

Public Works (1894) Department.

RAILWAY BRANCH.

G.O., No. 364-5. R

DATED 21st June

[Despatch Abstract.]

Nilgiri Railway.

Inspection report of the — and letter from the Engineer-in-chief stating the probable amount required to complete the Railway, ordered to be forwarded to the Govt of India and to specified officers, for information.

Forwarding the inspection report of the — and letter from the Engineer-in-chief stating the probable amount required to complete the Railway for information.

[illegible]

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

GOVERNMENT OF MADRAS.
PUBLIC WORKS DEPARTMENT.

Read the following papers :—

The inspection was made on 18th, 19th and 23rd May in company with the Engineer-in-Chief and the Assistant Engineers of the railway.

Chainage from Counoor.		Approximate amount done.	Remarks.
From	To		
0	39	1	The banks will require making up.
39	41	$\frac{1}{2}$	
41	50	1	A little filling required at chainage 47-48.
50	60	1	A little excavation to be done at chainage 51-52.
60	70	$\frac{1}{2}$	
70	80	1	
80	90	$\frac{1}{2}$	About 3 feet of cutting for 5 chains length will complete.
90	100	$\frac{1}{2}$	About 6 chains of 13 feet of cutting still remains to be done.
100	116	$\frac{1}{2}$	Four and a-half chains of clearing required owing to a bad slip.
116	118	1	
118	130	1	Practically finished; one chain of 22 feet cutting and $1\frac{1}{2}$ chains 10 feet filling still remaining.
130	136	1	
136	148	$\frac{1}{2}$	Three chains of 8 feet and $1\frac{1}{2}$ chains 2 feet cutting required to complete.
148	150	$\frac{1}{2}$	One chain of 2 feet cutting will finish.
150	165	$\frac{1}{2}$	Three chains of cutting requires to be taken out 8 feet in depth.
165	172	$\frac{3}{4}$	Four chains of 10 feet cutting still requires to be done.
172	182	1	The work is complete with the exception of 308 feet of tunnel.
182	191	1	Practically done; only a couple of chains of 3 feet cutting remaining.
191	193	1	
193	198	$\frac{1}{2}$	One and a-half chains of 8 feet cutting remains to be done.
198	201	$\frac{1}{2}$	Two chains to be taken out about 8 feet more in depth.
201	202	1	
202	210	$\frac{1}{2}$	Excavation aggregating two chains in length and 8 feet in depth remains to be done.
210	218	$\frac{1}{2}$	Two chains averaging 3 feet in depth to complete.
218	224	1	Complete except tunnel and filling at girder bridge.
224	228	$\frac{1}{2}$	An average depth of 8 feet to be taken out for $1\frac{1}{2}$ chains.
228	237	$\frac{3}{4}$	
237	242	0	Practically untouched.
242	246	$\frac{1}{2}$	

Chainage from Coonoor.		Approximate amount done.	Remarks.
From	To		
246	256	1	
256	272	$\frac{1}{2}$	
272	277	$\frac{1}{2}$	There remains to complete 3 chains of 3 feet, 5 chains of 16 feet, and 3 chains of 30 feet cutting.
277	281	$\frac{1}{2}$	About two chains to be taken out 3 feet more and the filling to be done.
281	284	$\frac{1}{2}$	Filling at bridge to be done and an aggregate of $2\frac{1}{2}$ chains of 20 feet cutting.
284	290	0	Three chains averaging 6 feet depth of cutting remains.
290	297	$\frac{1}{2}$	
297	303	$\frac{1}{2}$	
303	310	$\frac{1}{2}$	Four chains of 4 feet cutting and the filling remains to be done.
310	323	$\frac{1}{2}$	To complete cutting aggregating 6 chains in length 5 feet in height remains.
323	348	$\frac{1}{2}$	The cutting requires deepening about a couple of feet.
348	399	$\frac{1}{2}$	About 17 chains averaging 3 feet depth of cutting and practically all the bank remains to be done.
399	406	$\frac{1}{2}$	Filling untouched and 21 chains of excavation aggregating 20 feet in depth to be done.
406	408	0	Six chains of cutting averaging 6 feet to be done and all the filling.
408	412	$\frac{1}{2}$	Practically untouched.
412	425	$\frac{1}{2}$	Four chains of 12 feet cutting remains.
425	430	$\frac{1}{2}$	Nine chains of 10 feet cutting and all the filling to be done.
430	433	$\frac{1}{2}$	Five chains of cutting averaging 4 feet in depth required to complete.
433	436	$\frac{1}{2}$	Filling untouched.
436	445	$\frac{1}{2}$	Three chains of 12 feet cutting to be done.
445	450	$\frac{1}{2}$	Five chains of about 30 feet cutting remains to complete.
450	458	$\frac{1}{2}$	Five chains of 18 feet cutting to be done.
458	465	$\frac{1}{2}$	Six chains averaging 9 feet in depth to be excavated.
465	467	$\frac{1}{2}$	Six chains of 8 feet cutting remains.
467	469	$\frac{1}{2}$	Filling untouched. Two chains length to be lowered about 6 feet.
469	472	$\frac{1}{2}$	Fifteen feet depth of excavation for 2 chains to be done.
472	474	$\frac{1}{2}$	One chain of 18 feet cutting and the whole of the filling to complete.
474	487	$\frac{1}{2}$	Fifteen feet depth of cutting for 2 chains still remains to be excavated.
487	490	$\frac{1}{2}$	Fillings untouched; cutting aggregating 11 chains in length and 30 feet in height to be done.
490	498	$\frac{1}{2}$	Three chains of 10 feet cutting to complete.
498	503	$\frac{1}{2}$	Fifteen feet in depth to be taken out for 8 chains.
503	505	$\frac{1}{2}$	Filling untouched and 11 feet depth of cutting to be excavated for 5 chains.
505	515	$\frac{1}{2}$	Two chains of 20 feet cutting remains.
515	527	$\frac{1}{2}$	An aggregate of 10 chains of 11 feet cutting remains.
527	538	$\frac{1}{2}$	About 10 chains of 12 feet cutting remains.
538	542	$\frac{1}{2}$	Eleven chains of 8 feet cutting to be done.
542	550	$\frac{1}{2}$	Excluding probable tunnel about 4 chains of 17 feet cutting remains to be done.
550	567	1	Filling untouched. Excluding probable tunnel about $1\frac{1}{2}$ chains of 15 feet cutting remains.
567	578	$\frac{1}{2}$	
578	585	$\frac{1}{2}$	Filling untouched. Three chains to be excavated a further depth of 15 feet.
585	596	$\frac{1}{2}$	Two chains of 20 feet cutting to be done.
596	607	$\frac{1}{2}$	Nine chains to be taken out 5 feet more.
607	610	$\frac{1}{2}$	Six chains to be deepened 7 feet.
610	618	$\frac{1}{2}$	Filling untouched. Two chains of 9 feet cutting to be done.
618	621	$\frac{1}{2}$	Four chains to be taken out 12 feet more.
621	624	$\frac{1}{2}$	Filling untouched.
624	627	1	Three chains of 7 feet cutting remains.
627	640	$\frac{1}{2}$	
640	925	1	Cutting finished. Two chains of 6 feet filling to be done.

3. **Revetment walls.**—A revetment wall at chainage 257 has just been commenced and at chainage 292 an average height of 9 feet is required to complete the wall there. The walls are standing well and those referred to in the last report are finished.

4. **Bridges (Minor) and Culverts.**—The progress on the minor bridges and culverts is as follows:—

Openings.					Completed.	In progress.
2 x 12" pipe drain	...	...	...	...	2	...
1 x 18" "	...	...	...	...	1	...
1 x 2' culvert	...	...	...	...	2	...
2 x 2' "	...	...	...	...	14	2
3 x 2' "	...	...	...	...	6	2
1 x 4' "	...	...	...	...	1	...
1 x 4' " (arch)	...	...	...	...	1	...
1 x 5' "	...	...	...	...	1	...
1 x 6' "	...	...	...	...	3	...
1 x 6' " (arch)	...	...	...	...	2	...
1 x 7' "	...	...	...	...	...	1
2 x 7' "	...	...	...	...	2	...
1 x 10' " (arch)	...	...	...	...	2	...
1 x 20' girder bridge	...	...	...	...	3	1
Total					40	6

The masonry throughout is extremely good, stone of excellent quality (gneiss) being abundant.

5. **Bridges, Major.**—The progress on the major bridges is as follows:—

Kartary 4 x 60 feet.—Upper abutment completed, first pier 25 feet above ground, second pier just above present water level, being 12 feet from the bottom of the foundations, third pier 26½ feet high, lower abutment complete except as regards wing walls.

Hulikal 1 x 40 feet.—Upper abutment 22 feet up, lower abutment finished.

Runnymede 1 x 60 feet and 1 x 100 feet.—Upper abutment finished, pier 11 feet high, lower abutment 15 feet high. This bridge was originally designed for one span of 100 feet, but has been since increased by one 60 feet opening in consequence of alteration of the main stream.

Coonoor 1 x 60 feet.—The masonry of this bridge is finished.

Bridge No. 104, Chainage 188, 1 x 60 feet.—Lower abutment 10' 6" upper 7' 9" high.

Bridge No. 96, Chainage 223, 1 x 60 feet.—Lower abutment 8 feet high, upper not commenced.

Bridge No. 82-A, Chainage 277, 1 x 60 feet.—Both abutments finished.

Bridge No. 82, Chainage 281, 1 x 60 feet.—Lower abutment 12' 6" high, upper just commenced. This will be the highest bridge on the line, rail level being about 75 feet above the bottom of the nullah.

Bridge No. 75, Chainage 324, 2 x 60 feet.—Stone is being collected.

Bridge No. 34, Chainage 525, 3 x 60 feet.—Foundations of upper and lower abutments and of first pier commenced and about four feet height of masonry built in the second pier.

Bridge No. 31, Chainage 545, 2 x 60 feet and 2 x 40 feet.—The foundations of the upper abutment are in progress, and the masonry in the remainder of the bridge has been built to the following heights: first pier 14 feet, second pier 21½ feet, third pier 20 feet, lower abutment 13 feet.

Bridge No. 22, Chainage 608-5, 1 x 60 feet.—The foundations of both abutments have been commenced.

Bridge No. 21, Chainage 620, 2 × 40 feet.—Lower abutment 10' 6" high, masonry of upper abutment not commenced and the pier not started.

Bhavani bridge 2 × 100 feet and 2 × 60 feet (one at each end).—The 60 feet and the 100 feet span at the Méttupálaiyam end are erected and the main girders of the other 100 feet span are in position. The girders of this span were passed into position between the main girders of the already erected 100 feet span, so that they had to be brought closer together than their proper distance apart. The cross girders of this span are, except two, now service-bolted in position. The remaining 60 feet girders are about to be removed from the Méttupálaiyam land span, where they were used to supplement the permanent girders during the rolling over of the 100 feet spans, to their final position on the Coonoor side. This work will of course be easily carried out, and the numerous difficulties which have occurred in connection with this bridge can be considered as finally overcome.

6. Owing to the fall in the price of exchange and the consequent increased Indian cost of iron work, the economy of crossing the numerous ravines on braced iron standards is questionable, and the Engineer-in-Chief is at present engaged in considering alternative masonry designs. I understand that at the present value of exchange he anticipates the use of stone will effect a small saving.

7. *Tunnels.*—About 120 feet of heading has been driven out of 308 feet of tunnelling at chainage 174.35—177.45. Unfortunately a seam of clay has been met with at about formation level, sloping across the line towards the valley. Over this occurs a layer of solid rock about 20 feet thick, which in the tunnel approach is evidently on the move as the toe of the rock is splitting vertically. It would appear that the clay seam which is very narrow here has been washed out letting the superimposed rock down on to the rocky stratum below. The treatment of this will require careful consideration or a slip of considerable magnitude will occur, but before any decision can be come to it will be necessary to ascertain whether the entrance to the tunnel has been driven through live rock or a large boulder. The Consulting Engineer is about to inspect this tunnel. Of the remaining tunnels, that at chainage 236 has just been commenced. The Coonoor face encounters rather treacherous ground, being rock traversed by nearly vertical seams of clay connected by a horizontal layer at the top. The Méttupálaiyam entrance will be made through a natural cleft in the rock surmounted by an enormous boulder partly buried in the hill side. On the stability of the boulder will probably depend the decision as to converting the tunnel into cutting. Tunnels are also proposed at chainages 540 and 545, but no work has as yet been done.

8. *Ballast.*—For about four miles out of Coonoor a good deal of ballast has been laid. It is retained by dry stone ballast walling, which gives the line a very neat and business appearance. From Kullar station to Méttupálaiyam the line is roughly ballasted. The progress on the ghât section is as follows:—

Chainage.			
0 to 22.5	side drains, ballast walls and ballast spread.		
25 to 30	do.	do.	do.
32 to 38	do.	do.	do.
41 to 46	do.	do.	do.
48 to 50	do.	do.	do.
53 to 68	do.	do.	do.
70 to 80	do.	do.	do.
105.3 to 114.5	do.	do.	do.
115 to 118	do.	do.	do.
123 to 123.5	side drains and ballast walls only.		
123.5 to 133.5	side drains, ballast walls and ballast spread.		
135 to 140	do.	do.	do.
140 to 142	side drains and ballast walls only.		
155 to 157	do.	do.	do.
180 to 187.5	side drains, ballast walls and ballast spread.		
203.5 to 215	do.	do.	do.
598 to 602.5	do.	do.	do.

9. *Permanent-way.*—With the exception of a gap at the Bhavani bridge, the rails have been roughly laid from Méttupálaiyam to Kullar station and this length was trollyed over. The adhesion rails are of the 50 lbs. type connected with six-holed fish plates of a deep section. Twelve miles of rack-rail are stacked at Méttupálaiyam, and six miles are at Calicut where they are retained by the Agra Bank pending payment of charges.

10. *Stations and Buildings.*—On the ghât section the station sites are mostly levelled, and at Runnymede and Hill Grove gang butts are nearly finished. At Kullar the station-house and gang hut are almost completed. At Méttupálaiyam the Engineer-in-Chief wishes to run on to the sidings which are to be eventually used by the Nilgiri Railway, and is desirous that the Madras Railway should complete the station alterations as soon as possible.

11. *Plant, Rolling-stock, &c.*—I gather that the details given in the last report plant, rolling-stock, permanent-way and girders still hold good except as regards the rack-rail referred to in paragraph 9.

12. I understand that the provisional liquidator has only been able to allot Rs. 50,000 for expenditure on works and that the amount has to last till August next. This sum is totally inadequate to admit of much progress being made, and if it can be managed should be supplemented to the fullest extent possible. With funds so limited at his disposal, the Engineer-in-Chief is unable to let out contracts for those works on the line which require considerable command of money for their satisfactory execution, and he is therefore restricted to works within the power of petty contractors. This must mean a great waste of money in the shape of interest on expended capital, as the opening of the railway will be delayed by the non-completion of a few big works. I estimate that the unfortunate financial condition of the Nilgiri Railway Company will postpone the opening of the line by at least nine months even though sufficient funds be forthcoming after August.

MADRAS,
26th May 1894.

(Signed) A. D. G. SHELLEY, Captain, R.E.,
Government Inspector of Railways.

Note by Senior Government Inspector of Railways.

I found on inspection at chain 71 the top of the railway cutting is about 15 feet from the main road. This requires watching.

At chains 98–102 there is danger owing to the dip of the rock and lodgment of water of continual slips, and the Engineer-in-Chief will endeavour to run the line 20 feet further out from the present alignment by carrying on the 328 feet curve. For securing the cutting, a revetment wall at the base and inclined dry stone drains for some distance up the face of the cutting will be necessary.

Chains 103–104.—This cutting is in rock for 20 feet from formation with clay above; arching over will probably secure this against slips.

Chain 171.—The rest-house or chattram above should have a dry stone wall built between verandah pillars as a public protection.

Tunnel at chains 175–178.—I do not think the rock is on the move because at the base there is an open space which would be closed up if the rock was slipping. As a precaution I advise the cracks to be plastered up to ascertain if movement is taking place, and if so, an invert of small radius should be put in and carried to the end of open cut. This tunnel will require lining for two-thirds of its length.

The result of the inspection is satisfactory in regard to the quantity of work done and its quality.

The staff are now transferred from Mr. R. Woolley, contractor, to the official liquidator, and it is very desirable in the interests of the railway that their future services should be secured by whatever agency that completes the railway. For the information of those interested, an estimate should be made of the cost of completing the railway.

OOTACAMUND,
7th June 1894.

(Signed) F. R. UPCOTT,
Senior Govt. Inspector of Railways.

From the Engineer-in-Chief, Nilgiri Railway, to the Consulting Engineer for Railways, dated Coonoor, 18th June 1894, No. 2125.

In reply to your verbal request I have the honour to submit a memorandum showing approximately the proportion of work done on the Nilgiri Railway up to date and the probable amount required to complete it.

2. Full detailed completion estimates are being prepared.

3. It should be noted that this estimate is based on the assumption that the rack and all other material now delivered have been paid for.

ENCLOSURE.

APPROXIMATE estimate showing the proportion of the work done up to the end of June 1894 and the sum required to complete.

Head of estimate.	Proportion already done.	Amount required to complete.
<i>Indian Expenditure.</i>		
I. Preliminary expenses	...	RS.
II. Land	...	...
III. Formation—	...	...
(1) Earthwork	...	3,00,000
(2) Tunnels	...	1,00,000
(3) Retaining walls	...	50,000
IV. Bridgework—	...	...
(1) Major bridges	...	50,000
(2) Minor do.	...	50,000
(3) Viaducts	...	1,50,000
V. Fencing, &c.	...	10,000
VII. Ballast and Permanent-way—	...	...
(1) Ballast	...	40,000
(2) Permanent-way laying	...	1,00,000
(3) Sleepers	...	1,00,000
VIII. Stations and buildings	...	40,000
IX. Plant	...	10,000
XI. Rolling stock	...	50,000
XII. General charges	...	1,00,000
Total, Indian Expenditure	...	11,50,000
<i>English Expenditure.</i>		
(1) Girders	...	RS. 1,50,000
(2) Rolling stock	...	2,50,000
Grand Total	...	4,00,000
		15,50,000

ORDER—dated 21st June 1894, No. 364 R., Public Works.

(Ordered that a copy of the inspection report and of the letter and its enclosure read above be forwarded to the Government of India and to the undermentioned officers for information:—

- (1) Official Liquidator, Nilgiri Railway.
- (2) Examiner, Guaranteed Railway Accounts.

[Here enter No. 365 R., dated 21st June 1894.]

(True Extract.)

(Signed) F. R. UPCOTT,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

To the Official Liquidator.
" Examiner, Guaranteed Railway Accounts.

ENDORSEMENT—dated 21st June 1894, No. 365 R., Public Works.

Forwarded.

(By Order.)

(Signed) F. R. UPCOTT,
Joint Secy. to Govt., P.W.D.,
Railway Branch.

RAILWAY.

Govt. of {1894} Madras.
PUBLIC WORKS.

Dated June, 21st.

Recd.

Encl.

G.O., 21st June 1894, Nos. 364,
365 R.

JUNE.

Nilgiri Railway

Forwarding the inspection report of the
— and letter from the Engineer-in-Chief
stating the probable amount required to
complete the railway for information.

INSPECTION REPORT, NILGIRI RAILWAY.

The inspection was made on 18th, 19th and 23rd May in company with the Engineer-in-Chief and the Assistant Engineers of the railway.

2. **Earthwork.**—The amount of earthwork done is approximately shown in the accompanying tabular statement, which has been mainly derived from the progress section now in course of preparation. Any apparent discrepancies between this statement and that embodied in the inspection report of May 1893 are attributable to slips which must of necessity occur on a line of this description. On the whole, the cuttings are standing well, but there are a few minor slips and a rather heavy one in the Glenmore estate. If funds can be provided, the latter might with advantage be cleared. The banks, where made, appear to have nearly reached their final settlement.

Chainage from Coonoor.		Approximate amount done.	Remarks.
From	To		
0	39	1	The banks will require making up.
39	41	1	
41	50	1	A little filling required at chainage 47-48.
50	60	1	A little excavation to be done at chainage 51-52.
60	70	1	
70	80	1	
80	90	1	About 3 feet of cutting for 5 chains length will complete.
90	100	1	About 6 chains of 1½ feet of cutting still remains to be done.
100	116	1	Four and a-half chains of clearing required owing to a bad slip.
116	118	1	
118	130	1	Practically finished; one chain of 22 feet cutting and 1½ chains 10 feet filling still remaining.
130	136	1	
136	148	1	Three chains of 8 feet and 1½ chains 2 feet cutting required to complete.
148	150	1	One chain of 2 feet cutting will finish.
150	165	1	Three chains of cutting requires to be taken out 8 feet in depth.
165	172	1	Four chains of 10 feet cutting still requires to be done.
172	182	1	The work is complete with the exception of 308 feet of tunnel.
182	191	1	Practically done; only a couple of chains of 3 feet cutting remaining.
191	193	1	
193	198	1	One and a-half chains of 8 feet cutting remains to be done.
198	201	1	Two chains to be taken out about 8 feet more in depth.
201	202	1	
202	210	1	Excavation aggregating two chains in length and 8 feet in depth remains to be done.
210	218	1	Two chains averaging 3 feet in depth to complete.
218	224	1	Complete except tunnel and filling at girder bridge.
224	228	1	An average depth of 8 feet to be taken out for 1½ chains.
228	237	1	
237	242	0	
242	248	1	Practically untouched.
248	256	1	
256	272	1	There remains to complete 3 chains of 3 feet, 5 chains of 16 feet, and 3 chains of 30 feet cutting.
272	277	1	About two chains to be taken out 3 feet more and the filling to be done.
277	281	1	Filling at bridge to be done and an aggregate of 2½ chains of 20 feet cutting.
281	284	1	
284	290	0	Three chains averaging 8 feet depth of cutting remains.
290	297	1	

Chainage from Coonoor.		Approximate amount done.	Remarks.
From	To		
297	303	1	Four chains of 4 feet cutting and the filling remains to be done.
303	310	1	To complete cutting aggregating 6 chains in length 5 feet in height remains.
310	323	1	The cutting requires deepening about a couple of feet.
323	348	1	About 17 chains averaging 3 feet depth of cutting and practically all the bank remains to be done.
348	399	1	Filling untouched and 21 chains of excavation aggregating 20 feet in depth to be done.
399	406	1	Six chains of cutting averaging 6 feet to be done and all the filling.
406	408	0	Practically untouched.
408	412	1	Four chains of 12 feet cutting remains.
412	425	1	Nine chains of 10 feet cutting and all the filling to be done.
425	430	1	Five chains of cutting averaging 4 feet in depth required to complete.
430	433	1	Filling untouched.
433	436	1	Three chains of 12 feet cutting to be done.
436	445	1	Five chains of about 30 feet cutting remains to complete.
445	450	1	Five chains of 18 feet cutting to be done.
450	456	1	Six chains averaging 9 feet in depth to be excavated.
456	465	1	Six chains of 8 feet cutting remains.
465	467	1	Filling untouched. Two chains length to be lowered about 6 feet.
467	469	1	Fifteen feet depth of excavation for 2 chains to be done.
469	472	1	One chain of 18 feet cutting and the whole of the filling to complete.
472	474	1	Fifteen feet depth of cutting for 2 chains still remains to be excavated.
474	487	1	Filling untouched; cutting aggregating 11 chains in length and 30 feet in height to be done.
487	490	1	Three chains of 10 feet cutting to complete.
490	498	1	Fifteen feet in depth to be taken out for 8 chains.
498	503	1	Filling untouched and 11 feet depth of cutting to be excavated for 5 chains.
503	505	1	Two chains of 20 feet cutting remains.
505	515	1	An aggregate of 10 chains of 11 feet cutting remains.
515	527	1	About 10 chains of 12 feet cutting to be done.
527	538	1	Eleven chains of 4 feet cutting remains.
538	542	1	Excluding probable tunnel about 4 chains of 17 feet cutting remains to be done.
542	550	1	Filling untouched. Excluding probable tunnel about 1½ chains of 15 feet cutting remains.
550	567	1	Filling untouched. Three chains to be excavated a further depth of 15 feet.
567	578	1	Two chains of 20 feet cutting to be done.
578	585	1	Nine chains to be taken out 5 feet more.
585	596	1	Six chains to be deepened 7 feet.
596	607	1	Filling untouched. Two chains of 9 feet cutting to be done.
607	610	1	Four chains to be taken out 12 feet more.
610	618	1	Filling untouched.
618	621	1	Three chains of 7 feet cutting remains.
621	624	1	Cutting finished. Two chains of 6 feet filling to be done.
624	627	1	
627	640	1	
640	925	1	

3. Revetment walls.—A revetment wall at chainage 257 has just been commenced and at chainage 292 an average height of 9 feet is required to complete the wall there. The walls are standing well and those referred to in the last report are finished.

4. Bridges (Minor) and Culverts.—The progress on the minor bridges and culverts is as follows:—

Openings.					Completed.	In progress.
2 × 12" pipe drain	...	...	...	...	2	...
1 × 18" "	...	...	...	...	1	...
1 × 2' culvert	...	...	...	...	2	...
2 × 2' "	...	...	...	...	14	2
3 × 2' "	...	...	...	...	6	2
1 × 4' "	...	...	...	...	1	...
1 × 4' " (arch)	...	...	...	...	1	...
1 × 5' "	...	...	...	...	3	...
1 × 6' "	...	...	...	...	2	...
1 × 6' " (arch)	...	...	...	...	...	1
1 × 7' "	...	...	...	...	2	...
2 × 7' "	...	...	...	...	2	...
1 × 10' " (arch)	...	...	...	...	3	1
1 × 20' girder bridge	...	...	...	...	...	...
Total ...					40	6

The masonry throughout is extremely good, stone of excellent quality (gneiss) being abundant.

5. Bridges, Major.—The progress on the major bridges is as follows:—

Karlary 4 × 60 feet.—Upper abutment completed, first pier 25 feet above ground, second pier just above present water level, being 12 feet from the bottom of the foundations, third pier 26½ feet high, lower abutment complete except as regards wing walls.

Hulikal 1 × 40 feet.—Upper abutment 22 feet up, lower abutment finished.

Runnymede 1 × 60 feet and 1 × 100 feet.—Upper abutment finished, pier 11 feet high, lower abutment 15 feet high. This bridge was originally designed for one span of 100 feet, but has been since increased by one 60 feet opening in consequence of alteration of the main stream.

Coonoor 1 × 60 feet.—The masonry of this bridge is finished.

Bridge No. 101, Chainage 188, 1 × 60 feet.—Lower abutment 10' 6" upper 7' 9" high.

Bridge No. 96, Chainage 223, 1 × 60 feet.—Lower abutment 8 feet high, upper not commenced.

Bridge No. 82-A, Chainage 277, 1 × 60 feet.—Both abutments finished.

Bridge No. 82, Chainage 281, 1 × 60 feet.—Lower abutment 12' 6" high, upper just commenced. This will be the highest bridge on the line, rail level being about 75 feet above the bottom of the nullah.

Bridge No. 75, Chainage 324, 2 × 60 feet.—Stone is being collected.

Bridge No. 34, Chainage 525, 3 × 60 feet.—Foundations of upper and lower abutments and of first pier commenced and about four feet height of masonry built in the second pier.

Bridge No. 31, Chainage 545, 2 × 60 feet and 2 × 40 feet.—The foundations of the upper abutment are in progress, and the masonry in the remainder of the bridge has been built to the following heights: first pier 14 feet, second pier 21½ feet, third pier 20 feet, lower abutment 13 feet.

Bridge No. 22, Chainage 608-5, 1 × 60 feet.—The foundations of both abutments have been commenced.

Bridge No. 21, Chainage 620, 2 × 40 feet.—Lower abutment 10' 6" high, masonry of upper abutment not commenced and the pier not started.

Bharani bridge 2 × 100 feet and 2 × 60 feet (one at each end.)—The 60 feet and the 100 feet span at the Méttupálaiyam end are erected and the main girders of the other 100 feet span are in position. The girders of this span were passed into position between the main girders of the already erected 100 feet span, so that they had to be brought closer together than their proper distance apart. The cross girders of this span are, except two, now service-bolted in position. The remaining 60 feet girders are about to be removed from the Méttupálaiyam land span, where they

were used to supplement the permanent girders during the rolling over of the 100 feet spans, to their final position on the Coonoor side. This work will of course be easily carried out, and the numerous difficulties which have occurred in connection with this bridge can be considered as finally overcome.

6. Owing to the fall in the price of exchange and the consequent increased Indian cost of iron work, the economy of crossing the numerous ravines on braced iron standards is questionable, and the Engineer-in-Chief is at present engaged in considering alternative masonry designs. I understand that at the present value of exchange he anticipates the use of stone will effect a small saving.

7. Tunnels.—About 120 feet of heading has been driven out of 308 feet of tunnelling at chainage 174.35—177.45. Unfortunately a seam of clay has been met with at about formation level, sloping across the line towards the valley. Over this occurs a layer of solid rock about 20 feet thick, which in the tunnel approach is evidently on the move as the toe of the rock is splitting vertically. It would appear that the clay seam which is very narrow here has been washed out letting the superimposed rock down on to the rocky stratum below. The treatment of this will require careful consideration or a slip of considerable magnitude will occur, but before any decision can be come to it will be necessary to ascertain whether the entrance to the tunnel has been driven through live rock or a large boulder. The Consulting Engineer is about to inspect this tunnel. Of the remaining tunnels, that at chainage 236 has just been commenced. The Coonoor face encounters rather treacherous ground, being rock traversed by nearly vertical seams of clay connected by a horizontal layer at the top. The Méttupálaiyam entrance will be made through a natural cleft in the rock surmounted by an enormous boulder partly buried in the hill side. On the stability of the boulder will probably depend the decision as to converting the tunnel into cutting. Tunnels are also proposed at chainages 540 and 545, but no work has as yet been done.

8. Ballast.—For about four miles out of Coonoor a good deal of ballast has been laid. It is retained by dry stone ballast walling, which gives the line a very neat and business appearance. From Kullar station to Méttupálaiyam the line is roughly ballasted. The progress on the ghât section is as follows:—

Chainage.			
0 to 22.5	side drains, ballast walls and ballast spread.		
25 to 30	do. do. do.		
32 to 38	do. do. do.		
41 to 46	do. do. do.		
48 to 50	do. do. do.		
53 to 64	do. do. do.		
70 to 80	do. do. do.		
105.3 to 114.5	do. do. do.		
115 to 118	do. do. do.		
123 to 123.5	side drains and ballast walls only.		
123.5 to 133.5	side drains, ballast walls and ballast spread.		
135 to 140	do. do. do.		
140 to 142	side drains and ballast walls only.		
155 to 157	do. do. do.		
180 to 187.5	side drains, ballast walls and ballast spread.		
203.5 to 215	do. do. do.		
598 to 602.5	do. do. do.		

9. Permanent-way.—With the exception of a gap at the Bhavani bridge, the rails have been roughly laid from Méttupálaiyam to Kullar station and this length was trollyed over. The adhesion rails are of the 50 lbs. type connected with six-holed fish plates of a deep section. Twelve miles of rack-rail are stacked at Méttupálaiyam, and six miles are at Calicut where they are retained by the Agra Bank pending payment of charges.

10. Stations and Buildings.—On the ghât section the station sites are mostly levelled, and at Runnymede and Hill Grove gang huts are nearly finished. At Kullar the station-house and gang hut are almost completed. At Méttupálaiyam the Engineer-in-Chief wishes to run on to the sidings which are to be eventually used by the Nilgiri Railway, and is desirous that the Madras Railway should complete the station alterations as soon as possible.

11. Plant, Rolling-stock, &c.—I gather that the details given in the last report plant, rolling-stock, permanent-way and girders still hold good except as regards the rack-rail referred to in paragraph 9.

12. I understand that the provisional liquidator has only been able to allot Rs. 50,000 for expenditure on works and that the amount has to last till August next. This sum is totally inadequate to admit of much progress being made, and if it can be managed should be supplemented to the fullest extent possible. With funds so limited at his disposal, the Engineer-in-Chief is unable to let out contracts for those works on the line which require considerable command of money for their satisfactory execution, and he is therefore restricted to works within the power of petty contractors. This must mean a great waste of money in the shape of interest on expended capital, as the opening of the railway will be delayed by the non-completion of a few big works. I estimate that the unfortunate financial condition of the Nilgiri Railway Company will postpone the opening of the line by at least nine months even though sufficient funds be forthcoming after August.

MADRAS,
26th May 1894.

(Signed) A. D. G. SHELLEY, Captain, R.E.,
Government Inspector of Railways.

Note by Senior Government Inspector of Railways.

I found on inspection at chain 71 the top of the railway cutting is about 15 feet from the main road. This requires watching.

At chains 98–102 there is danger owing to the dip of the rock and lodgment of water of continual slips, and the Engineer-in-Chief will endeavour to run the line 20 feet further out from the present alignment by carrying on the 328 feet curve. For securing the cutting, a revetment wall at the base and inclined dry stone drains for some distance up the face of the cutting will be necessary.

Chains 103–104.—This cutting is in rock for 20 feet from formation with clay above; arching over will probably secure this against slips.

Chain 171.—The rest-house or chatram above should have a dry stone wall built between verandah pillars as a public protection.

Tunnel at chains 175–178.—I do not think the rock is on the move because at the base there is an open space which would be closed up if the rock was slipping. As a precaution I advise the cracks to be plastered up to ascertain if movement is taking place, and if so, an invert of small radius should be put in and carried to the end of open cut. This tunnel will require lining for two-thirds of its length.

The result of the inspection is satisfactory in regard to the quantity of work done and its quality.

The staff are now transferred from Mr. R. Woolly, contractor, to the official liquidator, and it is very desirable in the interests of the railway that their future services should be secured by whatever agency that completes the railway. For the information of those interested, an estimate should be made of the cost of completing the railway.

OOTACAMUND,
7th June 1894.

(Signed) F. R. UPCOTT,
Senior Govt. Inspector of Railways.

Allypore Railway.

Approximate Estimate.

Showing the proportion of the work done up to the end of June 1894 and the sum required to complete.

Indian Expenditure.

Head of Estimate.		Proportion already done	Amount required to complete.
I.	<u>Preliminary Expenses.</u>	.	.
II.	<u>Land.</u>	.	.
III.	<u>Formation</u>		
	(1) Earthwork	$\frac{3}{8}$	3,00,000
	(2) Tunnels	$\frac{1}{8}$	1,00,000
	(3) Retaining Walls	$\frac{1}{2}$	50,000
IV.	<u>Bridgework.</u>		
	(1) Major Bridges	$\frac{3}{4}$	50,000
	(2) Minor — " —	$\frac{1}{2}$	50,000
	(3) Viaducts	$\frac{1}{8}$	1,50,000
V.	<u>Fencing &c.</u>	$\frac{1}{4}$	10,000
VII.	<u>Ballast & P. W.</u>		
	(1) Ballast	$\frac{1}{3}$	40,000
	(2) P. W. laying	$\frac{1}{4}$	1,00,000
	(3) Sleepers	$\frac{1}{4}$	1,00,000
VIII.	<u>Station & Buildings.</u>	$\frac{1}{3}$	40,000
IX.	<u>Plant.</u>	$\frac{3}{4}$	10,000
XI.	<u>Rolling Stock.</u>	$\frac{1}{5}$	50,000
XII.	<u>General Charges</u>	$\frac{1}{2}$	1,00,000
Total Indian Expenditure Rs.			11,50,000
<u>English Expenditure</u>			
	(1) Girders	Rs. 1,50,000	
	(2) Rolling Stock	2,50,000	4,00,000
Grand Total Rs.			15,50,000.

Cronover }
June 18th 1894.

L. McLaughlin
ENGINEER IN CHIEF,
N. R.

No. 2125.

Recd
The Nilgiri Railway.

COONNOOR, 15th June 1894.

FROM

THE ENGINEER-IN-CHIEF,

NILGIRI RAILWAY,

COONNOOR.

TO

*The Consulting Engineer
for Railways
Pottamunda.*

Sir,
In reply to your verbal request I have the honor to submit a Memo. showing approximately the proportion of work done on the Nilgiri Railway up to date and the probable amount required to complete it.

2. Full detailed completion estimates are being prepared.

3. It should be noted that this estimate is based on the assumption that the rack and all other material now delivered has been paid for.

*I have the honor to be
Sir
Your most obedt. Servt.*

W. J. W. C. Pottamunda

ENGINEER IN CHIEF,
N. R.

Cir.

His Excellency the Governor
San M. Blas

San M. Blas

The Adventure Soldiers
I have await the in-
formation from herein
as to actual state of
the works before making
up their minds to finish
the line themselves a
well

San M. Blas
18/6

Inspection report for
section of the bridge
By.

Submitted for the
information of Govt.

F. H. C. C.

Then the sooner they see it, the better.
I understand that whenever the line
is taken over by any party in earnest,
it will take 12 months to complete.

19/6/94
17 June
19/6/94

Draft necessary order
and down in print
W. W. Whitman's letter
as testimony to be also
printed.

San M. Blas
18/6/94

364 R 21 June 1894.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

8 D
READ the following

Inspection Report, Nilgiri Railway

Letter from the Engr. } H.E. no 2125 of 18 June 1894
in Ch. Nilgiri Railway

Ordered that
a copy of the Inspection
Report, and of the letter
its enclosure herewith,
be forwarded to the Govt.
of India, & to the under-
mentioned offices for
information.

- (1) Official Liquidator Nilg.
2. Engr. Ch. Nilgiri
3. Mr. P. Macleod

(2) Examined by R. J. ...

To Official Liquidator
- Engr. Ch. Nilgiri
- Mr. P. Macleod
- Ex. B. R. ...

seen by E.R. 21/6

H.E. no 365 R of 21 June 1894
signed by ...
29/6/94
showed ...
27/7/94

MS. 17/6
in 15/6/94 R. 20/6

31
 Sir
 1 copy to off. Secy.
 1 copy to Secy.
 1 copy to Mr. C.
 1 copy to Mr. Percy
 1 copy to Mr. W. J.

GOVERNMENT OF MADRAS.

Public Works Department,
RAILWAY BRANCH,
OOTACAMUND.

27th June 1906

Dear Mackenzie

You shall have a copy of the official report on the Nilgiri Rail. way when ready.

I think I will keep the Palghat-Dividegate paper for you here as you return next month. I understand

Yours

Hoping you are well
Sincerely yours
W. F. R. Apple

John Mackenzie
Myra
S. Wyman.

GOVERNMENT OF MADRAS.

Public Works Department,
RAILWAY BRANCH,
OOTACAMUND.

29th June 1894

Dear Sirs

— " — Wightman
— " — Mackenzie
— " — Woolley.

I send herewith,
for your information, a
copy of G.O. No: 364 R of
21st June 1894, embodying
the Inspection Report
on the Nilgiri Railway.
Yours sincerely
H. J. A. Updegraff.

Office of Consulting Engineer
FOR RAILWAYS,
OOTACAMUND,

189 .

W. Calder -

See
D.A. 2
relating

the plan is
presented with the
office copy of the In-
spection report

the following are
those a copy of the
report deposited

W. Weylertum

" ~~Weylertum~~

" P. Woolley

" C. Mackenzie

For

-cc-

OK
2/10

D.R.

5 Please attach
these papers to case
Nilgiri Ry Inspection
Report -

OK
5/11

Hd.
29/6