ublic Works (1898) Department.

Note Portion of file removed & kept [illegible]
in C dep. [illegible]

G.O., No. 3209 W

DATED 15th Dec' 98

17/12/98

[Despatch Abstract.]

Anamalai Roads.

Passing orders on the Inspection Notes of the Chief Engineer, regarding the ———.

120/U

3/13

Indexed.

[P. W. 26.
1,000—12-2-98.]

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	D
4902	C	do	7.11.98				
4330	C	do	8.10.98				
974	D	do	22.9.98				
904	D	do	31.8.98				
897	D	do	30.8.98				
777	D	do	8.8.98				
744	D	do	3.8.98				
3191	C	do	16.7.98				
550	D	do	1.7.98				
429	D	do	7.6.98				
		ebc					

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

To be substituted for the G.O. of the same number and date.

BUILDINGS AND ROADS.
CIVIL WORKS.

Government (1898) of Madras.
PUBLIC WORKS.

Recd. } 1898. *Enclosures*
Regd. *Spare copies*

G.O., No. 3209 W., 15th December 1898.

DECEMBER.

Anamalai Roads

Passing orders on the Inspection notes of the Chief Engineer regarding the —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following paper :—

Inspection Notes by the Chief Engineer, P.W.D.

From 17th to 26th October 1898, I inspected the various routes proposed for cart-roads through the Anamalai Hills, in Coimbatore district, to open them up for planting. The objects of my inspection were—

(1) to decide on the route for the cart-road up the ghât;
(2) to decide on what further extension was needed and the route thereof;
(3) to discuss the whole question with the Collector, the Forest department and the planters.

I started from Angulkurchi, four miles north of the Auliar river, on 19th October, went up the Prince of Wales Ghât to Punachi, thence onwards to Paralai and part of the way to Sirukundru. I then turned west to Valparai and returned to Angulkurchi on October 26th *viâ* the Villani pass and valley. I was accompanied throughout by the Superintending Engineer (Mr. Garrett) and the Executive Engineer (Mr. Loam).

2. I saw the Collector and the Conservator of Forests at Coimbatore, and endeavoured to obtain their views on the route to be followed by the cart-road. The Collector had no very pronounced views on the matter, but rather inclined to the Villani valley route, as leading more directly into the centre of the planting districts. The views of the Conservator of Forests will be found in the attached demi-official letter, dated 22nd October 1898, and I may say that the proposals I make further on will fully meet them.

3. I made the following notes during my tour :—

(1) *Angulkurchi Rest-house.*—This is under the Coimbatore District Board, and is situated four miles from the Auliar river and the foot of the hills. It is a poor building consisting of three small rooms, with no out-houses. If a new rest-house is built here the existing rooms will do for godowns but the site is not suitable, being too close to the village, and when this planting district is more developed it will, I think, be advisable to build a new rest-house nearer the river.

(2) *Road from Angulkurchi to Velandorai (Auliar river).*—This is under the charge of the District Board and is on the point of being repaired. It is now just passable for carts and no more. It has two bad grades in it at about 10 and $10\frac{5}{8}$ mile which should be realigned by diversions eastwards; the former will be difficult, the latter easy. This should be done by the District Board, as both gradients are too steep for ordinary traffic, and will limit the weight of loads up the ghât.

(3) *Bridge across Auliar river.*—The site for this has been judiciously selected by Mr. Garrett, at a wide place, where flood water will have free passage, and where the foundation will be on solid rock throughout. The bridge will consist of 7 spans of 66 feet, and the iron work has already been ordered from Burn & Co. of Calcutta. Preparations for the construction of the bridge should commence at once so as to take full advantage of the dry season, *i.e.*, debris should be cleared from the site, and thrown down stream, the rock should be benched or blasted to take abutments and piers and materials collected. A good deal of stone is already at site, supplied at the moderate rate of Re. 1 per cubic yard. Some of it is good, but there is a good deal of inferior stuff, consisting of the outside decayed layers of gneiss. This should be rejected for the masonry, and only used for dry stone work.

(4) *First $3\frac{1}{2}$ miles of Ghât road.*—The construction of this road has already commenced under the orders given in G.O., No. 781 W., dated 23rd March 1898. It is in charge of Mr. Brodie, temporary Assistant Engineer, and starts from the river bank. In all side long ground the road should slope inwards at 1 in 25 to the inner drain, which should be dug to full dimensions and the earth carefully sectioned and rammed to this slope before metal is laid. The metal being broken is very fair in quality, but too big. It *must* be small enough to pass through a $1\frac{1}{2}$-inch ring in any direction. It should be laid 12 feet wide, not $12\frac{1}{2}$ feet as provided in the estimate, and 6 inches thick. All dry stone revetment work should be *most carefully* done. Too much trouble cannot be spent on this class of work, on which the stability of the road so largely depends. The width of the base of every revetment should be, as nearly as possible, half its height, the largest stones should be laid at the foot in a trench dug for the purpose, all interstices should be packed with small stone, the revetment built true to the required batter, and the earth backing behind not thrown in anyhow, but laid in 6-inch layers, sloping *away* from the revetment, and most carefully rammed and watered.

If these instructions are followed, the revetments will give no trouble, otherwise they will be a constant source of worry and expense. The proposed road-dam over small river at about quarter mile must be converted into a bridge of one span, as the river is said to frequently come down in flood and be impassable. The two wooden bridges in this length must be replaced by steel girders of about 35 feet and 30 feet span, respectively.

There are one or two portions in the third and fourth miles which require realizing. This should be carefully attended to.

(5) The above length of $3\frac{1}{2}$ miles is common to both the Punachi and the Villani valley routes. From this point onwards the route for the cart-road has still to be decided. I went up by the Punachi route and down by the Villani route.

(6) *Punachi route—(a) From $3\frac{1}{2}$ miles to Punachi $3\frac{1}{2}$—11 miles.*—There is some difficult country to traverse, especially in the fifth mile, where much heavy revetment work is needed. Where there is rock cutting or high revetments, the road should be only 10 feet wide—where the footings for revetments are precarious, they should always be blasted out, and the lower 3 feet of the revetment built in mortar.

Mr. Loam has already done a lot of widening and revetment work on this trace in 6th and 7th miles. The bridge at $\frac{7}{7}$ should have its centre pier removed and one (steel girder) span thrown across resting upon the existing dry stone abutments, which should have the upper three feet removed and relaid in mortar with bed stones for the girders. Every effort should be made to get as flat a grade as possible by realigning in places. The upper part of this length presents no difficulty.

(*b*) *From Punachi to Paralai* 11 *to* 20 *miles.*—This length runs through jungle throughout, except where it crosses the waterfall coffee estate and presents no difficulty whatever. A right of way 66 feet wide extends through the estate which will not be utilized to any great extent by the new road. It has been planted up with coffee, and the owners of the estate should be requested to exchange this area for the land required for the road. The trace for the road has not been completely aligned yet, and I have suggested an alternative route for the last three miles, and given instructions to have it surveyed at once. If found practicable it will shorten the line. The bridle path is very rough in places especially from 14 to 17 miles, and has never been properly made or maintained. Until the road is made I propose to give Mr. Marsh, the Managing Superintendent of Paralai estate, Rs. 1,000 per annum to maintain the bridle path in good order from its starting point about one mile from the Auliar river, to Paralai—Rs. 2,000 should be included in the estimate for this purpose.

(*c*) *From Paralai to Sirukundru* 20 *to* 31 *miles.*—I could only see three miles of this length, being stopped by heavy rain and swollen rivers. The part I saw presented no difficulty, and I was assured by Mr. Loam that the remaining portion was equally easy. The new rest-house at $\frac{20}{5}$ was sufficiently far advanced to enable

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following paper :—

Inspection Notes by the Chief Engineer, P.W.D.

From 17th to 26th October 1898, I inspected the various routes proposed for cart-roads through the Anamalai Hills, in Coimbatore district, to open them up for planting. The objects of my inspection were—

(1) to decide on the route for the cart-road up the ghât;
(2) to decide on what further extension was needed and the route thereof;
(3) to discuss the whole question with the Collector, the Forest department and the planters.

I started from Angulkurchi, four miles north of the Auliar river, on 19th October, went up the Prince of Wales Ghât to Punachi, thence onwards to Paralai and part of the way to Sirukundru. I then turned west to Valparai and returned to Angulkurchi on October 26th *viâ* the Villani pass and valley. I was accompanied throughout by the Superintending Engineer (Mr. Garrett) and the Executive Engineer (Mr. Loam).

2. I saw the Collector and the Conservator of Forests at Coimbatore, and endeavoured to obtain their views on the route to be followed by the cart-road. The Collector had no very pronounced views on the matter, but rather inclined to the Villani valley route, as leading more directly into the centre of the planting districts. The views of the Conservator of Forests will be found in the attached demi-official letter, dated 22nd October 1898, and I may say that the proposals I make further on will fully meet them.

3. I made the following notes during my tour :—

(1) *Angulkurchi Rest-house.*—This is under the Coimbatore District Board, and is situated four miles from the Auliar river and the foot of the hills. It is a poor building consisting of three small rooms, with no out-houses. If a new rest-house is built here the existing rooms will do for godowns but the site is not suitable, being too close to the village, and when this planting district is more developed it will, I think, be advisable to build a new rest-house nearer the river.

(2) *Road from Angulkurchi to Velandorai (Auliar river).*—This is under the charge of the District Board and is on the point of being repaired. It is now just passable for carts and no more. It has two bad grades in it at about 10 and $10\frac{5}{8}$ mile which should be realigned by diversions eastwards; the former will be difficult, the latter easy. This should be done by the District Board, as both gradients are too steep for ordinary traffic, and will limit the weight of loads up the ghât.

(3) *Bridge across Auliar river.*—The site for this has been judiciously selected by Mr. Garrett, at a wide place, where flood water will have free passage, and where the foundation will be on solid rock throughout. The bridge will consist of 7 spans of 66 feet, and the iron work has already been ordered from Burn & Co. of Calcutta. Preparations for the construction of the bridge should commence at once so as to take full advantage of the dry season, *i.e.*, debris should be cleared from the site, and thrown down stream, the rock should be benched or blasted to take abutments and piers and materials collected. A good deal of stone is already at site, supplied at the moderate rate of Re. 1 per cubic yard. Some of it is good, but there is a good deal of inferior stuff, consisting of the outside decayed layers of gneiss. This should be rejected for the masonry, and only used for dry stone work.

(4) *First $3\frac{1}{2}$ miles of Ghât road.*—The construction of this road has already commenced under the orders given in G.O., No. 781 W., dated 23rd March 1898. It is in charge of Mr. Brodie, temporary Assistant Engineer, and starts from the river bank. In all side long ground the road should slope inwards at 1 in 25 to the inner drain, which should be dug to full dimensions and the earth carefully sectioned and rammed to this slope before metal is laid. The metal being broken is very fair in quality, but too big. It *must* be small enough to pass through a $1\frac{1}{2}$-inch ring in any direction. It should be laid 12 feet wide, not $12\frac{1}{2}$ feet as provided in the estimate, and 6 inches thick. All dry stone revetment work should be *most carefully* done. Too much trouble cannot be spent on this class of work, on which the stability of the road so largely depends. The width of the base of every revetment should be, as nearly as possible, half its height, the largest stones should be laid at the foot in a trench dug for the purpose, all interstices should be packed with small stone, the revetment built true to the required batter, and the earth backing behind not thrown in anyhow, but laid in 6-inch layers, sloping *away* from the revetment, and most carefully rammed and watered.

If these instructions are followed, the revetments will give no trouble, otherwise they will be a constant source of worry and expense. The proposed road-dam over small river at about quarter mile must be converted into a bridge of one span, as the river is said to frequently come down in flood and be impassable. The two wooden bridges in this length must be replaced by steel girders of about 35 feet and 30 feet span, respectively.

There are one or two portions in the third and fourth miles which require realizing. This should be carefully attended to.

(5) The above length of $3\frac{1}{2}$ miles is common to both the Punachi and the Villani valley routes. From this point onwards the route for the cart-road has still to be decided. I went up by the Punachi route and down by the Villani route.

(6) *Punachi route—(a) From $3\frac{1}{2}$ miles to Punachi* $3\frac{1}{2}$—11 *miles.*—There is some difficult country to traverse, especially in the fifth mile, where much heavy revetment work is needed. Where there is rock cutting or high revetments, the road should be only 10 feet wide—where the footings for revetments are precarious, they should always be blasted out, and the lower 3 feet of the revetment built in mortar.

Mr. Loam has already done a lot of widening and revetment work on this trace in 6th and 7th miles. The bridge at $\frac{7}{7}$ should have its centre pier removed and one (steel girder) span thrown across resting upon the existing dry stone abutments, which should have the upper three feet removed and relaid in mortar with bed stones for the girders. Every effort should be made to get as flat a grade as possible by realigning in places. The upper part of this length presents no difficulty.

(*b*) *From Punachi to Paralai* 11 *to* 20 *miles.*—This length runs through jungle throughout, except where it crosses the waterfall coffee estate and presents no difficulty whatever. A right of way 66 feet wide extends through the estate which will not be utilized to any great extent by the new road. It has been planted up with coffee, and the owners of the estate should be requested to exchange this area for the land required for the road. The trace for the road has not been completely aligned yet, and I have suggested an alternative route for the last three miles, and given instructions to have it surveyed at once. If found practicable it will shorten the line. The bridle path is very rough in places especially from 14 to 17 miles, and has never been properly made or maintained. Until the road is made I propose to give Mr. Marsh, the Managing Superintendent of Paralai estate, Rs. 1,000 per annum to maintain the bridle path in good order from its starting point about one mile from the Auliar river, to Paralai—Rs. 2,000 should be included in the estimate for this purpose.

(*c*) *From Paralai to Sirukunaru* 20 *to* 31 *miles.*—I could only see three miles of this length, being stopped by heavy rain and swollen rivers. The part I saw presented no difficulty, and I was assured by Mr. Loam that the remaining portion was equally easy. The new rest-house at $\frac{20}{5}$ was sufficiently far advanced to enable us to occupy it. It is built of stone in mud, the former being small and unsuitable, but the walls have stood well through an exceptionally heavy monsoon. The outside walls should be plastered with Portland cement, except those in the verandah, which should be done with lime mortar as also the inside walls. Ground at back of building to be removed for a width of 12 feet. The building should be completed as soon as possible, and the whole place tidied up.

(7) *Villani route.*—I marched through easy country from Paralai to Valparai, the head-quarters of Messrs. Finlay, Muir & Co., a distance of $6\frac{1}{2}$ miles, a bridle path exists here already which can, easily and economically, be converted into a road if ever considered necessary. From Valparai I marched over the Villani pass to the Auliar river, along the approximate route which would be taken by a cart-road. The distance is about 19 miles, so that it is somewhat shorter than the Punachi route to Paralai and about seven miles shorter than the Punachi route to Valparai. The country to the south of the pass, *i.e.*, on the Valparai side, is easy enough for the first seven miles. The remaining four are very difficult, traversing steep and rocky ground, and the trace would have to be realized to the eastward if a cart-road is ever made here. North of the pass, which is about $9\frac{1}{2}$ miles from the river, the country is more or less difficult the whole way down. Precipitous sides, sheet rock, huge boulders, and heavy timber make the construction of a cart-road impossible except at great and prohibitive expense, and all idea of doing so must be abandoned. The views of the planters on the matter were naturally in consonance with their own interests. Those at Paralai and the neighbourhood wanted the Punachi route, those at Valparai the Villani route. I came to the conclusion that the best solution of the difficulty, the only possible one, in fact, as far as a cart-road is concerned, is to make a cart-road up the Punachi route to Paralai, and a bridle path $4\frac{1}{2}$ feet wide in the solid up the Villani route to Messrs. Finlay, Muir & Co's. boundary. The latter will provide the shortest possible route into the heart of the district for equestrians, pedestrians and pack bullocks, and will well repay its cost, which should not exceed Rs. 10,000. The present trace will require realigning here and there on the north side of the pass and from $\frac{7}{5}$ to 10 on the south side.

(8) I therefore recommend that sanction be given to—

(1) the construction of a cart-road from the Auliar river to Paralai, a distance of about 20 miles, the estimates for this are nearly ready, and will amount to between 3 and $3\frac{1}{2}$ lakhs including the bridge over the Auliar;

(2) the construction of a bridle path from Auliar river to Messrs. Finlay, Muir & Co's. boundary up the Villani valley—approximate cost Rs. 10,000;

(3) the grant of Rs. 1,000 per annum until (1) is completed for the maintenance of the existing bridle path between the Auliar river and Paralai *viâ* Punachi.

There is a grant of Rs. 50,000 for this work in the current year, and I propose to provide a grant of Rs. 2,50,000 in the coming year.

(9) It is, however, impossible for the road to stop at Paralai. These British Anamalais are a magnificent country, with soil, climate and conditions all favourable to the growth of coffee, and perhaps of tea. If they are traversed from end to end by a good cart-road, so that they can be thoroughly opened up they have a great future of prosperity before them, in which the state will have its share in proportion as it aids in the development. I strongly recommend, therefore, that the road be continued right through the planting district to Mount Stuart, where another outlet to the plains already exists. The best line for this extension will have to be carefully considered. I append two tracings—one on a large scale with some possible alternative routes shown in blue pencil and the other on a small scale showing the road to Paralai and Sirukundru in a firm red line, and proposed extensions in dotted red. Both tracings show the land already occupied.

(10) Mr. Loam has already, according to his instructions, continued the trace to Sirukundru in the extreme south of the district. This route skirts most of the blocks already occupied, and he has selected it because—

(1) the line is easy and cheap;

(2) it avoids 2 or 3 bad river crossings;

(3) it benefits the Forest department, which has extensive timber reserves in the neighbourhood of Sirukundru. The line is, therefore, in every way favourable, except that it does not traverse the heart of the district. There is little doubt, however, that if it was made planters would connect their estates with it by branch roads. I therefore think that it may be the best one to adopt. I have shown two possible alternative routes on the tracings—one passing through Valparai and then trending south-west to join the above-mentioned trace west of Sirukundru and the other running south-west from Paralai. Both would be useful lines and a final selection can only be made after further investigation.

(11) If Government approves of my proposal to extend the line to Mount Stuart, the line therefore will also have to be investigated. I have entered a possible one on the tracing. For this investigation work, and for the construction work proposed in paragraph 8, an experienced officer will be required, who is willing to take up the work, which will entail a great deal of exposure. I have found such an one in Mr. Wood, at present in charge of the West Coast division, and I propose placing him in charge when Mr. Loam goes on the furlough which has just been granted to him. The charge will be an important one and should form a temporary division with head-quarters of its own at Punachi.

I take this opportunity of recording my opinion that Mr. Loam, during the two years he has been in charge of these Anamalai roads, has done a great deal of hard work, which will all come in useful if the proposals above made are accepted. He has had exceptional difficulties to contend with in a most inaccessible country and has overcome them in a very creditable manner. He certainly in no way deserves the strictures which have been passed upon him by planters who have more assurance than knowledge, and who should, on the contrary, have been exceedingly grateful to him for his persistent and successful efforts to keep down the price of labour.

* * * * *

(Signed) W. B. deWINTON,
Chief Engineer.

29th November 1898.

ORDER—No. 3209 W., dated 15th December 1898.

The recommendations in paragraph 3 (8) of the Chief Engineer's note recorded above are sanctioned, and the Superintending Engineer, IV Circle, will take the necessary action thereon.

2. The proposal in paragraph 3 (11) to extend the line to Mount Stuart is approved, and it should be investigated accordingly.

3. Preparations for the construction of the bridge across the Auliar river should commence at once, and the Superintending Engineer will carefully carry out the Chief Engineer's instructions in paragraph 3, clauses (3), (4) and (6).

(True Extract.)

(Signed) W. B. deWINTON,
Secretary to Government.

To the Superintending Engineer, IV Circle.
" Examiner, Public Works Accounts.
" Revenue Department.
" Local and Municipal Department.

Exd. Shaik Karim.

BUILDINGS AND ROADS.
CIVIL WORKS.

Government {1898} of Madras.
PUBLIC WORKS.

Recd. } 1898.
Regd.

Enclosures
Spare copies

G.O., No. 3209 W., 15th December 1898.

DECEMBER.

Anamalai Roads

Passing orders on the Inspection notes of the Chief Engineer regarding the —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following paper :—

Inspection Notes by the Chief Engineer, P.W.D.

From 17th to 26th October 1898, I inspected the various routes proposed for cart-roads through the Anamalai Hills, in Coimbatore district, to open them up for planting. The objects of my inspection were—

(1) to decide on the route for the cart-road up the ghât;
(2) to decide on what further extension was needed and the route thereof;
(3) to discuss the whole question with the Collector, the Forest department and the planters.

I started from Angulkurchi, four miles north of the Auliar river, on 19th October, went up the Prince of Wales Ghât to Punachi, thence onwards to Paralai and part of the way to Sirukundru. I then turned west to Valparai and returned to Angulkurchi on October 26th *viâ* the Villani pass and valley. I was accompanied throughout by the Superintending Engineer (Mr. Garrett) and the Executive Engineer (Mr. Loam).

2. I saw the Collector and the Conservator of Forests at Coimbatore, and endeavoured to obtain their views on the route to be followed by the cart-road. The Collector had no very pronounced views on the matter, but rather inclined to the Villani valley route, as leading more directly into the centre of the planting districts. The views of the Conservator of Forests will be found in the attached demi-official letter, dated 22nd October 1898, and I may say that the proposals I make further on will fully meet them.

3. I made the following notes during my tour :—

(1) *Angulkurchi Rest-house.*—This is under the Coimbatore District Board, and is situated four miles from the Auliar river and the foot of the hills. It is a poor building consisting of three small rooms, with no out-houses. If a new rest-house is built here the existing rooms will do for godowns, but the site is not suitable, being too close to the village, and when this planting district is more developed it will, I think, be advisable to build a new rest-house nearer the river.

(2) *Road from Angulkurchi to Velandorai (Auliar river).*—This is under the charge of the district board and is on the point of being repaired. It is now just passable for carts and no more. It has two bad grades in it at about 10 and $10\frac{5}{8}$ mile which should be realigned by diversions eastwards; the former will be difficult, the latter easy. This should be done by the district board, as both gradients are too steep for ordinary traffic, and will limit the weight of loads up the ghât.

(3) *Bridge across Auliar river.*—The site for this has been judiciously selected by Mr. Garrett, at a wide place, where flood water will have free passage, and where the foundation will be on solid rock throughout. The bridge will consist of 7 spans of 66 feet, and the iron work has already been ordered from Burn & Co. of Calcutta. Preparations for the construction of the bridge should commence at once, so as to take full advantage of the dry season, *i.e.*, debris should be cleared from the site, and thrown down stream, the rock should be benched or blasted to take abutments and piers, and materials collected. A good deal of stone is already at site, supplied at the moderate rate of Re. 1 per cubic yard. Some of it is good, but there is a good deal of inferior stuff, consisting of the outside decayed layers of gneiss. This should be rejected for the masonry, and only used for dry stone work.

(4) *First $3\frac{1}{2}$ miles of Ghât road.*—The construction of this road has already commenced under the orders given in G.O., No. 781 W., dated 23rd March 1898. It is in charge of Mr. Brodie, temporary Assistant Engineer, and starts from the river bank. In all side long ground the road should slope inwards at 1 in 25 to the inner drain, which should be dug to full dimensions and the earth carefully sectioned and rammed to this slope before metal is laid. The metal being broken is very fair in quality, but too big. It *must* be small enough to pass through a $1\frac{1}{2}$-inch ring in any direction. It should be laid 12 feet wide, not $12\frac{1}{2}$ feet as provided in the estimate, and 6 inches thick. All dry stone revetment work should be *most carefully* done. Too much trouble cannot be spent on this class of work, on which the stability of the road so largely depends. The width of the base of every revetment should be, as nearly as possible, half its height, the largest stones should be laid at the foot in a trench dug for the purpose, all interstices should be packed with small stone, the revetment built true to the required batter, and the earth backing behind not thrown in anyhow, but laid in 6-inch layers, sloping *away* from the revetment, and most carefully rammed and watered.

If these instructions are followed, the revetments will give no trouble, otherwise they will be a constant source of worry and expense. The proposed road-dam over small river at about quarter mile must be converted into a bridge of one span, as the river is said to frequently come down in flood and be impassable. The two wooden bridges in this length must be replaced by steel girders of about 35 feet and 30 feet span, respectively.

There are one or two portions in the third and fourth miles which require realizing. This should be carefully attended to.

(5) The above length of $3\frac{1}{2}$ miles is common to both the Punachi and the Villani valley routes. From this point onwards the route for the cart-road has still to be decided. I went up by the Punachi route and down by the Villani route.

(6) *Punachi route—(a) From $3\frac{1}{2}$ miles to Punachi $3\frac{1}{2}$—11 miles.*—There is some difficult country to traverse, especially in the fifth mile, where much heavy revetment work is needed. Where there is rock cutting or high revetments, the road should be only 10 feet wide—where the footings for revetments are precarious, they should always be blasted out, and the lower 3 feet of the revetment built in mortar.

Mr. Loam has already done a lot of widening and revetment work on this trace in 6th and 7th miles. The bridge at $\frac{7}{7}$ should have its centre pier removed and one (steel girder) span thrown across resting upon the existing dry stone abutments, which should have the upper 3 feet removed and relaid in mortar with bed stones for the girders. Every effort should be made to get as flat a grade as possible by realigning in places. The upper part of this length presents no difficulty.

(*b*) *From Punachi to Paralai 11 to 20 miles.*—This length runs through jungle throughout, except where it crosses the waterfall coffee estate and presents no difficulty whatever. A right of way 66 feet wide extends through the estate which will not be utilized to any great extent by the new road. It has been planted up with coffee, and the owners of the estate should be requested to exchange this area for the land required for the road. The trace for the road has not been completely aligned yet, and I have suggested an alternative route for the last three miles, and given instructions to have it surveyed at once. If found practicable it will shorten the line. The bridle path is very rough in places especially from 14 to 17 miles, and has never been properly made or maintained. Until the road is made I propose to give Mr. Marsh, the Managing Superintendent of Paralai estate, Rs. 1,000 per annum to maintain the bridle path in good order from its starting point (about one mile from the Auliar river, to Paralai—Rs. 2,000 should be included in the estimate for this purpose.

(*c*) *From Paralai to Sirukundru 20 to 31 miles.*—I could only see three miles of this length, being stopped by heavy rain and swollen rivers. The part I saw presented no difficulty, and I was assured by Mr. Loam that the remaining portion was equally easy. The new rest-house at $\frac{20}{5}$ was sufficiently far advanced to enable

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

Read—the following paper :—

Inspection Notes by the Chief Engineer, P.W.D.

From 17th to 26th October 1898, I inspected the various routes proposed for cart-roads through the Anamalai Hills, in Coimbatore district, to open them up for planting. The objects of my inspection were—

(1) to decide on the route for the cart-road up the ghât;
(2) to decide on what further extension was needed and the route thereof;
(3) to discuss the whole question with the Collector, the Forest department and the planters.

I started from Angulkurchi, four miles north of the Auliar river, on 19th October, went up the Prince of Wales Ghât to Punachi, thence onwards to Paralai and part of the way to Sirukundru. I then turned west to Valparai and returned to Angulkurchi on October 26th *viâ* the Villani pass and valley. I was accompanied throughout by the Superintending Engineer (Mr. Garrett) and the Executive Engineer (Mr. Loam).

2. I saw the Collector and the Conservator of Forests at Coimbatore, and endeavoured to obtain their views on the route to be followed by the cart-road. The Collector had no very pronounced views on the matter, but rather inclined to the Villani valley route, as leading more directly into the centre of the planting districts. The views of the Conservator of Forests will be found in the attached demi-official letter, dated 22nd October 1898, and I may say that the proposals I make further on will fully meet them.

3. I made the following notes during my tour :—

(1) *Angulkurchi Rest-house.*—This is under the Coimbatore District Board, and is situated four miles from the Auliar river and the foot of the hills. It is a poor building consisting of three small rooms, with no out-houses. If a new rest-house is built here the existing rooms will do for godowns, but the site is not suitable, being too close to the village, and when this planting district is more developed it will, I think, be advisable to build a new rest-house nearer the river.

(2) *Road from Angulkurchi to Velandorai* (*Auliar river*).—This is under the charge of the district board and is on the point of being repaired. It is now just passable for carts and no more. It has two bad grades in it at about 10 and $10\frac{5}{8}$ mile which should be realigned by diversions eastwards; the former will be difficult, the latter easy. This should be done by the district board, as both gradients are too steep for ordinary traffic, and will limit the weight of loads up the ghât.

(3) *Bridge across Auliar river.*—The site for this has been judiciously selected by Mr. Garrett, at a wide place, where flood water will have free passage, and where the foundation will be on solid rock throughout. The bridge will consist of 7 spans of 66 feet, and the iron work has already been ordered from Burn & Co. of Calcutta. Preparations for the construction of the bridge should commence at once, so as to take full advantage of the dry season, *i.e.*, debris should be cleared from the site, and thrown down stream, the rock should be benched or blasted to take abutments and piers, and materials collected. A good deal of stone is already at site, supplied at the moderate rate of Re. 1 per cubic yard. Some of it is good, but there is a good deal of inferior stuff, consisting of the outside decayed layers of gneiss. This should be rejected for the masonry, and only used for dry stone work.

(4) *First $3\frac{1}{2}$ miles of Ghât road.*—The construction of this road has already commenced under the orders given in G.O., No. 781 W., dated 23rd March 1898. It is in charge of Mr. Brodie, temporary Assistant Engineer, and starts from the river bank. In all side long ground the road should slope inwards at 1 in 25 to the inner drain, which should be dug to full dimensions and the earth carefully sectioned and rammed to this slope before metal is laid. The metal being broken is very fair in quality, but too big. It *must* be small enough to pass through a $1\frac{1}{2}$-inch ring in any direction. It should be laid 12 feet wide, not $12\frac{1}{2}$ feet as provided in the estimate, and 6 inches thick. All dry stone revetment work should be *most carefully* done. Too much trouble cannot be spent on this class of work, on which the stability of the road so largely depends. The width of the base of every revetment should be, as nearly as possible, half its height, the largest stones should be laid at the foot in a trench dug for the purpose, all interstices should be packed with small stone, the revetment built true to the required batter, and the earth backing behind not thrown in anyhow, but laid in 6-inch layers, sloping *away* from the revetment, and most carefully rammed and watered.

If these instructions are followed, the revetments will give no trouble, otherwise they will be a constant source of worry and expense. The proposed road-dam over small river at about quarter mile must be converted into a bridge of one span, as the river is said to frequently come down in flood and be impassable. The two wooden bridges in this length must be replaced by steel girders of about 35 feet and 30 feet span, respectively.

There are one or two portions in the third and fourth miles which require realizing. This should be carefully attended to.

(5) The above length of $3\frac{1}{2}$ miles is common to both the Punachi and the Villani valley routes. From this point onwards the route for the cart-road has still to be decided. I went up by the Punachi route and down by the Villani route.

(6) *Punachi route*—*(a) From $3\frac{1}{2}$ miles to Punachi* $3\frac{1}{2}$—11 *miles.*—There is some difficult country to traverse, especially in the fifth mile, where much heavy revetment work is needed. Where there is rock cutting or high revetments, the road should be only 10 feet wide—where the footings for revetments are precarious, they should always be blasted out, and the lower 3 feet of the revetment built in mortar.

Mr. Loam has already done a lot of widening and revetment work on this trace in 6th and 7th miles. The bridge at $\frac{7}{7}$ should have its centre pier removed and one (steel girder) span thrown across resting upon the existing dry stone abutments, which should have the upper 3 feet removed and relaid in mortar with bed stones for the girders. Every effort should be made to get as flat a grade as possible by realigning in places. The upper part of this length presents no difficulty.

(*b*) *From Punachi to Paralai* 11 *to* 20 *miles.*—This length runs through jungle throughout, except where it crosses the waterfall coffee estate and presents no difficulty whatever. A right of way 66 feet wide extends through the estate which will not be utilized to any great extent by the new road. It has been planted up with coffee, and the owners of the estate should be requested to exchange this area for the land required for the road. The trace for the road has not been completely aligned yet, and I have suggested an alternative route for the last three miles, and given instructions to have it surveyed at once. If found practicable it will shorten the line. The bridle path is very rough in places especially from 14 to 17 miles, and has never been properly made or maintained. Until the road is made I propose to give Mr. Marsh, the Managing Superintendent of Paralai estate, Rs. 1,000 per annum to maintain the bridle path in good order from its starting point (about one mile from the Auliar river, to Paralai—Rs. 2,000 should be included in the estimate for this purpose.

(*c*) *From Paralai to Sirukundru* 20 *to* 31 *miles.*—I could only see three miles of this length, being stopped by heavy rain and swollen rivers. The part I saw presented no difficulty, and I was assured by Mr. Loam that the remaining portion was equally easy. The new rest-house at $\frac{20}{5}$ was sufficiently far advanced to enable us to occupy it. It is built of stone in mud, the former being small and unsuitable, but the walls have stood well through an exceptionally heavy monsoon. The outside walls should be plastered with Portland cement, except those in the verandah, which should be done with lime mortar as also the inside walls. Ground at back of building to be removed for a width of 12 feet. The building should be completed as soon as possible, and the whole place tidied up.

(7) *Villani route.*—I marched through easy country from Paralai to Valparai, the head-quarters of Messrs. Finlay, Muir and Co., a distance of 6½ miles, a bridle path exists here already which can, easily and economically, be converted into a road if ever considered necessary. From Valparai I marched over the Villani pass to the Auliar river, along the approximate route which would be taken by a cart-road. The distance is about 19 miles, so that it is somewhat shorter than the Punachi route to Paralai and about seven miles shorter than the Punachi route to Valparai. The country to the south of the pass, *i.e.*, on the Valparai side, is easy enough for the first seven miles. The remaining four are very difficult, traversing steep and rocky ground, and the trace would have to be realized to the eastward if a cart-road is ever made here. North of the pass, which is about 9½ miles from the river, the country is more or less difficult the whole way down. Precipitous sides, sheet rock, huge boulders, and heavy timber make the construction of a cart-road impossible except at great and prohibitive expense, and all idea of doing so must be abandoned. The views of the planters on the matter were naturally in consonance with their own interests. Those at Paralai and the neighbourhood wanted the Punachi route, those at Valparai the Villani route. I came to the conclusion that the best solution of the difficulty, the only possible one, in fact, as far as a cart-road is concerned, is to make a cart-road up the Punachi route to Paralai, and a bridle path 4½ feet wide in the solid up the Villani route to Messrs. Finlay, Muir & Co's. boundary. The latter will provide the shortest possible route into the heart of the district for equestrians, pedestrians and pack bullocks, and will well repay its cost, which should not exceed Rs. 10,000. The present trace will require realigning here and there on the north side of the pass and from $\frac{7}{5}$ to 10 on the south side.

(8) I therefore recommend that sanction be given to—

(1) the construction of a cart-road from the Auliar river to Paralai, a distance of about 20 miles, the estimates for this are nearly ready, and will amount to between 3 and 3½ lakhs including the bridge over the Auliar;

(2) the construction of a bridle path from Auliar river to Messrs. Finlay, Muir and Co's. boundary up the Villani valley—approximate cost Rs. 10,000;

(3) the grant of Rs. 1,000 per annum until (1) is completed for the maintenance of the existing bridle path between the Auliar river and Paralai *viâ* Punachi.

There is a grant of Rs. 50,000 for this work in the current year, and I propose to provide a grant of Rs. 2,50,000 in the coming year.

(9) It is, however, impossible for the road to stop at Paralai. These British Anamalais are a magnificent country, with soil, climate and conditions all favourable to the growth of coffee, and perhaps of tea. If they are traversed from end to end by a good cart-road, so that they can be thoroughly opened up they have a great future of prosperity before them, in which the state will have its share in proportion as it aids in the development. I strongly recommend, therefore, that the road be continued right through the planting district to Mount Stuart, where another outlet to the plains already exists. The best line for this extension will have to be carefully considered. I append two tracings, one on a large scale with some possible alternative routes shown in blue pencil and the other on a small scale showing the road to Paralai and Sirukundru in a firm red line, and proposed extensions in dotted red. Both tracings show the land already occupied.

(10) Mr. Loam has already, according to his instructions, continued the trace to Sirukundru in the extreme south of the district. This route skirts most of the blocks already occupied, and he has selected it because—

(1) the line is easy and cheap;

(2) it avoids 2 or 3 bad river crossings;

(3) it benefits the Forest department, which has extensive timber reserves in the neighbourhood of Sirukundru. The line is, therefore, in every way favourable, except that it does not traverse the heart of the district. There is little doubt, however, that if it was made planters would connect their estates with it by branch roads. I therefore think that it may be the best one to adopt. I have shown two possible alternative routes on the tracings, one passing through Valparai, and then trending south-west to join the above-mentioned trace west of Sirukundru and the other running south-west from Paralai. Both would be useful lines and a final selection can only be made after further investigation.

(11) If Government approves of my proposal to extend the line to Mount Stuart, the line therefore will also have to be investigated. I have entered a possible one on the tracing. For this investigation work, and for the construction work proposed in paragraph 8, an experienced officer will be required, who is willing to take up the work, which will entail a great deal of exposure. I have found such an one in Mr. Wood, at present in charge of the West Coast division, and I propose placing him in charge when Mr. Loam goes on the furlough which has just been granted to him. The charge will be an important one and should form a temporary division with head-quarters of its own at Punachi.

I take this opportunity of recording my opinion that Mr. Loam, during the two years he has been in charge of these Anamalai roads, has done a great deal of hard work, which will all come in useful if the proposals above made are accepted. He has had exceptional difficulties to contend with in a most inaccessible country and has overcome them in a very creditable manner. He certainly in no way deserves the strictures which have been passed upon him by planters who have more assurance than knowledge, and who should, on the contrary, have been exceedingly grateful to him for his persistent and successful efforts to keep down the price of labour.

(12) I cannot conclude these notes without reference to a subject which has nothing to do with the Engineering side of this question (except that enough money to build the road has already been lost) and that is the suicidal policy adopted by the Revenue department in disposing of this valuable property. I have little or no acquaintance with the methods of selling land in this country, but to the ordinary mind the proper course would seem to have been that the Forest department should demarcate the 80 square miles to be sold into 1,000 acre blocks, in such a manner as to give to each block as equitable a share as possible of good and bad land, and then that the blocks should be sold by auction after full and ample notice to the public. Instead of this, the few persons who knew the country were allowed to go up and select what land they pleased, make their own boundaries and purchase it at the nominal price of Rs. 5 per acre. They naturally took all the best land they could find, and promptly sold most of it for Rs. 30 per acre, and good land up there is now, I am told, worth Rs. 50 per acre. The last transaction of this kind took place during my visit in accordance, I believe, with the Advocate-General's advice that Government was bound by its original advertisement. But I hope and trust that, once this obligation has been satisfied, no further land will be sold until the country is thoroughly opened up and its excellence for planting purposes known far and wide, *i.e.*, for two years to come.

(Signed) W. B. deWINTON,
Chief Engineer.

29th November 1898.

Order—No. 3209 W., dated 15th December 1898.

The recommendations in paragraph 3 (8) of the Chief Engineer's note recorded above are sanctioned, and the Superintending Engineer, IV Circle, will take the necessary action thereon.

2. The proposal in paragraph 3 (11) to extend the line to Mount Stuart is approved, and it should be investigated accordingly.

3. Preparations for the construction of the bridge across the Auliar river should commence at once, and the Superintending Engineer will carefully carry out the Chief Engineer's instructions in paragraph 3, clauses (3), (4) and (6).

4. The matter referred to in paragraph 3 (12) has been settled in G.O., No. 573, Revenue, dated 5th October 1898.

(True Extract.)

(Signed) W. B. deWINTON,
Secretary to Government.

To the Superintending Engineer, IV Circle.
„ Examiner, Public Works Accounts.
„ Revenue Department.
„ Local and Municipal Department.

Exd. P. Seetharam.

A

For orders

Print

P. W. DEPARTMENT.

Read the following :—

Inspection Notes by the Chief Engineer, P. W. D., dated 29th Novr. 1898.

[illegible] S. E. IV

Circulated to

Mr. [illegible]

ORDER. No: 3209 W d/ 15-12-98.

12P

The recommendations in para 3 (8) of the Chief Engineer's Note recorded above are sanctioned, and the Supdg. Engineer, IV Circle, will take the necessary action thereon.

2. The proposal in para 3 (11) to extend the line to Mount Stuart is approved, and it should be investigated accordingly.

3. Preparations for the constructions of the bridge across the Auliar river should commence at once, and the Supdg. Engineer will carefully carry out the Chief Engineer's instructions in para 3, clause (3)

T. A.
B. P.

DW
W.

[P. W. 4
1,000—14-11-98.]

(3), (4) & (6).

4. The matter referred to in para 3 (12) has been settled in G.O. No. 573 Revenue dated 5th Oct. 1898.

ARK
12.12.98

13.12.98

Dft:

The recommenda-
-tions in para 2 ( ) of
the Chief Engineer's Note
recorded above are ac-
-cepted, and the Supt.
Engineer, IV C. will take
the necessary action thereon.
2. The proposal in
para [illegible] to extend the
line to [illegible]
[illegible]
[illegible]
3. [illegible]

Send a MS copy to
SE IV in advance

To

The Supdg. Engr., IV Circle
" Examiner, P.W. Accnts
" Revenue Dept
" L & M. Dept.

15/12/98

11/12/98

Public Works Department.

8

Read the following:—

Inspection Notes by the Chief Engineer, Public Works Department dated 29th November 1898, regarding Anamalai Roads.

3209

Circulated to

FOR ORDERS.

His Excellency the Governor.
The Hon'ble Mr. A. T. Arundel.
The Hon'ble Mr. H. M. Winterbotham.

Please see my Notes inside.

A.T.A.
5.12.98

11.12.98

P. W. 43
500—14-11-98.

1448 10.12.98

P. W. Dept

VP

Inspection Notes
by the Chief Engineer P.W.D.

From 17th to 26th October 1898 I inspected the various routes proposed for cart roads through the Anamalai Hills in Coimbatore district, to open them up for planting. The objects of my inspection were

(1) to decide on the route for the cart road up the ghaut

(2) to decide on what further extension was needed and the route thereof

(3) to discuss the whole question with the Collector, the Forest Department and the planters.

I started from Angalkurchi 4 miles north of the Auliar river on 19th October, went up the Prince of Wales Ghaut to Punachi, thence onwards

to

VP

P. W. Dept

Inspection Notes
by the Chief Engineer P. W. D.

From 17th to 26th October 1898 I inspected the various routes proposed for cart roads through the Anamalai Hills in Coimbatore District, to open them up for planting. The objects of my inspection were

(1) to decide on the route for the cart road up the ghaut.

(2) to decide on what further extension was needed and the route thereof

(3) to discuss the whole question with the Collector, the Forest Department and the planters.

I started from Angulkurchi 4 miles north of the Aliar river on 19th October, went up the Prince of Wales Ghaut to Punachi, thence onwards to

VP

P. W. Dept

Inspection Notes
by the Chief Engineer P.W.D.

From 17th to 26th October 1898 I inspected the various routes proposed for cart roads through the Anamalai Hills in Coimbatore District, to open them up for planting. The objects of my inspection were

(1) to decide on the route for the cart road up the ghaut

(2) to decide on what further extension was needed and the route thereof

(3) to discuss the whole question with the Collector, the Forest Department and the planters.

I started from Angulkurchi 4 miles north of the Aliar river on 19th Octob [illegible] the Prince of W [illegible] to Punachi, [illegible] ance or. It has

2 be

to Paralai and part of the way to ~~[illegible]~~ Sireekyundry. I then turned west to Val Parai and returned to Angulkurchi on October 26 via the Villani Pass & valley. I was accompanied throughout by the Superintending Engineer (Mr. Garrett) and the Executive Engineer (Mr. Loam).

2. I saw the Collector and the Conservator of Forests at Coimbatore, and endeavoured to obtain their views on the route to be followed by the Cart road. The Collector had no very pronounced views on the matter, but rather inclined to the Villani valley route, as leading more directly into the centre of the planting Districts. The views of the Conservator of Forests will be found in the attached D.O. letter dated 22nd October 1898 and I may say at the proposals I make on will fully meet them.

On further

3. I made the following notes during my tour

(1) Angalkurchi Resthouse
This is under the Coimbatore District Board, and is situated 4 miles from the Auliar river and the foot of the hills. It is a poor building consisting of 3 small rooms, with no outhouses. If a new Resthouse is built here the existing rooms will do for godowns, but the site is not suitable, being too close to the village, and when this planting District is more developed it will, I think, be advisable to build a new Resthouse nearer the river.

(2) Road from Angalkurchi to Velandorai (Auliar river)
This is under the charge of the District Board and is on the point of being repaired. It is now ~~part~~ just passable for carts and no more. It has

2 be

2 bad grades in it at about 10 and $10\frac{5}{8}$ mile x which should be realigned by diversions eastwards; the former will be difficult, the latter easy. This should be done by the District Board, as both gradients are too steep for ordinary traffic, and will limit the weight of loads up the ghaut.

(3) Bridge across Auliar river

The site for this has been judiciously selected by Mr. Garrett, at a wide place, where flood water will have free passage, and where the foundation will be on solid rock throughout. The bridge will consist of 7 spans of 66', and the iron work has already been ordered from Burn and Co. of Calcutta. Preparations for the construction of the bridge should commence at once, so as to take full advantage of the dry season i.e. debris should be cleared from the site, and thrown down stream, the rock should be benched or blasted to take abutments and piers, and materials collected. A good deal of stone is already at site, supplied at the moderate rate of Rupee 1 per C. yd. Some of it is good, but there is a good deal of inferior stuff, consisting of the outside decayed layers of gneiss. This should be rejected ~~by~~ for the masonry, and only used for dry stone work.

Yes.
A.S.H.

x S. Clay K. Linked file

(4) First $3\frac{1}{2}$ miles of Ghaut Road.

The construction of this road has already commenced under the orders given in G.O. No. 781W dated 23rd March 1898. It is in charge of Mr. Brodie, temporary Asst. Engineer and starts from the river bank. In all side long ground the road should slope i[illegible]as

2 bo

at 1 in 25 to the inner drain, which should be dug to full dimensions and the earth carefully sectioned and ~~secured~~ rammed to this slope, before metal is laid. The metal being broken is very fair in quality, but too big. It must be small enough to pass through a 1½" ring in any direction. It should be laid 12' wide, not 12½' as provided in the estimate, and 6" thick. All dry stone revetment work should be most carefully done. Too much trouble cannot be spent on this class of work, on which the stability of the road so largely depends. The width of the base of every revetment should be, as nearly as possible, half its height, the largest stones should be laid at the foot in a trench dug for the purpose, all interstices should be packed with small stone, the revetment built true to the required batter, and the earth backing behind, not thrown in anyhow, but laid in 6" layers, sloping away from the revetment, and most carefully rammed and watered.

If these instructions are followed the revetments will give no trouble otherwise they will be a constant source of worry and expense.

The proposed road dam over small river at about ¼ mile must be converted into a bridge of 1 span, as the river is said to frequently come down in flood & be impassable.

The two wooden bridges in this length must be replaced by steel girders of about 35' and 30' span respectively.

There are one or two portions in the third and fourth miles which require realigning. This should be carefully attended to.

(5) The

(5) The above length of $3\frac{1}{2}$ miles is common to both the Punachi and the Villoni valley routes. From this point onwards the route for the cart road has still to be decided. I went up by the Punachi route and down by the Villoni route.

(6) Punachi route.

(a) From $3\frac{1}{2}$ miles to Punachi $3\frac{1}{2}$ – 11 miles.

There is some difficult country to traverse, especially in the 5th mile, where much heavy revetment work is needed. Where there is rock cutting, or high revetments, the road should be only 10' wide. Where the footings for revetments are precarious, they should always be blasted out, and the lower 3' of the revetment built in mortar.

Mr. Loam has already done a lot of widening and revetment work on

this

this trace in 6th & 7th miles. The bridge at $\frac{7}{7}$ should have its centre pier removed and one (steel girder) span thrown across resting upon the existing dry stone abutments, which should have the upper 3' removed and relaid in mortar with bed stones for the girders. Every effort should be made

get as flat a grade as possible, by realigning in places. The upper part of this length presents no difficulty.

(b) From Punachi to Paralai 11 to 20 miles

This length ~~seems~~ runs through jungle throughout, except where it crosses the Waterfall Coffee Estate and presents no difficulty whatever. A right of way 66' wide extends through the estate which will not be utilised to any great extent by the new road. It has been

plotted

(5) The above length of $3\frac{1}{2}$ miles is common to both the Punachi and the Villoni valley routes. From this point onwards the route for the cart road has still to be decided. I went up by the Punachi route and down by the Villoni route.

(6) Punachi route.

(a) From $3\frac{1}{2}$ miles to Punachi $3\frac{1}{2}$ – 11 miles.

There is some difficult country to traverse, especially in the 5th mile, where much heavy revetment work is needed. Where there is rock cutting, on high revetments, the road should be only 10' wide. Where the footings for revetments are precarious, they should always be blasted out, and the lower 3' of the revetment built in mortar.

Mr. Loam has already done a lot of widening and revetment work on

this

this trace in 6th & 7th miles. The bridge at $\frac{7}{7}$ should have its centre pier removed and one (steel girder) span thrown across resting upon the existing dry stone abutments, which should have the upper 3' removed and relaid in mortar with bed stones for the girders. Every effort should be made get as flat a grade as possible, by realigning in places. The upper part of this length presents no difficulty.

(b) From Punachi to Paralai

11 to 20 miles

This length ~~seems~~ runs through jungle throughout, except where it crosses the Waterfall Coffee Estate and presents no difficulty whatever. A right of way 66' wide extends through the estate which will not be utilised to any great extent by the new road. It has been planted up with coffee, and the owners of the Estate should be requested to exchange this area for the land required for the road. The trace for the road has not been completely aligned yet, and I have suggested an alternative route for the last 3 miles, and given instructions to have it surveyed at once. If found practicable it will shorten the line. The bridle path is very rough in places especially from 14 to 17 miles, and has never been properly made or maintained. Until the road is made I propose to give Mr. Marsh, the managing Superintendent of Paralai Estate Rs 1000 per annum to maintain the bridle path in good order from its starting point (about 1 mile from the Autiar river) to Paralai. Rs 2000 should be

fl

✓ with

be included in the Estimate for this purpose.

(c) From Paralai to Sirukundu

20 to 31 miles.

I could only see 3 miles of this length, being stopped by heavy rain and swollen rivers. The part I saw presented no difficulty, and I was assured by Mr. Loam that the remaining portion was equally easy. The new Resthouse at $\frac{20}{5}$ was sufficiently far advanced to enable us to occupy it. It is built of stone in mud, the former being small and unsuitable – but the walls have stood well through an exceptionally heavy monsoon. The outside walls should be plastered with Portland cement, except those in the verandah, which should be done with lime mortar as also the inside walls – Ground at backs of building to be removed for a width of 12'. The building should be completed as soon as possible, and the whole place tidied up.

(7). Valloni route.

I marched through easy country from Paralai to Val Parai, the head quarters of Messrs. Finlay Muir and co – a distance of 6½ miles – a bridle path exists here already which can, easily and economically, be converted into a road if ever considered necessary.

From Val Parai I marched over the Valloni pass to the Auliar river, along the approximate route which would be taken by a cart road. The distance is about 19 miles, so that it is somewhat shorter than the Punachi route to Paralai and about 7 miles shorter than the

Punachi

Punachi route to Val Parai. The country to the south of the pass, i.e. on the Val Parai ~~route~~ side, is easy enough for the first 7 miles. The remaining 4 are very difficult, traversing steep and rocky ground, and the trace would have to be realigned to the eastward if a cart road is ever made here. North of the pass which is about 9½ miles from the river, the country is more or less difficult the whole way down. Precipitous sides, sheet rock, ~~large~~ huge boulders, and heavy timber make the construction of a cart road impossible except at great and prohibitive expense, and all idea of doing so must be abandoned. The views of the planters on the matter were naturally in consonance with their own interests. Those

Paralai
2,50,000

Paralai and the neighbourhood wanted the Punachi route, those at Val Parai the Villoni route. I came to the conclusion that the best solution of the difficulty, the only possible one, in fact, as far as a cart road is concerned, is to make a cart road up the Punachi route to Paralai, and a bridle path $4\frac{1}{2}'$ wide in the solid up the Villoni route to Messrs. Finlay Muir and Co's boundary. The latter will provide the shortest possible route into the ~~[illegible]~~ heart of the district for equestrians, pedestrians and pack bullocks, and will well repay its cost, which should not exceed Rs10,000 - The present trace will require realigning here and there on the north side of the pass & from $\frac{7}{5}$ to 10 on the South south side.

(8). I therefore recommend that sanction be given to

(1) the construction of a cart road from the Auliar river to Paralai, a distance of about 20 miles - the estimates for this are nearly ready, and will amount to between 3 and $3\frac{1}{2}$ lakhs including the bridge over the Auliar.

(2) the construction of a bridle path from Auliar river to Messrs. Finlay Muir and Co's boundary, up the Villoni valley - approximate cost Rs10,000.

(3) the grant of Rs1000 per annum until (1) is completed for the maintenance of the existing bridle path between the Auliar river and Paralai via Punachi.

There is a grant of Rupees 50,000 for this work in the current year, and I propose to provide a grant of Rupees 2,50,000

I think the recommendations in this para. 8, should be accepted.
A.S.H

I agree with W.
A.S.

H.W.

he has been in charge of these Anamalai roads, has done a great deal of hard work, which will all come in useful if the proposals above made are accepted. He has had exceptional difficulties to contend with in a most inaccessible country and has overcome them in a very creditable manner. He certainly in no way deserves the strictures which have been passed upon him by planters who have more assurance than knowledge, and who should, on the contrary, have been exceedingly grateful to him for his persistent and successful efforts to keep down the price of labour.

I am glad to hear this.

(12). I cannot conclude these notes without reference to a subject which has nothing to do with the Engineering side of this question (except that enough money

to

to build the road has already been lost) and that is the suicidal policy adopted by the Revenue Department in disposing of this valuable property. I have little or no acquaintance with the methods of selling land in this country, but to the ordinary mind the proper course would seem to have been that the Forest Department should demarcate the 80 square miles to be sold into 1000 acre blocks, in such a manner as to give to each block as equitable a share as possible of good and bad land, and then that the blocks should be sold by auction after full and ample notice to the public. Instead of this, the few persons who knew the country were allowed to go up and select what land they pleased, make their own boundaries and purchase it at the nominal price of Rs 5 per acre.

If this inducement had not been offered, this valuable tract might have remained untouched for years. The opening out of new

They

They naturally took all the best land they could find, and promptly sold most of it for Rs 30 per acre, and good land up there is now, I am told worth Rs 50 per acre. The last transaction of this kind took place during my visit in accordance I believe with the Advocate General's advice that Government was bound by its original advertisement. But I hope and trust that once this ~~obligation~~ obligation has been satisfied, no further land will be sold until the country is thoroughly opened up and its excellence for planting purposes known far and wide, i.e. for 2 years to come.

29-11-98

5AW

---

new land is always speculative, — [illegible] in the same way as the prospecting of mining land. If you wish to open up quickly, you must give liberal inducements. This course pays in the end.

A.G.H.

I entirely agree with what H.E. has noted. It is the extreme care which is taken by the mining rules to prevent any one from making a big profit that has stifled the mining industry in British territory & driven it to native states. We have avoided this in the Anamalai arrangements. A.A.

7.12.98

I think some such order has been given.

A.G.H.

5.12.98

G.O. 573 Rev.
D/5.10.98.

Flagged C

My beyond experience has made me a pessimist as regards coffee planting, but whether for Forest purposes or for coffee the proposed opening up of the tract is required. I have no useful remarks to offer.

9-12-98

Inspection Notes by CS

From ~~Oct~~ 17 to 26 October 1898 I inspected the various ~~[illegible]~~ routes preferred for cart roads through the Anamalai Hills in Coimbatore District, in [illegible] of the planting. The objects of my inspection were

(1) to decide on the route for the cart road of the start.

(2) to decide in what further extension has needed a the route thereof

(3) to discuss the whole question with the Forest Dept & with ~~planters~~ the planters

I started from Angalkurichi to [illegible] North of the Aliyar River on 19th Oct. ~~&~~ went up the Ghat to 'Punachi'; thence [illegible] to [illegible] a part of the [illegible]. I then [illegible] — [illegible] to [illegible] & returned to Angalkurichi on the

They naturally took al
best land they could
and promptly sold mo
it for Rs30 per acre,
good land up there is
I am told worth Rs50
acre. The last transa
of this kind took place
my visit in accordance
believe with the Advoc
General's advice that Go
ment was bound by i
original advertiseme
But I hope and trust t
once this ~~obligation~~ obligation has
satisfied, no further la
will be sold until the
country is thoroughly ope
up and its excellence
planting purposes know
far and wide, i.e. for
years to come.

L Bell
29.

2

Inspection Notes by C.S.

From ~~Oct~~ 17 to 26, October 1898
I inspected the various ~~[illegible]~~ routes proposed for cart roads ~~through~~ the Anamalai hills in Coimbatore District, [illegible] of the Planting [illegible]

The objects of my inspection were
(1) to decide on the route for the cart road up the Ghat.
(2) to decide on what further extension the route thereof has needed
(3) to discuss the whole question of Forest reservation with the Forest Dept & with ~~Planters~~ the planters.

I started from Angalkurichi [illegible] North of the Aliyar River on 19th Oct. & went up the Ghat to 'Panachi', thence [illegible] to Valparai a part of the [illegible] to. I then [illegible] to [illegible] & [illegible] went to [illegible] & returned to Angalkurichi on the

Oct 26. via the Villini Pass & valley. I was accompanied throughout by the Deputy Cons (Mr Ferretti) & the Valuer (Mr Brown)

2. ~~Fr~~ I saw the Collector & the Conservator of Forests at Coimbatore & endeavoured to obtain their views on the route to be followed by the Cart road. The Collector had no very pronounced views on the matter, but rather inclined to the Villini valley route, as leading more directly into the Centre of the planting Districts. The views of the Conservator of Forests will be found in the attached d. o. letter dated 22.10.87 & I may say that the proposals I make further on will fully meet them.

3. I made the following notes during my tour

(1) Angalthurai Resthouse.

This is under the Coimbatore District Board, & is situated 1/4 miles from the Anchar River & the foot of the hills. It is a poor building consisting of 3 small rooms with no outhouses. If a new Resthouse is built here the existing rooms will do for godowns; but the site is not suitable, being too close to the village, & when this planting District is more developed it will I think be advisable to build a new Resthouse near the River.

(2) Road from Angalthurai to Velamdorai (Anchar River). This is under the charge of the Dist. Bd. & is in the form of being cleared. It is now just passable for Carts & no more. It has 2 bad grades in it at about 10 & 10 1/2 miles which should be realigned by diversions eastwards, the former

while different, the latter easy.
This should be done by the District
Board ~~on the plant road while~~
as both gradients are too steep
for ordinary traffic & will limit
the ~~type~~ weight of loads of the
plant.

(3) Bridge across Lukhai River.

The site for this has been judiciously
selected by Mr Garrett, at a wide
place, where flood water will
have free passage, & where the foundations
will be on solid rock throughout.
The bridge will consist of 7 spans of
66', & the iron work has already
been ordered from Burn & Co of
Calcutta. Preparations for the
construction of the bridge should
commence at once, so as to take
full advantage of the dry season.
i.e. debris should be cleared from
the site, & stones down stream,
the rock should be benched or
blasted to take abutments &
piers & materials ~~should be~~
collected — A good deal of

2

stone ~~has~~ is already at site, collected
at the moderate rate of Rs 1 per
cyd — Some of it is good, but there
is a good deal of inferior stuff,
consisting of the outside decayed layers of
gneiss. This should be rejected
for the masonry, or used only for
dry stone work.

(4) First 3½ miles of Plant Road.

The construction of this road has
already commenced ~~as for~~ under the orders
given in my D.O. No dated
It is in charge of Mr Brodie. Length
Asst Engr. & starts from the river
bank. ~~Sec~~ For all side long
ground the road should slope
inwards at 1 in 25 to the inner drain, which
should be dug to full dimensions,
& the earth carefully sectioned & rammed to
this slope, before metal is laid
The metal being broken is very fair
in quality, but too big. It must
~~not exceed~~ be small enough to
pass through a 1½" ring in any

direction – It should be laid 12'
wide, not 12½' as provided in
the estimate, & 6" thick.
All dry stone revetment work
should be most carefully done –
Too much trouble cannot be spent
on this class of work, in which
the ~~[illegible]~~ stability of the road so
largely depends – The base of every
revetment should be as nearly as
possible half its height, the largest
stones should be laid at the foot
in a trench ~~carefully~~ dug for the
purpose, all interstices should be
~~carefully~~ packed with small stone,
the revetment built true to the
required batter, & the earth backing
behind, not thrown in anyhow,
but laid in 6" layers, sloping
away from the revetment, & well
carefully rammed & watered.
If these instructions are followed, the
revetments will give no trouble –
otherwise they will be a constant source
of worry & expense –

3.

The proposed road dam over small river at abt ¼ mile must be converted into a bridge of 1 span, as the river is said to frequently come down in flood & be impassable.

The two wooden bridges in this length must be replaced by steel girders of abt 35' & 30' span respectively.

There are one or two portions in the third & fourth miles which require realigning. This should be carefully attended to.

(5) The above length of 3½ miles is ~~are~~ common to both the Gumachi & the Villiam valley routes. From this point onwards the route to be cart road has still to be decided. I went by the Gumachi route & down by the Villiam route

(6) Gumachi route. 3½ - 11 miles

(a) From 3½ miles to Gumachi.

There is some ~~heavy to~~ difficult

country to traverse, especially in the 5th mile, where much heavy revetment work is needed. Where there is rock cutting, or high revetments the road should be kept 10' wide. Where the footings for revetments are necessary, they should always be blasted out, & the lower 3' of the revetment built in mortar.

Mr Swan has already done a lot of widening & revetment work in this trace in 6th & 7th mile.

The bridge at 7/7 should have its centre piers removed, & one (steel girder) span thrown across, utilizing the existing dry stone abutments, which should have the upper 3' removed & relaid in mortar with bed stones for the girders.

Every effort should be made to get as flat a grade as possible by realigning in places.

The upper part of this length presents no difficulty.

16) From Punachi to Pasalai 11 to 20 miles

This first length runs through jungle throughout, ~~& presents~~ except where it crosses the Waterfall coffee estate & presents no difficulty whatever. A right of way 66' wide through the estate which extends will not be utilised to any great ~~[illegible]~~ extent by the new road.

It has been planted up with coffee, & the owners of the estate should be expected to exchange this area for the land required for the road.

The trace for the road has not been completely adopted yet, & I have suggested an alternative route for the last 3 miles, & given instructions to have it surveyed at once. If found practicable, it will shorten the line. The bridle path is very rough in places especially from 11 to 17 miles, & has never been properly made or maintained. Until the road is made I propose to give Mr Marsh, the managing supdt. of Pasalai estate Rs 1000 be annum to maintain the bridle path in good order from its ~~base~~ starting point (about 1 mile from the Ambar River) to Pasalai — Rs 2000 should be included in the estimate for this purpose.

(c) From Pasalai to Srinkunda.

20 to 21 miles.

I walked up the 8 miles of this length, being stopped by heavy rain & swollen rivers — the last 8 miles presented no difficulty & I was assured by Mr Swam that the remaining portion was equally easy.

The new Resthouse at $\frac{20}{5}$ was sufficiently far advanced to enable us to occupy it — It is built of stone in mud, the former being small & uneven — but the walls have stood well through an exceptionally heavy monsoon. The whole walls should be plastered with P. cement, except there in the verandah, which should be done with lime mortar as also the inside

walls. ground at back of building to be cemented for a width of 12'; The building should be completed in a months time, & the whole place tidied up —

7. Vellimi route.

I marched, though easy country, from Pasalai to Val Parai, the headquarters of Messrs Finlay Muir & Co — a distance of 6½ miles. A bridle path exists here already which can, easily & economically, be converted into a road if ever considered necessary.

I marched over the From Val Parai to the Ambar Vellimi pass to the ~~route~~ approximate river, along the route which would be taken by a cart road. The distance is about 19 miles, so that it is somewhat shorter than the Pumachi route to Pasalai, & about 8 miles shorter than the Pumachi route to Val Parai —

be assumed to maintain the bridle
path in good order from its ~~base~~ starting point
(about 1 mile from the Aliyar River)
to Parelai — Rs 2000 should be
included in the estimate for this
purpose.

(c) From Parelai to Dornkunda.
20 to 21 miles.

I could only see 3 miles of this
length, being stopped by heavy rain
& swollen rivers — The part I saw
presented no difficulty, & I was
assured by Mr Deane that the
remaining portion was equally
easy.

The new Rest house at 20/5 was
sufficiently far advanced to
enable me to occupy it.
It is built of stone in mud,
the former being small & uneven
— but the walls have stood
well through an exceptionally
heavy monsoon. The whole
walls should be plastered with
P. cement, except there in the verandah,
which should be done with lime
mortar as should the inside

---

walls. Around at back of building
to be cemented for a width of 12';
The building should be completed
in a month or two, & the whole
place tidied up —

7. Vellini route.

I marched through easy country
from Parelai to Val Parai, the
headquarters of Messrs Finlay Muir
& Co — a distance of 6½ miles.
A bridle path exists here already
which can, easily & economically,
be converted into a road if
ever considered necessary. I marched over the
From Val Parai to the Aliyar.
Vellini pass to the ~~route~~ approximate
survey, along the route which would be taken
route which would be taken
a cart road. The distance is
about 19 miles, so that it is
somewhat shorter than the Pollachi
route to Parelai, & about 3 miles
shorter than the Pollachi
route to Val Parai —

The country to the South of the Pass,
i.e. in the Bal Swai side, is
easy enough, ~~until~~ for the first
7 miles – The remaining 4 are
very difficult, traversing steep
& rocky ground, & the trace would
have to be realigned to the cart
road if a cart road is
ever made here. North of the
Pass which is abt 9½ miles from
the river, the country is more
or less difficult the whole
way down – precipitous sides,
sheer rock, huge boulders, & heavy
timber make the construction of
a cart road impossible except
at great & prohibitive expense.
& the idea of doing so must be
abandoned – The views of the
planters in the matter were
naturally in consonance with
their own interests. Those at
Dasalai & the neighbourhood
wanted the Dimachi route,
those at Bal Swai the Villani route.
I came to the conclusion that the
best solution of the difficulty, & the
only possible one: in fact, as far as
a cart road is concerned, is to
make a cart road up the Dimachi
route to Dasalai & a bridle
path 4½' wide on the valid, up
the Villani route to keep fully
forms a Cis boundary – The latter
will provide the shortest possible
route into the heart of the district
for sportsmen, pedestrians, & pack
animals, & will not cost as much as
a cart, which should not exceed
Rs 10,000 – The present trace will
require realigning here & there on
the N. side of the Pass, & from
$\frac{7}{8}$ to 10 on the S. side –

8. I therefore recommend that
sanction be given to
(1) the construction of a cart
road from the Kulhar River
to Dasalai, a distance of

abt 20 miles – the estimated cost of this road being, & I understand, to between 3 & 3½ lakhs including the bridge over the Ambar –

(2) the construction of a bridle path from Ambar River to [illegible] Finlay Pass on the [illegible] boundary of the [illegible] valley – approximate cost Rs 10,000 –

(3) the grant of Rs 1000 per annum until (1) is completed for the maintenance of the existing bridle path between the Ambar River & Sarahi via Pumachi –

There is a grant of Rs 50,000 for this work in the current year, & I propose to provide a grant of Rs 2,50,000 in the coming year –

5.

9. It is, however, impossible to let the road stop at Sarahi. These British [illegible] are a magnificent country, with soil, climate & conditions all favourable to the growth of coffee, & perhaps of tea. If they are [illegible] by a good cart road so that they can be thoroughly opened up, they have a great future before them, in which the State will have its share in proportion as it aids in the development. I strongly recommend, therefore, that the road be continued right through the planting district to Mount Stuart, where another outlet to the plains already exists. The best line for this extension will have to be carefully considered. I attend

2 tracings, one on a large scale with ~~the~~ some possible alternative routes shewn in blue pencil, & the other on a small scale shewing the road to Tiralee in a firm red line, & proposed extensions in dotted red - ^

^Both ~~the~~ tracings ~~[illegible]~~ shew the line already accepted

10 The Overseer has already, according to his instructions, continued the trace to Srinbundra in the extreme south of the District - This route skirts most of the blocks already accepted, & has been selected because

(1) the line is easy & cheap

(2) it avoids 2 or 3 bad river crossings.

(3) it benefits the Forest Dept, which have extensive [illegible] timber reserves in the neighbourhood of Srinbundra -

The line is, therefore, in every way favourable, except that it does not traverse the heart of the District - There is little doubt however, that if it was made, planters would connect their estates with it by branch roads - I therefore think that it may be the best one to adopt.

I have shewn 2 possible alternative routes in the tracings, one passing through Val Parai & then trending to west ~~[illegible]~~ to join the above mentioned trace west of Srinbundra, & the other running South west from Tiralee - Both would be useful lines & ~~it remains~~ a final selection can only be made after further investigation.

11 If Govt. approves of my proposal to extend the line to Mount Stuart the line thereto will also have to be investigated - I have entered a possible one in the tracings - For this investigation

work, & for the construction work. proposal in para 8, an experienced officer whose experience, who is willing to take up the work, which will entail a great deal of exposure. I have found such an one in Mr Wood. at present in charge of the West Coast Div. & I propose placing him in charge when Mr Swain goes on the furlough which has just been granted to him. The charge will be an important one, & should form a temporary division with head quarters of its own at Pimachi. I take this opportunity of recording my opinion that Mr Swain, during the 2 years he has been in charge of these Anamalai roads, has done a great deal of hard work, which will all come in useful if the

proposals above made are accepted. He has had exceptional difficulties to contend with in a most inaccessible country & has overcome them in a very creditable manner ~~in which~~ ~~great credit~~. He he ~~deserves~~ certainly in no way deserves the criticisms which have been passed upon him by planters who have more assurance than knowledge, & who should, to the contrary, have been exceedingly grateful to him for his persistent & successful efforts to keep down the price of labour.

12. I cannot conclude these notes without reference to a subject which has nothing to do with the engineering side of this question, & (except that everything to build the road has already been built) & that is the remedial policy adopted by the Rev. Duff in

disposing of this valuable property – ~~I must plead complete ignorance~~ have little or no acquaintance with of the methods of selling land in the country, but to the ordinary mind the proper course would seem to have been that the Forest Dept should demarcate the 60 square miles to be sold into 1000 acre blocks, in such a manner as to give for each block as equitable a share as possible of wood & bad land, & then that the blocks should be sold by auction after ample notice to the public.

Instead of this, the few persons who knew the country were allowed to go & select what land they pleased, make their own boundaries & purchase it at the nominal price of Rs 5 per acre – they naturally took all the best land they could find, & promptly sold most of it for Rs 30 per acre, & the govt land up there is now, I am told worth Rs 50 per acre – The last transaction of this kind took place during my visit ~~because~~ in accordance with the advocate-gen's [illegible] I believe, advice that Govt has formally to repeal its original advertisement meeting its obligation has been satisfied & I hope & trust that no further land will be sold until the country is thoroughly opened up & its excellence for planting purposes ~~[illegible]~~ known far & wide. – [illegible] ~~I would sell no more~~ for 2 years to come.

26.11.01

disposing of this valuable property – ~~I must plead complete ignorance~~ have little or no acquaintance with the methods of selling land in the Colony, but to the ordinary mind the proper course would seem to have been that the Forest Dept should demarcate the 80 square miles to be sold into 1000 acre blocks, in such a manner as to give ~~for~~ in each block as equitable a share as possible of wood & bad land, & then that the blocks should be sold by auction after full & ample notice to the public.

Instead of this, the few persons who knew the country were allowed to go & select what land they wished, make their own boundaries & purchase it at their pleasure at a nominal price of Rs 5 per acre. They naturally took what the ~~bo~~ best land they could find, & promptly sold most of it for Rs 30 per acre, & ~~the~~ good land up there is now, I am told worth Rs 50 per acre. The last transaction of this kind took place during my visit ~~[illegible]~~ in accordance I believe, with the advocate's pressing advice that Govt. has formally to signal advertisement meeting its obligation has been satisfied but I hope strongly that no further land will be sold until the Colony is thoroughly opened up & its excellence for planting purposes known far & wide – 79 ~~Hoped~~ ~~I should sell no more~~ for 2 years to come.

26.11.01

t.

V8