

Public Works (1897) Department.

G.O., No. 343.44

DATED 13. May 1877

[Despatch Abstract.]

Nilgiri Railway: Ordered that the Senior Govt Inspector's Report of inspection of the — be forwarded to the Govt of Ind. and to certain officers for information.

Nilgiri Railway: Forwarding Pts:
embodying the Senior Govt Inspectors
reports of inspection of the —.

1. The first group of people who are not allowed to enter the country are those who are not citizens of the United States.

24/5/77

1. *Introduction*

18/5/97

[illegible][illegible]

Government {1897} of Madras.
PUBLIC WORKS.

Spare copies

MAY.

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GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read the following paper :—

Report of an inspection of the Nilgiri Railway, made by the Senior Government Inspector of Railways, Madras, during the month of April 1897.

ORDER—No. 343 R., dated 13th May 1897.

Ordered that a copy of the inspection report be forwarded to the Government of India and to the undermentioned officers for information :—

- (1) The Agent and Chief Engineer, Nilgiri Railway.
- (2) The Examiner of Railway Accounts.

[Here enter No. 344 R., dated 13th May 1897.]

(True Extract.)

Under Secretary to Government,
Railway Branch.

To the Agent and Chief Engineer, Nilgiri Railway.
„ Examiner, Guaranteed Railway Accounts.

End. T. K. Narayana Aiyangar.

NILGIRI RAILWAY.

METRE GAUGE, 16 $\frac{3}{4}$ MILES.

Report of an inspection made by the Senior Government Inspector of Railways, Madras, during the month of April 1897.

The inspection was made on April 15th, 16th and 17th in company with the Company's Agent and Chief Engineer, and of his officers over their respective sections. On the 15th I inspected from Mettuppálaiyam to Kullar bridge, by train and trolley; on the 16th, from Coonoor to Hillgrove station on foot; and on the 17th, also on foot, from Hillgrove station to Kullar bridge.

2. The chief significance of the present report lies in its probably being the last before the line is offered for inspection prior to opening for traffic. I shall therefore lay special stress upon those matters which seem to me to demand attention before permission for opening can be accorded. The inspection reports of 1895 and 1896 give very full details of construction and of progress; so I shall, on the present occasion, refrain from repeating these details.

3. I shall now endeavour to give a general bird's eye view of the state of progress throughout the line, adhering, as in previous reports, to the division of the line into the following sections :—

I. Coonoor to Runnymede	...	...	...	...	...	3 miles.
II. Runnymede to Hillgrove	...	...	...	...	...	3 "
III. Hillgrove to Adderley	...	...	...	...	...	3 "
IV. Adderley to Kullar	...	...	...	...	...	3 "
V. Kullar to Mettuppálaiyam	...	...	...	...	...	4 $\frac{1}{2}$ "

4. *State of Progress.—Formation.*—Section I, practically completed, except that steps must still be taken to cure the slips in the cuttings at chains 65, 87, 98, and 144. Section II—Some cuttings still remain unfinished, mostly those in which there is a core of rock; two months, however, will see these through. Some cuttings, notably those at chain 170, 241, 264 and 270, are likely to give trouble and will need special treatment as experience during the coming rains may dictate. Section III, from Hillgrove, chain 305, to chain 407.—There are perhaps two or three months more of work to be done on several cuttings, one or two of which will need special attention. From chain 407 to chain 447 a good deal of work still remains unfinished and it will be fully, as I judge, four or five months before these 40 chains are ready for the rails. It is here, at chain 411, that is to be found perhaps the most dangerous cutting on the line; it shall be referred to in detail further on. There are, perhaps, two months' work on the formation between chain 447 and Adderley, chain 490. Section IV.—Between Adderley and Kullar there is no unfinished work which two months more will not see through. Section V, from Kullar to Mettuppálaiyam, is practically finished. *Bridging.*—Masonry between Coonoor and Mettuppálaiyam is, I think, about nine-tenths finished. Two months more ought to see the end of the bridge masonry, but there will probably be some revetment work to be done all through, and after, next rains. Owing to the practical impossibility of road transport for heavy weights, girders cannot be got into place until rails get up. *Tunnels.*—Except at tunnel No. IX, of which some 80 feet are still in heading, all tunnels are finished, with the exception of some work which I shall refer to in detail later on in this report. *Platelaying.*—Except for a short break in a cutting, platelaying has been completed from Mettuppálaiyam to the Kullar bridge, and about 30 chains more have been done between Runnymede and Hillgrove. The work is of so special a nature that the best progress of a platelaying gang will probably never be greater than three chains per day, and it may scarcely average two.

5. *Cuttings needing special treatment.*—In paragraph 4 I referred briefly to ten or twelve cuttings which will need special treatment. All these have been under Mr. Weightman's careful consideration; and the measures which he is adopting at most of them, whether extra sloping, or the clearing out of pockets of soft stuff, or the drainage of springs, or the building of retaining walls, seem to me to be likely to result in securing a line as free as may be from interruption during the rains. But the cases of some of these cuttings are so serious, and the expenditure involved in securing them seems likely to be so large, and the risk to the travelling public of leaving them insecure is so great, that I think it necessary to be very emphatic in expressing what I consider ought to be done to secure them. (a) Chain 65—About 100 feet of retaining wall 7 feet high, fit to become the side wall hereafter of a cut-and-cover, will here be necessary, together with such remedial treatment of the slip, above the line, as experience during next rains may suggest. (b) Chains 97–100—This is the sloppy troublesome slip referred to as the Glenmore slip in previous reports. The Engineer-in-Chief has represented that the draining of this slip of its spring water, by the digging and filling with stone of deep interlacing cross gaps, as recommended in the last report, will be very difficult or impossible; I have therefore advised him to try tapping the springs by driving horizontally into the soft stuff as far as the rock, in the neighbourhood of the springs, shorter or longer lengths of closely perforated iron piping, so as to provide lines of least resistance for the water, and so to lead it out into the side drains. This, combined with a retaining wall, which may, if necessary hereafter, serve for a side wall for a cut-and-cover, will, I think, be all that is needed at present; it will be a cheap contrivance, and it *may* have a permanent effect. (c) The cutting in soft moorum and kaolin at chain 264 will probably go on disintegrating and slipping for years, though it is not very badly impermeated with springs. The cutting seems to be through an old land slip. To minimise as far as possible the chances of the line being obstructed, it will be well to leave a broad berm outside the side drain, so as to give the inevitable slips a chance of getting cleared away before they accumulate on to the rails. A steeper slope and a level berm will here be better than a flatter slope and no berm. (d) The side cutting from chain 410 to 412 is, I think, the most dangerous one on the line. It is in clay, and over and mixed with the clay are some gigantic boulders weighing each many hundred tons. These and the clay are all on the slide, though the line itself is apparently on a good hard bottom. This slip *must* be treated at once, for it would be impossible to allow the line to be opened for traffic in the face of the continual menace of the great boulders, which, with the earth they are bedded in, are even now on the move. The place might be tunnelled and a corner cut off; but cut-and-cover, without cutting off the corner, will be cheaper, quicker and easier, while equally effective, if a thick cushion of clay be laid over the roof. This may cost anything from Rs. 20,000 to Rs. 30,000, but it is inevitable. A perusal of paragraph 8 of last report shows that it could not easily have been foreseen by the Engineer-in-Chief.

6. *Tunnels needing special treatment.*—It would be impossible to allow a line to be opened, especially a rack line like this, so long as there is a serious risk of falls of rock from the roofs of the tunnels. In the case of doubtful tunnels, where it may perhaps be safe to leave lining alone for the present, they can easily enough be lined hereafter if necessary, while trains are running, by the use of a travelling gantry with a short length of centering, to be shunted out on a siding in the day time, and used at night for building a corresponding length of lining. For tunnel No. VIII the possibility of this must be looked forward to for 25 feet of the upper end; the lower end of the same tunnel is unsatisfactory, but it will suffice for the present if a certain great fissure is carefully built in from properly cut skewbacks. I do not consider that the rest of the tunnel at present needs half-lining, the rock though fissured seems sound. Tunnel No. V—Some loose bits of rock must be brought down. Tunnel No. III—About 25 feet of the upper end of this must be lined, and the same length of the lower end. Much of the roof of this tunnel is doubtful, consisting as it does of horizontal strata of rock not too hard. It will not be necessary to line the whole of it if the rock be high groined like a deep gothic arch. This may be done for a quarter of the money that it would cost to line it, and will be equally effective. Tunnel No. II—Twenty-five feet of the south end are being lined, and 25 feet of the north end require lining also, the rest is good enough. This is all that

I would say is really necessary to do to the tunnels if the line is to be fit for opening; but there is no doubt that some of them would be more satisfactory for a little more lining. This, however, as I have explained, can be done at any time hereafter if experience should prove it to be necessary.

7. *Bridges needing special treatment.*—I was informed that a flood has reached up to within 15 inches of the bottom of the plate girders of the Bhavani bridge near Mettuppalaïyam. With the inevitable extension of cultivation and jungle clearing, the maximum flood line in these parts will rise if anything higher, and certainly not lower, in future years. The rail level of this bridge ought to be raised fully 15 inches more so as to give a clearance of 2'-6".

8. *Station Buildings.*—Except at Coonoor these are everywhere practically ready for opening; at Coonoor work is proceeding on the upper storey of the building. It is proposed to work with a station or home signal only, and to compulsorily stop all descending trains outside the points of the catch sidings. There will be only one crossing place; the other stations will be watering stations, and may get a little local traffic.

9. *General.*—The details of construction have been so fully described in previous reports that it is unnecessary to repeat them here. The work throughout is of excellent quality, and each detail of design and of work gives evidence of the extreme care with which Mr. Weightman has treated it. It may perhaps strike a casual observer that the staff is needlessly large for so short a piece of line; but an experience of the physical labour involved in a five-mile inspection, and even in reaching the line from the road, is sufficient to prove that every man on the staff is necessary if work is to be properly supervised. A rack railway to be safe must be practically faultless both in its track and in its road bed; and, when the matters to which I have called attention have been attended to, the Nilgiri railway, if it continues to be laid with the same care as has been devoted to its lower part, will be as nearly as possible faultless. My inspection took place during and after a fall of about 4½ inches of rain, but no harm was done anywhere, and side drains and culverts worked well. There are a few corrugated galvanized culverts. These ought to be fully embedded in concrete. They should, in fact, merely form centerings for concrete culverts, as they rust very fast and may give trouble hereafter. In a few places trees growing on the edges of cuttings require cutting down.

10. *Probable date of opening.*—I think it most unlikely that the Nilgiri Railway can be offered for opening before the end of March 1898, unless the Engineer-in-Chief is at once given a free hand to carry out the works which, in the above paragraphs, I have stated to be essential for the public safety. If there is no delay in his receiving the necessary sanction, it may perhaps be possible to open on the 1st of January 1898.

11. *Extension to Ootacamund.*—In a few days I hope to make an inspection of the route contemplated for the extension to Ootacamund, and to advise about the site for the terminal station at that place, a much vexed question which has been greatly exercising the minds of those locally interested.

OOTACAMUND,
21st April 1897.

F. J. E. SPRING, M. INST. C.E., M. AM. SOC. C.E.,
Senior Government Inspector of Railways, Madras.

2

RAILWAY.

Government {1897} of Madras.
PUBLIC WORKS.

Recd.

Enclosures

Regd.

} 1897.

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G.O., Nos. 343, 344 R., 13th May 1897.

MAY.

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Forwarding Proceedings embodying the Senior Government Inspector's report of inspection of the —.

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21st April 1897.

F. J. E. SPRING, M. INST. C.E., M. AM. SOC. C.E.,
Senior Government Inspector of Railways, Madras.

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V. Kullar to Mettuppálaiyam	...	...	...	...	...	$4\frac{1}{2}$ "

4. *State of Progress.—Formation.*—Section I, practically completed, except that steps must still be taken to cure the slips in the cuttings at chains 65, 87, 98, and 144. Section II—Some cuttings still remain unfinished, mostly those in which there is a core of rock; two months, however, will see these through. Some cuttings, notably those at chain 170, 241, 264 and 270, are likely to give trouble and will need special treatment as experience during the coming rains may dictate. Section III, from Hillgrove, chain 305, to chain 407.—There are perhaps two or three months more of work to be done on several cuttings, one or two of which will need special attention. From chain 407 to chain 447 a good deal of work still remains unfinished and it will be fully, as I judge, four or five months before these 40 chains are ready for the rails. It is here, at chain 411, that is to be found perhaps the most dangerous cutting on the line; it shall be referred to in detail further on. There are, perhaps, two months' work on the formation between chain 447 and Adderley, chain 490. Section IV.—Between Adderley and Kullar there is no unfinished work which two months more will not see through. Section V, from Kullar to Mettuppálaiyam, is practically finished. *Bridging.*—Masonry between Coonoor and Mettuppálaiyam is, I think, about nine-tenths finished. Two months more ought to see the end of the bridge masonry, but there will probably be some revetment work to be done all through, and after, next rains. Owing to the practical impossibility of road transport for heavy weights, girders cannot be got into place until rails get up. *Tunnels.*—Except at tunnel No. IX, of which some 80 feet are still in heading, all tunnels are finished, with the exception of some work which I shall refer to in detail later on in this report. *Platelaying.*—Except for a short break in a cutting, platelaying has been completed from Mettuppálaiyam to the Kullar bridge, and about 30 chains more have been done between Runnymede and Hillgrove. The work is of so special a nature that the best progress of a platelaying gang will probably never be greater than three chains per day, and it may scarcely average two.

5. *Cuttings needing special treatment.*—In paragraph 4 I referred briefly to ten or twelve cuttings which will need special treatment. All these have been under Mr. Weightman's careful consideration; and the measures which he is adopting at most of them, whether extra sloping, or the clearing out of pockets of soft stuff, or the drainage of springs, or the building of retaining walls, seem to me to be likely to result in securing a line as free as may be from interruption during the rains. But the cases of some of these cuttings are so serious, and the expenditure involved in securing them seems likely to be so large, and the risk to the travelling public of leaving them insecure is so great, that I think it necessary to be very emphatic in expressing what I consider ought to be done to secure them. (a) Chain 65—About 100 feet of retaining wall 7 feet high, fit to become the side wall hereafter of a cut-and-cover, will here be necessary, together with such remedial treatment of the slip, above the line, as experience during next rains may suggest. (b) Chains 97–100—This is the sloppy troublesome slip referred to as the Glenmore slip in previous reports. The Engineer-in-Chief has represented that the draining of this slip of its spring water, by the digging and filling with stone of deep interlacing cross gaps, as recommended in the last report, will be very difficult or impossible; I have therefore advised him to try tapping the springs by driving horizontally into the soft stuff as far as the rock, in the neighbourhood of the springs, shorter or longer lengths of closely perforated iron piping, so as to provide lines of least resistance for the water, and so to lead it out into the side drains. This, combined with a retaining wall, which may, if necessary hereafter, serve for a side wall for a cut-and-cover, will, I think, be all that is needed at present; it will be a cheap contrivance, and it may have a permanent effect. (c) The cutting in soft moorum and kaolin at chain 264 will probably go on disintegrating and slipping for years, though it is not very badly impermeated with springs. The cutting seems to be through an old land slip. To minimise as far as possible the chances of the line being obstructed, it will be well to leave a broad berm outside the side drain, so as to give the inevitable slips a chance of getting cleared away before they accumulate on to the rails. A steeper slope and a level berm will here be better than a flatter slope and no berm. (d) The side cutting from chain 410 to 412 is, I think, the most dangerous one on the line. It is in clay, and over and mixed with the clay are some gigantic boulders weighing each many hundred tons. These and the clay are all on the slide, though the line itself is apparently on a good hard bottom. This slip must be treated at once, for it would be impossible to allow the line to be opened for traffic in the face of the continual menace of the great boulders, which, with the earth they are bedded in, are even now on the move. The place might be tunnelled and a corner cut off; but cut-and-cover, without cutting off the corner, will be cheaper, quicker and easier, while equally effective, if a thick cushion of clay be laid over the roof. This may cost anything from Rs. 20,000 to Rs. 30,000, but it is inevitable. A perusal of paragraph 8 of last report shows that it could not easily have been foreseen by the Engineer-in-Chief.

6. *Tunnels needing special treatment.*—It would be impossible to allow a line to be opened, especially a rack line like this, so long as there is a serious risk of falls of rock from the roofs of the tunnels. In the case of doubtful tunnels, where it may perhaps be safe to leave lining alone for the present, they can easily enough be lined hereafter if necessary, while trains are running, by the use of a travelling gantry with a short length of centering, to be shunted out on a siding in the day time, and used at night for building a corresponding length of lining. For tunnel No. VIII the possibility of this must be looked forward to for 25 feet of the upper end; the lower end of the same tunnel is unsatisfactory, but it will suffice for the present if a certain great fissure is carefully built in from properly cut skewbacks. I do not consider that the rest of the tunnel at present needs half-lining, the rock though fissured seems sound. Tunnel No. V—Some loose bits of rock must be brought down. Tunnel No. III—About 25 feet of the upper end of this must be lined, and the same length of the lower end. Much of the roof of this tunnel is doubtful, consisting as it does of horizontal strata of rock not too hard. It will not be necessary to line the whole of it if the rock be high grained like a deep gothic arch. This may be done for a quarter of the money that it would cost to line it, and will be equally effective. Tunnel No. II—Twenty-five feet of the south end are being lined, and 25 feet of the north end require lining also, the rest is good enough. This is all that

I would say is really necessary to do to the tunnels if the line is to be fit for opening; but there is no doubt that some of them would be more satisfactory for a little more lining. This, however, as I have explained, can be done at any time hereafter if experience should prove it to be necessary.

7. *Bridges needing special treatment.*—I was informed that a flood has reached up to within 15 inches of the bottom of the plate girders of the Bhavani bridge near Mettuppálaiyam. With the inevitable extension of cultivation and jungle clearing, the maximum flood line in these parts will rise if anything higher, and certainly not lower, in future years. The rail level of this bridge ought to be raised fully 15 inches more so as to give a clearance of 2'-6".

8. *Station Buildings.*—Except at Coonoor these are everywhere practically ready for opening; at Coonoor work is proceeding on the upper storey of the building. It is proposed to work with a station or home signal only, and to compulsorily stop all descending trains outside the points of the catch sidings. There will be only one crossing place; the other stations will be watering stations, and may get a little local traffic.

9. *General.*—The details of construction have been so fully described in previous reports that it is unnecessary to repeat them here. The work throughout is of excellent quality, and each detail of design and of work gives evidence of the extreme care with which Mr. Weightman has treated it. It may perhaps strike a casual observer that the staff is needlessly large for so short a piece of line; but an experience of the physical labour involved in a five-mile inspection, and even in reaching the line from the road, is sufficient to prove that every man on the staff is necessary if work is to be properly supervised. A rack railway to be safe must be practically faultless both in its track and in its road bed; and, when the matters to which I have called attention have been attended to, the Nilgiri railway, if it continues to be laid with the same care as has been devoted to its lower part, will be as nearly as possible faultless. My inspection took place during and after a fall of about $4\frac{1}{2}$ inches of rain, but no harm was done anywhere, and side drains and culverts worked well. There are a few corrugated galvanized culverts. These ought to be fully embedded in concrete. They should, in fact, merely form centerings for concrete culverts, as they rust very fast and may give trouble hereafter. In a few places trees growing on the edges of cuttings require cutting down.

10. *Probable date of opening.*—I think it most unlikely that the Nilgiri Railway can be offered for opening before the end of March 1898, unless the Engineer-in-Chief is at once given a free hand to carry out the works which, in the above paragraphs, I have stated to be essential for the public safety. If there is no delay in his receiving the necessary sanction, it may perhaps be possible to open on the 1st of January 1898.

11. *Extension to Ootacamund.*—In a few days I hope to make an inspection of the route contemplated for the extension to Ootacamund, and to advise about the site for the terminal station at that place, a much vexed question which has been greatly exercising the minds of those locally interested.

OOTACAMUND,
21st April 1897.

F. J. E. SPRING, M. Inst. C.E., M. Am. Soc. C.E.,
Senior Government Inspector of Railways, Madras.

N. 343 dated 13/5/97

PROCEEDINGS OF THE MADRAS GOVERNMENT.

- A/-*
- (1) His Excellency the Governor
 - (2) The Honble Mr. Cross, C.S.

Read the following

Report on Inspection of the Nilgiri Ry. 21st April 97

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Ordered that a copy of the Inspection report be forwarded to the Government of India and to the undermentioned officers for information:-

- (1) The Agent & Ch. Insp. Nilgiri Ry
- (2) ~~The Official Legislature~~
- (3) ~~The Agent & Ch. Insp. Nilgiri Ry~~
- (4) The Examiner of Ry. Accs.

148 No 344. D 27/3 May 1897
Forwarded.

- To
- The Agent & Ch. Insp. Nilgiri Ry
- ~~The Official Legislature~~
- ~~The Agent & Ch. Insp. Nilgiri Ry~~
- ~~The Examiner of Ry. Accs.~~

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