rate	Amount	Total
31	Miles. Metalling Roadway with 9" to 6" Kan Stone & 1½" binding 4 Yards broad including Scraping & cleaning side drains at per Mile	Do	940	184140
1	No 10 Timber Bridge 58 ft span per ft		25	1450
3	No 15 Do 104 ft Do Do		25	2600
4	No 20 Do 33 ft Do Do		25	825
5	No 31 Do 31 ft Do Do		25	775
62	Culverts each at	Do	300	6200
7	Bridge 200 ft Clear waterway at Kuckapandy Tenay			30000
8	Bridge 250 ft Clear waterway at Kinga Tenay.		15000	15000
	Total.			265390
	Add 10 Per cent for Superintendence.			26539
	Grand Total.			291929

W Kinderz. Asst Engr
District Engineer's Office
Trincomalee 10th June 1873

Abstract Estimate № 3

119

№	Particulars	Amount	Total
1	Estimate № 1. Making certain urgently required repairs to meet existing ordinary traffic on Road from Calicut to Nellighery boundary via the Karkur Ghaut.	8640	8640 .. ..
2	Estimate of the probable cost and completing Road. № 5 from Calicut to Nellizi Boundary via Mungore and Karkur Ghaut as a 1st Class road having an 18 ft formation and 12 ft width of Metalling & deep	47962	47962 .. ..
3	Estimate of the probable cost of completing the existing lines of communication between Calicut & Northward and South Wynaad viz. Sandercotty Ghaut 1st Section Calicut to Luckady Section Detailed Estimate № 1.	18600	
	2. Section Luckady to Manantoddy viz. Gerriade № 2.	17840	
	3rd Section Luckady to Ommadale viz. Mafady. № 3.	29120	64560 .. ..
	Total Calicut & Wynaad Railway		[illegible] .. ..
4	Estimate of the probable cost of constructing a Railway line of		

of 80 Miles in length between Coalicut and Devalah and a Broad line of 40 Miles in length between Pythiny and Manantoddy as per Estimate No 4. 3629035

106 Detailed Estimate No 1, Coalicut & Wynaad Rail 70

Showing approximate Quantities and Cost of Works and Materials required to complete the 120 Miles of proposed Railway between Coalicut and Wynaad Manantoddy Devalah.

	Particulars of Works	Rate	Amount	Total
	1st	£	£	£
1st	Sleepers. Best Jungle Wood Sleepers 8 feet 7 Yards each 5" x 4" x 7 feet 1 Mile	1 ..	2016 ..	
120	Total for 120 Miles			241920 ..
No	Ballast 6 feet wide and 1 foot thick = 3 Cubs per yard men			
800	For 40 Miles of Ballast Complete	" 26	8250 ..	
600	For 80 Miles of Ballast Complete	" 8	52800 ..	
	Total for 120 Miles			61050 ..
Vide No 3	Permanent Way 1st Rails 30 lbs steel Rails prices Quoted Middlesbro 4-11-81			
47	Total for 1 Mile	96 ..	4871 ..	
Vide No 3	2nd Fastening Fish Plates, Fish Bolts, nuts and spike &c Landing transit up country 150 Miles and slinging out and fitting up in position allow as per Detail Item No 2 Estimate No 1	at 61 ..	2867 ..	
47	For cost of one Mile of Permanent Way	151 ..	7077 ..	

Wynaad Calicut Railway 71

Detailed Estimate No 2 of rolling stock required for Calicut and Wynaad Railway 120 miles

Quantity	Description	Rate	Amount	Total
8	Locomotives	1000 "	8000 "	
15	1st Class carriage to hold say			
	8 passengers	300 "	do 4500 "	
12	2nd - do - to hold 16 - do	235 "	do 2820 "	
30	3rd - do - do - 24 - do	205 "	do 6150 "	
10	Horse Boxes	150 "	do 1500 "	
8	Carriage Trucks	60 "	do 480 "	
200	Goods waggons	73 "	14600 "	
50	Mineral and other tipping			
	low sided waggons	53 "	do 2650 "	
30	Cattle waggons	80 "	" 2400 "	
25	Break Vans	165 "	do 4125 "	
	8 per Cent for additional Cost of rack rail and gearing on each of the above Engines 15000	1500 "	1500 "	
	Engine Duplicates		1000 "	
3	Break down Crane 5 tons	300 "	each 900 "	
	Engine sheds &c		1500 "	
50	Spare wheels, axles, axle boxes		1920 "	
100	do Engines and Carriage lamps &c	2 10 "	250 "	
700	Freight and Insurance	2 10 "	1750 "	66340
	Fitting up rolling stock say 10 per Cent			5630
	Total			71970
	Add for Sundries 10 per Cent			7197
	Grand Total			79167
				12

4 1½ Grand Total Rupees 79179

W Anderson

Parliamentary Paper

Estimate of Cost of 120 Miles

		151 " "	5060
Add extra cost of Rack Railway			
Estd. for 4 Miles of	Ro Complete 15 " "	26400 "	
Cost of 8 Miles	Ro Ro 16 " "		20200
	Total Permanent Way		25260
Earth Works			
For 4 Miles (760 x 5 x 1½)		2 990 "	
For 32 Miles			
For 8 Miles Ghaut (760 x 4 x 2)		4 2800 "	
For 80 Miles Ghaut (760 x 3 x 1½)		4 16400 "	
For 120 Miles			28280

W Anderson M. I. C. E.
District Engineer
L. I. Railway

Calicut & Wynaad Railways

Detailed Estimate No 3 for 15 Stations with buildings complete for Calicut & Wynaad Railway 120 miles. 123

No.	Particulars	Rate	Amount	Total
11	Stations - Each to have a through siding 300 ft long and one blind Do 150 ft long or a total of ½ of a mile of road ____ @ Rs	9060/12	" "	755 " "
4	Station - Each to have a through siding 300 ft long and day & blind sidings each 150 ft long or a total of ⅙ of a mile of road ____ @ Rs	9060/6	" "	1510 " "
57	Points & Crossings ____ @ "	214	" "	12198 " "
15	Wells ____ "	300	" "	4500 " "
15	Buggies or Freedmans apparatus for watering Engines in lieu of ordinary pumps system ____ @ Rs	300	" "	4500 " "
	Buildings			
11	Goods Sheds ____	400	" "	4400 " "
4	Ditto ____	700	" "	2800 " "
11	Station Masters Houses ____	300	" "	3300 " "
4	Ditto ____ Do ____	500	" "	2000 " "
11	Booking Office & waiting Sheds	300	" "	3300 " "
4	Ditto ____ Do ____	500	" "	2000 " "
11	Latrines ____	200	" "	2200 " "
4	Ditto ____	400	" "	1600 " "
11	Plat forms ____	50	" "	550 " "
4	Do ____	150	" "	600 " "
	Carried over ____			46,213 " "

No.	Particulars	Rate	Amount	Total
	Brought Over		46,313 - -	
	General Buildings			
1	Work Shops	20000 - -	20,000 - -	
1	Stores	3000 - -	3000 - -	
1	Central Office	20000 - -	20,000 - -	
15	Engine Drivers Huts	500 - -	7500 - -	
3	Waiting Rooms for 1st Class passenger with bed Rooms and Cook Houses attached	1500 - -	4500 - -	
4	Engine Sheds	1500 - -	6000 - -	
	Ground total			107,313

All the above Erections and buildings with the exception of work shops 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 work Shops and Central Offices are to be built of laterite in Chunam and have tiled roofs

W Underwood M 1866

District Engineer Coal Fields
Pondicherry

Calicut Wynaad Railway

Estimate № 4

Plate layers Tools

For 120 miles of Track - 13 Gangs

Quantity	Particulars	Rate	Amount
№ 1			
52	Picaxes 4 X 13 Gangs	2 8 "	130 " "
52	Pick bates 4 X 13	2 12 "	143 " "
52	Crowbars 4 X "	1 12 "	91 " "
26	Spanners 2 X "	" 8 "	13 " "
26	Pinch bars with steel claw 2 X 13	3 " "	78 " "
52	Bell Hooks 4 X 13	1 4 "	65 " "
52	Mammoties 4 X "	" 12 "	39 " "
13	Wooden Lever 1 X "	10 " "	130 " "
	Lets of Light Board		
13	Lights 1 X 13	2 " "	26 " "
4	Trollies 4	80 " "	320 " "
4	Jam Crow 4	50 " "	200 " "
2	Rachet Screw Jack 2 (6 Ton)	40 " "	80 " "
13	Track Gauge 1 X 13 (2'-6")	5 " "	65 " "
1	Portable Forge 1	65 " "	65 " "
13	Spirit-level 1 X 13	6 " "	78 " "
13	Screw Augur 1 X " (1/2")	1 4 "	16 4 "
13	" " 1 X " (3/4")	1 8 "	19 8 "
13	" " 1 X " (1")	1 12 "	22 12 "
1	one Engineers or Line Inspectors Trolly worked by Lever and double crank Axle	560 " "	560 " "
13	Adzes 13	8 " "	104 " "
2	Pull Cramps 2	15 " "	30 " "
2	Crank Brace 2	8 " "	16 " "
	Carried Over		2291 8 "

	Brought forward				2291 8 "
100	Bits 100		"	12 " 75 "	"
13	Axes 4 lbs 13		2	" " 26 "	"
26	Sledge hammers steel faced 7 lbs		2	8 " 65 "	"
6	Racket Brace		30	" " 180 "	"
					2637 8 "
	Add 10 per Cent				263 " "
	For 30 miles	R. S.			3000 " "
	For 120 miles	"			12000 " "

Wm Underhill

Wynaad Calicut Railway

Estimate No 8

Locomotive Work shop Fittings for 120 miles

Quantity	Particulars 19	Rate £	Amount £	Total £
2	Horizontal Engines and Cornish Boilers Feed pumps and fittings with gun metal working Parts	300 ..	600 ..	
2	3 inch shafting 80 ft with wall bearings Brackets &c	40 ..	80 ..	
2	16 inch Lathes 5 ft. Centre self acting, screw cutting	130 ..	260 ..	
2	do 8 ft do do	75 ..	150 ..	
2	Radial drilling machine with drills, tools, Stable Complete	115 ..	230 ..	
2	Bench drilling machine with fast and loose Pulley	20 ..	40 ..	
2	Steam Hammer & Anvil	125 ..	250 ..	
2	screwing machine	50 ..	100 ..	
2	Tube and Bolt screwing machines with cutting off apparatus affixed to large machine up to 6 Inch with extra set of dies Complete	35 ..	70 ..	
2	do with adjustable dies up to 1½ inch diam with extra set of dies complete	16 ..	32 ..	
2	Sets of stocks and dies with worth threads fitted into case up 1 inch diam Taper second smaller tap to each size in oak case	47 ..	94 ..	1906 ..
	Carried forward			1906 ..

	Brought forward			1900 - -
2	Vice bits and Chisels &c	35 - -	70 - -	
8	Eight Sets of Smiths tools and anvils	15 - -	120 - -	128
8	do Smiths Fires with Iron with hoods	165 -	130 - -	
8	do Portable Forges	5 - -	40 - -	
2	Hydraulic Presses for wheels setting & unsetting	35 - -	70 - -	
2	do for Smiths use	50 - -	100 - -	
400	Four hundred Set of Slitting	1 - -	28 - -	
2	Slotting machine	90 - -	180 - -	
2	Planing machine	80 - -	160 - -	
2	Shaping do	15 - -	30 - -	
2	Fan with Driving Drum & Counter shaft pipes &c	60 - -	120 - -	
2	Grindstones Complete	20 - -	40 - -	
2	Mills for Boring Cylinders	60 - -	120 - -	
	Sundries	300 - -	300 - -	1408 - -
	Total for 30 miles of Railway			3614 -
	Total for 120 miles of Ry 3614 x 2½			£ 9035 - -
				13 - -
				10348 - -

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

W Anderson

Detailed Estimate No 6 Cabinet & Wynaad Railway

Construction Establishment for Cabinet & Wynaad Railway 120 Miles

No.	Particulars		Rate	Amount	Total
1	Chief Engineer		1200 —	1200 —	
	Travelling Allowance		150 —	150 —	
3	Assistant Engineers	each	600 —	3000 —	
	Travelling Allowance		100 —	300 —	
5	Engineering Assistants	"	100 —	500 —	
	Travelling Allowance	"	30 —	150 —	
10	Inspectors	"	100 —	1000 —	
	Travelling Allowance	"	30 —	300	
20	Sub Inspectors	"	45 —	900 —	
	Travelling Allowance	"	15 —	300 —	
12	Chief Engineers Writers		25 —	300 —	
4	Do Accountants		30 —	120 —	
1	Chief Store-Keeper		100 —	100 —	
1	Chief Engineers Office Manager	"	100 —	100 —	
25	District Writers	"	20 —	500 —	
5	Do Store Keepers	"	40 —	200 —	
5	Cook Keepers	"	40 —	200 —	
40	Peons & Boys	"	7 —	280 —	
	Total for 1 Month			9800 —	
	Total for 30 Months				294000 —

E Blenkinsop Lieut
Asst Engineer Nilgiris

Estimate No. 7

Calicut Wynaad Railway

Bridges on Wynaad Railway 120 Miles

	Particulars			Rate	Amount	Total
15	Waterways each 30 ft in the clear at			2000 "	30,000 "	
4	Do	40 ft	Do	" 3000 "	12,000 "	
4	Do	50 ft	Do	" 6000 "	24,000 "	
2	Do	60 ft	Do	" 8000 "	16,000 "	
2	Do	80 ft	Do	" 11,000 "	22,000 "	
2	Do	100 ft	Do	" 15,000 "	30,000 "	
1	1 Do	200 ft	Do	" 30,000 "	30,000 "	
8	1 Do	250 ft	Do	" 40,000 "	40,000 "	204,000 "
9	120 Miles Minor Waterway at Rs per mile			2000 "	240,000 "	240,000 "
			Total			444,000 "
	Add for Sundries 10 per cent					40,000 "
			Grand Total			£ 484,000 "

98

12.c

Detail Estimate. No 8 for One mile of Road
Myraadtans Colend Railway 2ft 6" Guage

Particulars	Rate	Amount	Total
30 lb Steel Rails			
167 Tons at £7-15-0 at £5.4 per ton	Rs	93 " "	4581 " "
Fish plates & Bolts 23/4 tons at £ 15 per ton	Rs	180 " "	495 " "
Dog spikes & Fang Bolts One ton at £16	Rs	216 " "	216 " "
Carting up Country Lay for 30 miles Rs 15 per ton			
Bringing out & fitting together		15 " "	200 " "
Laiding Lay Rs 5 per ton		5 " "	111 " "
Freight & insurance	Rs	30 " "	1410 " "
Sleepers 2016 (Jungle wood) @ Re		1 " "	2016 " "
Total Rupees			9059

One mile of Woods patent Steel
Sleepers at 2000 each 23 lbs to the
mile - 20½ tons) at £ 210 209 " "
Clasp Chains Lay 5 tons at £ 11 " " 55 " "
Freight 27½ tons at £ 2 10 " 68 " "
- 289 + 55 + 68 x 12 4944
2000 Keys at Rs 3 per 100 260
5204

W Ludlow Asst Engr
District Engineer Office

Detailed Estimate No 9 Wynaad & Calicut Railway

Probable Working expences for a Year.

Nos	Particulars	Rate per Annum	Amount	Total
1	Manager & Chief Engineer ... at	1500 " "		
	Do Travelling Allowance.	100 " "	1600 " "	
1	Locomotive Superintendent	850 " "		
	Do Travelling allowance	100 " "	950 " "	
1	Resident Engineer	850 " "		
	Do Travelling Allowance	100 " "	950 " "	
1	Chief Accountant	600 " "	600 " "	4100 " "
	Engineering Subordinate Establishment			
	Chief Engineers & Agent Staff Office			
1	Manager	100 " "	100 " "	
1	Accountant	50 " "	50 " "	
4	Do Writers	20 " "	80 " "	
1	Store Keeper	50 " "	50 " "	
20	Writers	20 " "	400 " "	
4	Draughtsman	30 " "	120 " "	
6	Peons	7	42 " "	842 " "
	Resident Engineers Staff			
3	Inspectors	120 " "	360 " "	
6	Sub Do	40 " "	240 " "	
6	Writers	20 " "	120 " "	
6	Peons	7 " "	42 " "	
1	Cash Keeper	40 " "	40 " "	
40	Maistries Platelayers	7 " "	420 " "	1224 " "

	Brought forward					6164 —
		6		1440		1440 —
	Gang					
	Traffic Department					
	T. M. Inspector	100 — —		100 — —		100 —
	T. M. Office Establishment					
	Clerks	20 — —		400 — —		440 —
	Accountant	40 — —		40 — —		
	1st Class Stations					
	C. in C.	at	60 — —	240 — —		
	Clerks	at	15 — —	30 — —		
	Signallers	"	15 — —	15 — —		
	Porters	"	6 — —	60 — —		
	Sweepers	"	5 — —	5 — —		
	Watchmen		4 — —	4 — —		466 —
	Night Watchmen		7 — —	112 — —		
	2nd Class Stations					
	C. in C.	at	20 — —	220 — —		
	Clerk & Signaller	"	15 — —	45 — —		
	Porters	"	6 — —	24 — —		
	Sweepers		5 — —	5 — —		294 —
	Watchmen		4 — —	4 — —		
	Additional Staff					
	Guards	at	25 — —	575 — —		
	Spare hands for Marshalling trains checking tickets, also available for guards if needed		20 — —	400		975 —
	Carried over					9853

	Brought forward					135 9853
	Locomotive Department					87
1	Foreman	at	250 — —	250 — —		
18	Drivers	"	80 — —	1440 — —		
20	Foreman	"	15 — —	300 — —		
4	Tellers	"	100 — —	400 — —		
20	Do.	"	40 — —	800 — —		
20	Odd hands	"	20 — —	400 — —		
10	Writers		20 — —	200 — —		
2	Store-Keepers		30 — —	60 — —		
10	Watchmen		7 — —	70 — —		3920 —
	Audit Staff.					
1	Office Manager		100 — —	100 — —		
20	Writers and Accountants		25 — —	500 — —		
4	Peons		7 — —	28 — —		
1	Travelling Inspectors of Accounts		60 — —	60 — —		688 —
	Total for 1 Month					14461 —
	Total for 1 Year					173532 —
	Total as per above				173532 —	
	Cost of Working 15 trains per day at Rs 12 per Train				65700 —	239232 —
	Add for Coaching, Merchandise, Collecting & Delivery of Materials 25 per cent					60000 —
	Add Contingencies 10 per cents					29000 —
	Grand Total.					328900 —

M Henderson

Calicut Wynaad Railway
Detailed Estimate № 10

Of Bridges for various spans up to
Average height of Masonry will be about 18 Ft. above
foundation and will amount to about 150 Cyds in
each Bridge.

	Particulars		Rate	Amount	Total
№ 1	5 ft. opening 50 Cyds at				
	Girders at				
	Fitting and erecting				
№ 2	10 ft. 70 Cyds at				
	Girders				
	Erecting				
№ 3	Masonry 150 Cyds at		5 " "	750 " "	
	15 ft. Span girders £30				
	plain	£ 2/32 } 32		384 " "	
1½	Tons Timber say			30 " "	
	Erecting			30 " "	1234 " "
№ 4	20 ft. girders £40				
2	Tons plain	4/44 X 12		528 " "	
	Masonry			750 " "	
	Timber			60 " "	
	Erecting			60 " "	1398 " "

30 ft: £80

	Tons Girder $\frac{8}{88}$ X 12	1056 " "	
	Plain Timber	100 " "	
	Erecting	130 " "	
	Masonry	750 " "	2036 " "
6	40 ft: Girders £1140		
	Plain $\frac{14}{154}$ X 12	1848 " "	
7	Tons Timber	130 " "	
	Erecting	200 " "	
	Masonry	750 " "	2948 " "
7	50 ft: Girder with		
	Cross Girder £ $\frac{330}{384}$ X 12	4608 " "	
14	Tons Timber	250 " "	
	Masonry	1000 " "	
	Erecting	510 " "	6368 " "
8	60 ft: Span Cross girder		
25	Tons and main Girders £ $\frac{500}{550}$ X 12	6600 " "	
	Timber	300 " "	
	Masonry	1000 " "	
	Erecting	750 " "	
			8060 " "

W Anderson

136

Wynaad Calicut Railway

Estimate No. 11

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

Particulars	Rate	Amount
Wires and Insulators 120 Miles at	90 " "	10800 " "
Magnetic dial Instruments for 12 intermediate Stations	500 " "	6000 " "
Do Ink recording Seement Patent for three terminal	680 " "	2040 " "
Tools for erecting		750 " "
Spare Materials		1200 " "
Iron Posts 120 Miles	420 " "	50400 " "
Erecting 120 ditto	75 " "	9000 " "
Cartage Do 120 ditto	50 " "	6000 " "
Clearing land say 20 Miles at 1 chain 160 acres @	20 " "	3200 " "
Total		89390 " "

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

G. Ludwell

Abstract Estimate No.

Showing approximate Quantities & Cost of Works & Materials required to Complete the 120 Miles of proposed Railway between Calicut — Wynaad — Manantoddy — Devalah.

Particulars	Amount	Total
Item No 1 Slapers — Best jungle wood For 120 Miles	24,920 " "	
Item No 2 Ballast for 120 Miles	6,050 " "	
Item No 3 Rails & Fastenings for 120 Miles	85,640 " "	
Item No 4 Extra cost for Rack Railway	2,11,200 " "	
Total for Permanent Way		1365810 " "
Item No 5 Earth work 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 " "	
		1287565 " "
Carried over		2641375 "

Brought Forward		2641375
Plate layers Tools		
For 120 Miles of Track — 60 Gangs		
Vide Detailed Estimate No 4	12000	
Locomotive Works Shops Fittings		
For 120 Miles		
Vide Detailed Estimate No 5	108420	
Construction Establishment		
For 120 Miles		
Vide Detailed Estimate No 6	294000	
Bridges		
Vide Detailed Estimate No 7	484000	898420
Grand Total		3539795
Cost per Mile of Furnished Road	29233	
Add cost of Telegraph line complete as per Estimate No 11		89300
Grand Total for 120 Miles Complete		3629095

128

W Anderson

India Office,
London, 9th February, 1882.

Public Works,
No. 8

To His Excellency The Most Honourable The Governor General of India in Council.

My Lord Marquis,

Para. 1. From the proceedings of the Madras Government noted in the margin,* which have lately been forwarded to me in connection with the improvement of the roads leading to the Wynaad Gold Fields, on which subject I had occasion to address that Government in my Public Works Despatch, No. 3, of 27th January 1881, I learn that your Excellency's Government has declined to grant a contribution from Imperial Funds towards the maintenance of the road leading from Ootacamund to Naduvatam in the Wynaad district.

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

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

I have the honour to be,
My Lord Marquis,
Your Lordship's most obedient humble Servant,
(Signed) HARTINGTON.

1-4-82.
2 Nilgiri. 7-5-81.
2170-9 Rr. 5-9-81.
2282 Rr. 14-11-81.
319 " 1-4-82.

No 1.

Public Works
9th Feb 1882.

Copy
Letter to the Govt of Madras

No 8

Rec'd 16th April

Endorsement.

No. 138 P.W.D.

Forwarded to the Govt of Madras in the P.W. Dept with the request that it may be stated what has been done, or what is now proposed in the way of improving communications via the Pyraad Pass.

By Order
G. Allan Major
Secy to Govt

Public Works Dept.
Ootacamund
21st April 1882.

Old 32-A
only 27 pages

Orig Copie

1889

No. 140

Read letter of Govt of Madras, 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'/2 feet, from Calicut to Manantoddy and Wynaad, via the Tamaracheri and Perriot Ghats. Beyond the fact that the cost of the line has been estimated at #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

of Government; the first being brought for-
ward by the Wynaad Planters' Association,
and the second by Messrs Burchells &
London. To neither of these 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 con-
struction of the line recommended by the
Local Fund Board of Malabar.

4. In the first place, the pro-
posed gauge of 2'6" feet is a mistake.
In view of the certainty that any line
which may be constructed to link
Wynaad with the West Coast will ul-
timately be extended to join existing
and proposed lines in Mysore and in
the Nilgiri district, there can be no
reasonable doubt that the adoption of

the metre gauge is obligatory.

5. In the second place, there is noth-
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 Karkur ghat.
(2) the Tholadi ghat.
(3) the Tamaracheri ghat.
(4) the Perriot ghat.
(5) the Kuttiadi ghat.
(6) the Periar ghat.

Of these, the Karkur ghat may probably
be struck out; partly on account of the
large quantity of bridging which would
be

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 Sultanpalliatam or Gudalur. - The result of my recent visit to Wynaad, in company with the Right Honorable the Governor, was

was to satisfy me that Gudalur, 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 85 3/4 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 Gudalur into connection with the Indian Railway system. Taking an average outlay of £ 50,000 per mile, the cost of this little extension would probably amount to about £ 14,00,000.

9.

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 Gudalur, 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 favour 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

143 892

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.

V. Manthwood

27 April 1882. Colonel R.E.

Con. Engineer for Railways

To

W. with papers returned.

(1882/83)

N.W.C. No. 3225.

No. collected.

17/5/82

Local Fund Board's Office (194)
Cotacamund 22nd May 1882.

No. 2.

From R. W. Barlow Esqre
President
Local Fund Board
Nilgiris

To Colonel A. H. Sankey R.E. C.B.
Chief Engineer
P.W. Department
Cotacamund

Sir,

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 Cotacamund to Neddivattum and Gudalur during 1879-80, 1880-81 and 1881-82, as stated by the Local Fund Engineer in his letter No. 186, dated 16th 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 ghaut roads in the District are under the superintendence of the Circle Board, they are maintained by Provincial Grants given by Government every year.

2

2. During 1880-81, owing to the bad state of the road from Cataca-mund to Seddiva-ttum, a Special Provincial grant of Rupees 2,000 for 1880-81 and 1881-82 was given; vide G.O. No 299, dated 21st February 1881. Under G.O. quoted above a contribution of Rupees 30,000- was contemplated to be provided in the Chinchona Budget for 1881-82 and liabilities have been incurred by the Local Land Engineer, in anticipation of such grant being made. No such grant was however provided in the Chinchona Budget, but a further sum of Rupees 2,000- from Provincial funds was allotted at the close of the past official year for the road in question; vide G.O. No 201, dated 6th February 1882. (a) (b)

3. The following sums were allotted to the road from Ootacamund to Seddivattum and Gudalur.

	Yearly Provincial Grant.	Special Provincial Grant	Total.
In 1879-80	6160--	--	6160--
-- 1880-81	3690--	10,000--	13690--
-- 1881-82	3080--	30,000--	33080--
Total =	12830--	40,000--	52,830--

Of which the yearly Provincial grants were spent on the whole line from Catacamund to Seddivattum and Gudalur in each of the above years. The Special Provincial grants

894 185

grants Rupees 40,000-- were only for the Construction of the portion from Catacamund to Seddivattum.

4. Rupees 25,878-3-4, were spent on the Seddivattum 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 Rupees 10,000- said by you, to have been made in the P.W. Department, quoted in the latter portion of para 1 of your letter, seems to be the grant given in G.O. No 2,821, dated 16th November 1881, for repairing the Communications leading to Wynaad Gold fields. Only a portion of it Rupees 4,500- was given for the repairs of the roads of this Districts.

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

	Rs.	As.	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	--	--
Amounts Contemplated to be given in para 3 of your letter under reply	64,000	--	--
Total Rs =	82,621	12	8
Add maintenance Grant for 1882-83.	3080	--	--
Grand Total Rs	85,701	12	8
Add	16,000	--	--
Rs	101,701		

Wrong - If Rs 16000 to be granted as alleged Proper it was assumed that Work will go to the Estimate Grant of Rs 16000 to be required by the Person for Work for which Estimate to Date but they ended not Completed now the reason

RBH

I have the honor to be
Sir
Your most obt. Servt.

O. H. Oglesby

President
L. F. Board
Illinois

Pr Encl 3161.

From.

R. H. Barlow Esqr
President
L. F. Board
Silgiris

To Col R. H. Sankey R.E. C.B.
Chief Engineer P.W.
Ootacamund

No 2.

Dated 22nd May 1882.
Rec. 24/5

Subject.
Grants Provincial Rs

Stating what will be available for expenditure on the road from Ootacamund to Kotagherry during 1882-83

OLS. 31/5

Local Funds Board's Office
Ootacamund 23rd May 1882.

No 3. From R. H. Barlow Esqr
President
L. F. Board
Silgiris

To Colonel R. H. Sankey R.E. C.B.
Chief Engineer
P. W. Department.
Ootacamund

Sir,

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 para 2. of his letter states that Rs 1,500 allotted by the Superintending Engineer 4th Circle for the repairs of the Communications leading to Wynaad Gold fields was subsequently withdrawn, but he is not aware of that the Circle Board have, on the instruction of the Accountant General, taken credit for this amount into their accounts from Provincial Funds.

I have the honor to be
Sir
Your most obedt Servt

President
L. F. Board Nilgiris

Local Fund Engineer's Office
Coimbatore 21st May 1882.

No 13. 148 1799

From

J Ashburnhey Esqr C.E.
Local Fund Engineer
Nilgiri District
Coimbatore

To R.W. Rawlins Esqr
President
Local Fund Board
Nilgiris

Sir,

In reference to your endorsement dated the 20th Instant on letter No 117 E dated the 17th Idem from the Chief Engineer P.W.D to your address I have the honor to report that the figures given in my letter No 186 dated the 15th March/82 do not include the promised Grant of Rs. 20,000 from Cinchona 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 1st February 1882 No 224.

The grant of Rupees 10,000 made by the P.W.D in the last Official year and referred to at the conclusion of para one of the Chief Engineer's letter under reference is I think, the special grant for the repair

repair of the road from the head of the Tambrachery Ghaut towards South East Wynaad and the Nilgiris vide G.O dated the 16th November 1882 W. The Superintending Engineer IV Circle allotted 4,500 Rupees 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).

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 P.W.D in 1879-80. This amount should not strictly be included in grants for completing the formation of the road which is naturally a new work. If this amount is excluded as I think it should be, the Grants up to date amount to Rs 14,000- as follows.

G.O. P.D. dated 21st February 1881 No 299
For Expenditure in 1880-81 ——— Rs 10,000—
Do 1881-82 ——— " 10,000—
Total Rs 20,000—
G.O P.D. Dated 4th July 82 No 2041
For Expenditure in 1881-82 ——— " 4000
Total Grant Rs 14,000—
Do Expenditure in 1880-81 was Rs 2369-11-7
Do 1881-82 " — 2508-5-3
Total Expenditure to end of 1881-82 = 25878-3-4

Leaving

14121-12-8
1498
149

Leaving Rupees
Of existing Grants available for
Expenditure in 1882-83
Adding to this the Grant of Rs 64,000—
which the Chief Engineer
hopes to assign in the current year.
we shall have exactly Rs 78121-12-8
for expenditure on the road in question in
1882-83 and if the Superintending Engineer
IV Circle recalls Rs 4,500— out of 5,000—
sanctioned in G.O. dated the 16th November
1881 No 2821 W. the total amount avai
=lable for expenditure in the current year
will be Rupees 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 Neddivattum, 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 dis-
=tribution.

Road from Ootacamund to Neddivattum Rs 50,000—
Do - from Neddivattum to Gudalur - 12,000-
Do - from Nadgany to Devalah - 10,500
Do from Kotagiri to Mettupalaiam 10,000
Total Rs. 82,500

I beg to suggest that this
proposal

proposal be submitted to the Chief Engineer.

I have &c
(signed) J. Ashanghnessy Lt
Executive Engineer
L. F. Board
Algiers

(Wr. Sy 3.5.82)

Approved

President
L. F. Board
Algiers

L. F. Board's Office
Ahalamaweed
3rd May 1882.

No. 12 C
E. W.

Supg Engineer's Office. 4th
Camp Ahalamaweed 24th May

150

From,

The Superintending Engineer
4th Circle

To,

The Chief Engineer
P. W. D.

Sir,

With reference to G. O.
No 1190 W dated 10th May 1882, I
have, as requested in para 6 of
the Order, the honor to report
that I consider without some
rearrangement of Divisions
and Charges I cannot recom-
mend that the P. W. Department
should undertake the works
proposed

working them entirely through
a Sub Officer is very unsatisfac-

3. I would recommend the
a new Division Consisting of the
Nilgiri District and the Wynaad
should be formed and that the
present West Coast Division
be made a 3° 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 Division is I believe
a final settlement of the Establish-
ment.

4. As this is the Case
I can only propose a

Rearrangement

proposed to be carried out
the Nilgiris.

At present the Executive
gineer has charge of the South
nara, Malabar and Nilgiri
istricts his head quarters are
t Calicut it takes him 2
ays to go from there to Ootaca-
mund and to visit the Stations
on the Coast he has a rule to
go by steamer as this is the
case he cannot give that attention
to the works on the Nilgiries
that is advisable and I would
depreciate any more work being
added to his charge as of course

working

rearrangement of the Charges
the present Divisions and
though I regret it much I
see no cause to follow but
recommend that that the
present West Coast Division be
made the Nilgiri Division to
consist of the Nilgiri 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

152 8467

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
2nd Class one should be made a
1st Class one. The new Nilgiri
Office can however be made 3rd Class
in place of the West Coast 2nd 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

attached to the Coimbatore Division as the account work in it will be enormously increased.

7. With regard to Establishment the following shews what I would propose the differences are but small.

Divisions	Sub Divisions at present.	Executive Engineer	Assistant Engineer	Upper Subordinates	Establishment
West Coast	3.	1	2	12	
Coimbatore.	2	1	1	5	
Total	5	2	3	17	

Proposed.

Nilgiri	1			4	
Coimbatore.	5	1	3	12	
Total.	5	2	3	16.	

Note 1 Upper Subordinate is to be employed in North Arcot Dn where owing to the abandoned Talookas being taken up. 6 in place of 5 Upper Subordinates are absolutely necessary.

I do not consider the Nilgiri Division will require a sub Division and 4 Upper subordinates should be ample even with the extra work proposed to be taken up. At present there is a Sub Officer and 2 Upper Subordinates.

The 5 Sub Divisions in Coimbatore would be as follows:-

1st Mangalore in charge of an Assistant Engineer and 1 Overseer as the 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 Head quarters an Assistant Engineer should be in Charge.

Cannanore

2d 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.

3d Calicut in charge of an Assistant Engineer with 3 Upper Subordinates.

This Charge is the Head quarters of the Revenue Department there are 3 military Stations in it Calicut Mattiapuram and Pulon and many Civil building it will be a most important sub division-

Coimbatore

4th Coimbatore an Upper Sub-ordinate in charge of the Sub-Division with 2 Overseers it will include the Station of Coimbatore the Noyel and Ambravatty upper irrigation-

5th Erode Sub Division Assistant Engineer in charge with 3 Overseers.

This will be a most important sub Division comprising the Sattyamungalom Channels the Kalingarayen 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 of I think the best time for the changes

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 para 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 1880 (+ Not received in office 25/5) It will I have but little doubt be necessary for the Estimates sanctioned by the Local Fund Board for the road from Ootacamund to Godaloor 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 1st Class line of Communication and judging from the work done in the 1st 3 miles this most

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 Nilgiri ghaut to Ootacamund being placed under charge of this Department being considered. I think the whole line from the foot of the Ghaut to Ootacamund to Godaloor and eventually to Devallah and Lakkady to the foot of the Coombacherry Ghaut should eventually be a Provincial line under charge of the

D. D. Works and that this line should be made 1st 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 Nilgiri ghaut to Godaloor might be taken up for that portion from the foot of the Ghaut 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.

I have the honor to be.
Sir,
Your Most Obt. Servant

W. Reid Lt Col RE
Supg. Engineer

P. Cons 3813

From

The Secretary to Govt

4th Circle

To The Chief Engineer

& W.D.

Dated 24th

Rd. 6/63 May/82

No. 12C
E.W.

Reports that without
some rearrangement
of Divisions & Charges
the P.W. Department
cannot undertake the
works proposed to be
carried out on the
Nilgiries.

Pub. 35/0

X

No. 1416 W

158

PUBLIC WORKS DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 6th June 1882

Read the following:—

Note by the Chief Engineer N.D. (M.C.)	dy 23d January 1882	
Proceedings, Financial Dept	" No. 319 dy 1st April "	
Endorsement of the Govt of India on Despatch from the Secy of State for India No. 8 dy 9th February 1882.	" " 138 C dy 19th " "	
Note by the Consg Engr for Rys	" " dy 27th " "	
From the President, Nilgiri L.S. Board	" 2 dy 22d May "	
Do do	" 3 dy 23d " "	
From the Sec. IV Circle	" 12C/EW dy 24th " "	

In a Memorandum dated 23d 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 calcu-
-lated at 17 3/4 lakhs
of Rupees; and the Consulting
Engineer for Railways subm-
-its a Note under date
the 27th April 1882 on the
proposals embodied in
GO 319 dated 1st April
1882 (Financial) for opening
up the Wynaad by means of

Railways.

3 As regards the
proposed railway develop-
-ment, the Right
Honorable the Governor
in Council concurs
generally in the views

& No. 8 Public Works
dy 9th February 1882

& 189

on a Despatch from the
Secretary of State enquiring
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
& planting
& industries

of the Consulting Engineer for Railways as to the direction which any new lines should take - Here is, ~~Land~~, no prospect of Provincial Funds being in a position to meet the cost of the Extension from Gundulpett to Gudalur, and should this Extension be called for - the work will have to be under-taken as an Imperial one -

4. So far as can be forecasted at present Provincial aid must be restricted to the completion of the existing line from Nilgiris to Gudalur, through the Nilgiris Government Dee Pit- ~~Strict~~ the portion within their own territory to the frontier near Lipparkadu this Government would be prepared to give the Subject their most- Serious Consideration

completion of the Kota-
-cammed, Nedivatum
and Gudalur road, with
eventual Extension to
the heads of the Karkur
and Tambracherry -
Fairly large
Ghats - Considerable
sums have already
been granted for this
work, and during the
current official year -
large appropriations have
either been made or
promised -

5. It would appear that
there is at present availa-
-ble with the L. F. Board
an unexpended balance

from previous grant of Rs 14,122,
that the
Financial Deptt
have assigned from
Provincial Funds
to the Nilgiri
Circle a sum of " 50,000,
and that a
further contribution
of Rupees — 40,000
was recently
promised by the
PW Department;
making a total
of Rupees 104,122
for expenditure during
the current offeicial
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 Supt.
Engineer 4th Circle,
that the main line of
communication from
Mettapollium to Gudalur
should be resumed by
Govt will therefore be
carried into effect at
once. The assignment
of Rs 50000 made in
the Financial Deptt will
be reserved for this purpose,
and the unexpended
balance of Rs 14122 in
the hands of the Local
Fund Board will be
similarly employed. The
sum available for im-
mediate expenditure on
this main line of

for original works
communication will thus
be Rs 64122. Seeing that (7)
labor has to be organized
and a new Division to be
formed as sanctioned below,
it will not probably be
practicable to utilise a
much larger sum.

11. The grant of Rs 40000
held in reserve in para 2
of GO. 1190 W dated 10th
May 1882 will now be
resumed - the appropriation
of Rs 10,000 is however made
from the Provincial Reserve
for the Kotagherry Glenn
road to be expended
by the Local Fund Board. — or by the PW Depart 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
Nilgiri 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 Nilgiri 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 now
as proposed in para 7
of his letter No 12C dated 6 W.
24th May 1882. The
Coimbatore Division will
be raised from the
2nd to the 1st class
and the Nilgiri Division
will be allowed an
establishment at the
special rates of pay
shown below

1 Clerk	3 Class	2° grade		60	60
1	"	4th	1st	"	40	40
2	"	4th	2nd	"	30	60
1 Draftsman		1st Class			50	50
1	"		2nd	"	35	35
1 Messenger					9	9
1	"				8	8
						262.

9 the proposal of the Supg Engineer to grant a special batta allowance to this Establishment equivalent to 3/10 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 Supg Engineer will carry out the details of the arrangements now

So as to take effect ~~not exceed by the least~~ ~~not Capture than the~~ ~~first of the~~ 1st August 1882. 16

No. 1417W dy 6th January 1882

Copy of the above forwarded to the Govt of India with reference to their endorsement No. 138 C dy 19th April 1882. and No 407 RE dy 6th May 1882.

31/5/82

S.E. 4th Circle ✓
C.E. for Rys. ✓
Ex. P.W. Secty. ✓
Financial Dept ✓
C.E.P.W. Bapatla ✓
Date 13/7/82

7.C

a. IIII/4 B.S.R.

12-82

20-11-94

1-3-96

8-6-96

13-9-16 √

6-X-17 √

original

G.O. № 1416-7 W 6-6-82