

Urgent

Public Works (1899) Department.

RAILWAY BRANCH.

G.O., No. 228.29. *Ry*

DATED 23rd Feb 1899.

*122
2
20
36
1* *enclosed both*

[Despatch Abstract.]

Calicut-Cannanore Railway

Ordered that the letter from the Govt conveying sanction to the adoption of a grade of 1 in 150 on miles 25 to 36 of the line, & of steeper grades on miles 36 to 40; also to the acquisition of the collection of materials, & the commencement of so much of the construction work of the line as will not prejudice the gauge question, be commd to the Cons. Engrs for issue of the necessary instructions to the Agent, Engrs Coy, & a copy of the Pros furnished to the Agent.
Forwarding copy of Pros embodying the comments of the Cons. Engrs for the M. S. Engrs, on the note by the Director of Ry Construction on the — project, from miles 25 to 44 & 44 to 59 of the —

RAILWAY.

Government (1899) of Madras.
PUBLIC WORKS.

Recd.

Regd.

} 1899.

Enclosures

Spare copies

G.O., Nos. 228, 229 Ry., 23rd February 1899.

FEBRUARY.

Calicut-Cannanore Railway

Forwarding copy of Proceedings embodying the comments of the Consulting
Engineer for Railways, Madras, on the note by the Director of Railway Construction
on the — project.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read again the following paper:—

G.O., Nos. 1451-52 Ry., dated 24th November 1898.

Read also the following papers:—

Telegram from—The Joint Secy. to the Govt. of Madras, P.W. Dept., Ry. Branch.
To—The Secretary to the Government of India, Public Works Department.
Dated—Madras, 14th January 1899, No. 5 B.

Agent Madras Railway says Mr. Upcott is under the impression that there is no obstacle to acquisition Cannanore land beyond mile 26. But in your 1607 R.C. progress beyond that mile was forbidden and no reply yet received to my 1452 Ry. November 24th forwarding finally revised alignment and asking for orders so that land might be acquired. Please wire whether land acquisition may proceed.

Telegram from—The Secretary to the Government of India, Public Works Dept.
To—The Joint Secretary to the Government of Madras, P.W. Dept., Ry. Branch.
Dated—Calcutta, 25th January 1899, No. 010 R.C.

Your telegram numbered and dated as follows, 5 B. 14th instant, and your letter numbered and dated as follows, 1452 Ry. 24th November last. Grading 1 in 150 accepted from mile 26 to 56 but long and undrained cuttings should be avoided. Between miles 56 and 60 steep grades to be adopted. Acquisition land, collection material and commencement work may now proceed. Letter follows.

From—The Secretary to the Government of India, Public Works Department.
To—The Joint Secretary to the Government of Madras, P.W. Dept., Ry. Branch.
Dated—Simla, 3rd February 1899, No. 194 R.C.

I am directed to confirm the Public Works Department telegram quoted in the margin, conveying the sanction of the Government of India to the adoption of a

grade of 1 in 150 on miles 26 to 56 of the Calicut-Cannanore Railway, and of steeper grades on miles 56 to 60; also to the acquisition of land, the collection of material and the commencement of so much of the construction work of the line as will not prejudice the gauge question.

2. I am at the same time to forward herewith, for consideration, copy of a note by the Director of Railway Construction, dated 5th January 1899, on the project from miles 26 to 59, and to say that the alignment between miles 56 and 60 should be laid down with a ruling grade of 1 in 80 as indicated in the last paragraph thereof.

ENCLOSURE.

Note, dated 5th January 1899, by the Director of Railway Construction on the Project from Miles 26 to 44 and 44 to 59 of the Calicut-Cannanore Extension.

Only plans and sections of the line have been submitted, but no estimates at all except a priced table of quantities of the earthwork for miles 26-44 and of the land for same. No quantities are given for miles 44-59.

2. The information given on the plan is exceedingly meagre, as apparently little or no planableness was done, and no index plan has been sent, so it is very difficult to scrutinize the alignment. Judging, however, from the information given on the plans, it does not seem that the line has been located with that detailed carefulness by which alone an economical alignment can be obtained in a country such as this appears to be. The love of long straight lines is evident in nearly every sheet of the project, though the introduction of more curvature would apparently often conduce to economy (e.g., at miles 26½, 27, 27½, 33½, 37½ perhaps, 49½, 51, 54½, 55 and 58, and perhaps other places, but the information on the plans is too meagre to show it with certainty).

3. The sections are graded to 1 in 150, and the Consulting Engineer says that he considers this to be the proper grade for the country; but the banks and cuttings are usually heavy and in some cases very heavy, and there is no doubt that the adoption of a steeper gradient would save a great deal of earthwork. It would also seem that in a country like this, and with such a heavy rainfall, it is very desirable to avoid long cuttings and to arrange that such cuttings as are unavoidable shall be so graded as to give thoroughly efficient drainage.

4. The following alterations in alignment and grading suggest themselves:—

- (a) Miles 26½ to 27½.—Judging from the plans, work might be saved by slewing the alignment to the west at cutting 86 and to the east at mile 27; the curvature need not be excessive, and crossing the Murat river slightly skew to the alignment selected need be no disadvantage.
- (b) Bridge No. 88.—A 60-foot girder in a 14-foot bank seems an extravagant design. The channel crossed looks very unimportant on the plan. A 3×20 feet would probably be cheaper.
- (c) Cutting No. 87 might be graded both ways to 1 in 100 with advantage, both to drainage and cost; and unless headway for boats is required at bridge No. 88, the grade might be run down and bank No. 86 made 4 or 5 feet lower.
- (d) Mile 30½.—Cutting No. 91 is nearly 3,000 feet long without a single cross outlet. It might be much shortened by grading to 1 in 100 with advantage.
- (e) Mile 31½.—Cutting No. 93 is 1,600 feet long usually level without a single outlet. It should be graded both ways to facilitate drainage. This would also save work, especially if 1 in 100 be adopted.
- (f) Miles 33 and 34.—If the meagre details given on the plans indicate what they would seem to do, the introduction of a little more curvature would reduce work at cuttings 94, 96 and 98 and probably on the intermediate bank and perhaps elsewhere.
- (g) Mile 36.—Mahé station seems to fall in a very awkward place, and is graded 1 in the lower and level end of a cutting, 2,200 feet long, which would give trouble with heavy rainfall. The pencil grading seems preferable and could be adopted even with 1 in 150 grades.
- (h) Mile 37½.—Cuttings 109 and 110 should be regraded to reduce work in the cuttings even if it be increased in the banks. Here and elsewhere the advisability of utilizing the spoil of the cuttings in the banks, and thereby saving money both in land and earthwork, appears to have been overlooked.
- (i) Mile 42.—Cutting No. 119 is 4,000 feet long, of which 3,300 feet is graded in one direction without a single outlet for drainage, and it intersects a large number of deeply-sunk pathways which must be nullahs in heavy rain. Reverse grades at a higher level should be adopted to improve drainage and, if 1 in 100 be adopted, would save work.
- (j) Mile 45.—Cutting No. 124 is 3,200 feet long, graded both ways. But if the 1 in 150 grade be taken straight across bridge 124, and there is no reason why it should not, the formation could be raised 6 to 8 feet and work saved and drainage improved.
- (k) Miles 49 to 50.—The reason for crossing the Yerana river 3 times is not evident and the alignment looks susceptible of improvement. Also bridge No. 139 with two spans of 40 feet in a 10-foot bank seems extravagant. Four spans of 20 feet would surely be equally efficient and certainly cheaper.
- (l) Miles 51 and 52.—The work here is very heavy, containing cutting No. 129, 2,200 feet long and 46 feet deep on a curve, and bank No. 130, 4,000 feet long and 22 feet deep, and must surely admit of better alignment, though the plan is too meagre to show exactly how. If realignment is impossible, the adoption of a 1 in 100 grade would probably save at least Rs. 23,000 and be much easier maintained.
- (n) Miles 54 to 55.—Realignment seems possible here also to reduce the big bank No. 137 and perhaps the cuttings too; and if 1 in 100 is adopted at mile 51, it should be adopted here, and a saving of at least Rs. 10,000 effected thereby.

(c) Miles 56 to 59.—This is very heavy, and the adoption of a 1 in 100 grade would save at least Rs. 60,000 on the selected alignment. But it is difficult to understand what sort of country this can be where heavy cuttings, such as this, cannot be avoided or largely reduced by more careful alignment and sharper curvature.

5. From the above remarks it is clear that although a very noticeable improvement has been already effected on the original project (which was estimated to cost Rs. 82,03,482 for 59 miles, i.e., an average of Rs. 1,39,042 per mile), yet there is still room for further economy in alignment and considerable improvement in detail, particularly in the drainage of cuttings; and the Consulting Engineer should be directed to have the matter further investigated.

6. As regards grading, I think it may be taken that the adoption of 1 in 100 instead of 1 in 150 ruling grade would save, in round numbers, about Rs. 50,000 between miles 26 and 50; and also Rs. 1,00,000 more between miles 50 and 59½ in earthwork alone; and probably about Rs. 25,000 and Rs. 30,000 more, respectively, in Land and Bridgework, or say Rs. 75,000 and Rs. 1,30,000 altogether, respectively.

7. On the other hand, the steeper gradients would reduce the loads with existing engines (5' 6" gauge) by about 30 per cent., i.e., three trains would be required on the 1 in 100 for every two required on 1 in 150, unless the trains were banked over the steep parts or more powerful engines obtained for the branch. The traffic estimated for is not enough to fill two broad gauge trains per day, so that the decrease of load would not be of much importance at first; but the traffic will probably grow rapidly so that it is not safe to assume that the difference between the two ruling gradients would long remain less than one broad gauge train each way per diem. The cost of working an extra daily train between Calicut and Cannanore, 55 miles, would be not more than Rs. 1-00 per train mile, i.e., Rs. 110 per day, say Rs. 40,000 per annum, which at 3½ per cent. would be equivalent to a capital expenditure of about Rs. 11,50,000. It is clear, therefore, that it is not worth while to steepen the grades between Calicut and Cannanore to such an extent as would necessitate so many extra trains to be run.

8. This, however, does not apply to the short extension between Cannanore and Baliapatam where the Consulting Engineer (paragraph 9 of his note) admits that a large saving (estimated by him at Rs. 91,000 for earthwork alone) can be obtained by using 1 in 100 grade and where full loads are not to be expected. In fact it would be well to go further. This extension is only four miles long, and ends up at a creek, which from the small scale map available, appears to be about half a mile across at that point, so that it hardly seems likely that it would form part of the permanent alignment for a railway from Cannanore to Mangalore. Also any such permanent line is at present exceedingly problematical. Under these circumstances, there seems no need at present for this extension to be made up to a permanent or first-class standard; it will serve its purpose equally well if made of a temporary character with the lightest possible works, and a ruling grade certainly not easier than 1 in 80, which will enable the engines to take half the loads they do on 1 in 150. If so laid out a saving of perhaps 1½ to 2 lakhs can be effected.

Comments of the Consulting Engineer for Railways, Madras, on the Note, dated 5th January 1899, by the Director of Railway Construction.

It seems evident that the Director of Railway Construction thought that the plan and section which he was criticising purported to be part of a "Project." Such however was not the case. The preparation of the project was and still is in hand. The intention of this Government's letter No. 1452 RY., dated 24th November 1898, was to supply to the Government of India sufficient information to show them that the previous line had been immensely improved, and that, for at least as far as Cannanore, 1 in 150 was the right grading. There was no suggestion that the grading of the section had been perfected in detail or that improvements in detail alignment were not still to go on. As a fact since November last further improvements in alignment on the ground have gone on, as well as of the grading in the office. All that was wanted was that, before time was spent on what might afterwards prove infructuous, the Government of India should broadly say whether or not they had accepted the general 1 in 150 grading up to Cannanore and 1 in 100 beyond. I would desire it to be clearly understood once for all that up till the last moment of actually starting work upon a given section the improvement of every detail of the works on that section is being attended to. No bridge, for example, is allowed to be started until the working drawings and estimate have been seen and approved, and no culvert until its type has been approved. There was no need to send the section to Simla for instructions as to the minor details of grading, &c., to which the chief part of Mr. Hodson's note has been directed. All this is in a state of progress here, under my general supervision. I shall now go through Mr. Hodson's notes *seriatim*.

(1) I did not suppose that estimates were expected in November last. They were then and are still in hand; but it seemed desirable first that the adoption of the 1 in 150 should be accepted by the Government of India; and just enough information, and no more, was sent up as seemed necessary for this object. Since then an earthwork estimate on both gauges has been prepared, also minor bridge and many other estimates. All are in a state of movement; but, as explained, no individual work is touched until I have seen its drawings and estimate. All these when eventually collected will form the "Detailed Revised Estimate." The quantities of earth between Cannanore and Baliapatam were not given, but the saving between 1 in 150 and 1 in 100 was given.

(2) Mr. Hodson could not have been expected to realize that a good deal of the hill sketching on the plan was very poor, places being constantly shown by the draughtsman as isolated hills which ought to have been shown as ridges. In such a country as this, densely covered for the greater part of its surface with cocoanuts, gardens, religious buildings and homesteads, good plane-tableing is very expensive. But some confidence surely is due to the Engineers, and they have not really done the absurd things that the draughtsman's sketchy hill shading would lead to the belief that they had done.

Another point on which I wish to lay stress is that although the original survey plans are covered in places, sometimes for miles at a time, with alternative trial lines and cross sections, these were not sent to Simla. It seemed supererogatory that they should be so sent, for I have been through them all with the Company's Engineers with great thoroughness time after time.

(4) (a) (f) (k). These detailed realignments will be seen to; the Railway Engineers have been instructed. (b) This had already been attended to. The section which went up only showed bridges incidentally; it was only meant to enable the broad question of 1 in 100 or 1 in 150 to be dealt with. Each individual bridge is being dealt with on its own merits, and there is no such thing as building a bridge with certain spans just because those spans are found on the section. (c), (d), (e), (h), (i), (j). These are matters of detailed grading which will be attended to with numerous others. The section, as already explained, had no pretensions to be a finished graded section. (n) This is the section on the south approach to Cannanore station where the whole alignment is complicated by passing through densely peopled suburbs. It is under contemplation to move the railway station further away from the town and perhaps in this way the section near here may be improved, but perhaps not. It is to be surveyed. (l) This has already been very greatly improved in the ordinary course of the work that is going on, with a saving of nearly half a lakh of rupees. (o) These last three or four miles of country have been surveyed and sectioned and cross sectioned in every direction by Mr. Anson who, after his experience in the hill section of the Assam-Bengal Railway, is quite capable of picking the best available line. I have seen the country; it is an extremely difficult one, and I believe that the best line has been got. The adoption of a grade of 1 in 80 will of course ease the earthwork. The original plans show everywhere two trial lines, and in places three, with very long and numerous cross sections.

(5) Drainage of cuttings; like foundations of bridges and all other details, this is in process of being attended to; whether by reverse grading, or by steeper grading or by cross draining or otherwise, as engineering considerations may dictate. Further economy in alignment and improvement in detail are all going on wherever there seems any chance of securing them. But it must be realised that it may not always be practicable, without weeks of work, to exhibit such detail on a plan as will show to the far distant critic what the professional man on the ground sees at a glance.

(7) The traffic estimated for may not be enough to fill two broad gauge trains per day, because, under a vicious system, the traffic forecast has been based on existing cart and foot traffic instead of, as experience would indicate to be the correct method, on density of population and the probability of their travelling. I believe that the forecasters of the early Burma lines reckoned on a very small traffic. Everyone who knows anything about the Malabar coast judges that a line here costing under a lakh a mile ought to be an 8 or 10 per cent. investment.

(8) I have read the Government of India's order, as contained in the last paragraph of their No. 194 R.C., dated the 3rd February 1899, that the alignment beyond Cannanore must have a ruling gradient of 1-25 per cent. These orders must of course

be accepted unless the Government of India should see fit to alter them. They are based, however, on the arguments adduced in the last paragraph of Mr. Hodson's Note, and I do not consider these arguments to be valid for the purpose in view. I cannot admit that extension to Mangalore is exceedingly problematical. Indeed, so far as can be learnt the traffic prospects of an extension to Mangalore are but little inferior to those of the Calicut line; that is, if built for under a lakh a mile it ought to pay from 5 to 7 per cent. That whole belt of coast, though narrow, is one of the richest parts of India. Moreover, the Government of Madras has adopted the definite policy of endeavouring to get railway communication for Mangalore as well as for Coorg and up towards the Mysore plateau wherever access can be found to it. If five years hence does not see a railway project under sanction for Mangalore it is pretty certain that ten years hence will see it built, and we must keep looking forward.

Now, so far as I can learn without an actual detail survey, the point at which the Cannanore-Baliapatam line hits the Baliapatam creek is the one spot at which the Mangalore extension is likely to cross the creek; indeed the only spot, without a circuit of some miles to the east, into difficult country where the extra cost would far more than cover the cost of bridging the comparatively wide but almost currentless estuary at Baliapatam. That estuary though 2,000 feet wide will need no more than 1,000 feet of 40 ft. bridging and no training work to speak of. It is merely a shallow back-water for half its breadth, and its wideness is due to the softness of the material composing its bed and its banks. A little way up-stream it is only half as wide; but the place is almost inaccessible on account of the town, and to go there would necessitate a siding down to the present station site at the creek, because the object of going to the town is to tap the large timber trade and this necessitates the station being down on the river bank flats. I cannot of course say as yet whether the Baliapatam-Mangalore country is a 1 in 80 country or a 1 in 100 country. My impression, from enquiries and a study of the maps, is that it may prove to be a 1 in 100 country, and I therefore think that the Cannanore-Baliapatam section may ultimately have to be regraded to 1 in 100. However, this can always be done with no very serious waste of money if hereafter found necessary. Should the Government of India therefore not change their mind, it must for the present be graded at 1 in 80. Perhaps there may be so good a traffic out of Baliapatam as to demand the use of a shunting engine as a pusher. But what is more likely is that, pending extension, the traffic from Baliapatam will be worked up to Cannanore with a separate engine making extra trips, and that trains will be made up for the 1 in 150 run at Cannanore.

ORDER—No. 228 Ry., dated 23rd February 1899.

The Consulting Engineer for Railways will issue the necessary instructions to the Agent, Madras Railway Company. A copy of these Proceedings will be forwarded to the Government of India.

[Here enter No. 229 Ry., dated 23rd February 1899.]

(True Extract.)

FRANCIS J. E. SPRING,
Joint Secretary.

To the Consulting Engineer for Railways.

ENDORSEMENT—No. 229 Ry., dated 23rd February 1899.

Forwarded.

(By order.)

FRANCIS J. E. SPRING,
Joint Secretary.

TELEGRAM

URGENT
DEFERRED

SERIAL

No. 107

FROM

Madras

To

Calcutta

Re
Madras Ry.

Works

5Bx Agent Madras Railway says Mr. Mallet is under the impression that there is no obstacle to acquisition Cannanore land beyond mile 26. But in your 1607. R.C. program beyond that mile was forbidden. And no reply yet received to my 1452 Ry. November 24. ~~1452~~ forwarding finally revised alignment and asking for orders so that land might be acquired. Please wire whether land acquisition may proceed.

FJS.

14/1/99

out of

14/1/99

Public Works (1899) Department.

Railway
CURRENT No. 134

Printed 2
for 228/4
25-2-99
2 Please send the copy
of the printed copy
27

From

The Govt of India

Order

228/4

23/2/99 S/1/3 Telegram No. 010 R.C.

Dated 25th January 1899

Received

Registered } 26. 1. 99

Enclosures

Spare copies

SUBJECT.

Calicut-Cannanore Ry.

Orders. re. Commence-
ment of work. + acquisition
of land. beyond mile
26.

Public Works (1899) Department.

Railway
CURRENT No. 211

30

From
The Govt of India

Order

Recd. G.O. $\frac{1951-1952}{22-11-78}$

Telgram from Secy. of R.R. 010.R.C. 22-1-79.

No. 194 R.C.

~~Cancelled~~

Records

7/11

13/1/79

Dated 3rd February 79

Received

Registered } 11. 2. 79

Enclosures 1.

Spare copies 2.

SUBJECT.

Calicut Cannanore Ry.

Sanctioning commence-
ment of work. beyond mile
26. on the — and forwarding
copy of a note by the
Director of Ry Construction
on the above project

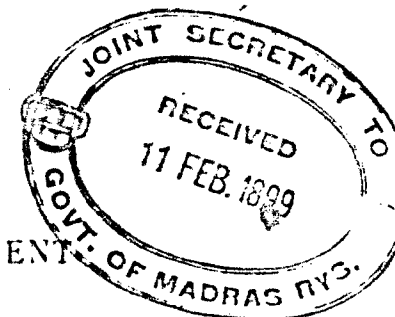
No.	Date.

No.	Date.
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All communication should be addressed to the Secretary.

GOVERNMENT OF INDIA.

RAILWAY CONSTRUCTION.



The Joint Secretary to the Government of Madras,
Public Works Department, Railway, Branch.

Sir,

No. 010 R.C., dated 25th January 1899. : the Government of
Your telegram No. 4 dated as follows:— : India to the adop-
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Letter follows. :
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and 60 should be laid down with a ruling grade of 1 in. 80 as indicated in the last para thereof.

I have the honour to be,

Sir,

Your most obedient servant,

C. J. W.
Offg: Under Secretary.

Documents accompanying:-

Copy of a note dated 5th January
1899 on the project from Miles 26 to 44
and 44 to 59 of the Calicut Cannanore
extension. (with 2 spare copies.)

ARCT

3/2/99

5 S.P.
Project
Calicut Cannanore
Extension
Note on the Project from Miles 26 to 44 and 44 to 59 of the Calicut-Cannanore Extension.

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(6) As regards grading, I think it may be taken that the adoption of 1 in 100 instead of 1 in 150 ruling grade would save (in round numbers) about Rs. 50,000 between miles 26 and 50, and also Rs. 1,00,000 more between miles 50 and 59½ in earthwork alone, and probably about Rs. 25,000 and Rs. 30,000 more respectively in Land and Bridgework, or say Rs. 75,000 and Rs. 1,30,000 altogether respectively.

(7) On the other hand, the steeper gradients would reduce the loads with existing engines (5' 6" gauge) by about 30 per cent., i. e., three trains would be required on the 1 in 100 for every two required on 1 in 150, unless the trains were banked over the steep parts or more powerful engines obtained for the branch. The traffic estimated for is not enough to fill two broad gauge trains per day, so that the decrease of load would not be of much importance at first, but the traffic will probably grow rapidly so that it is not safe to assume that the difference between the two ruling gradients would long remain less than one broad gauge train each way per diem. The cost of working an extra daily

train between Calicut and Cannanore, 55 miles, would be not more than Rs. 1'00 per train mile, i. e., Rs. 110 per day, say Rs. 40,000 per annum, which at 3½ per cent. would be equivalent to a capital expenditure of about Rs. 11,50,000. It is clear, therefore, that it is not worth while to steepen the grades between Calicut and Cannanore to such an extent as would necessitate so many extra trains to be run.

;) This, however, does not apply to the short extension between Cannanore and aliapatam where the Consulting Engineer (paragraph 9 of his note) admits that a large saving (estimated by him at Rs. 94,000 for earthwork alone) can be obtained by using 1 in 100 grade and where full loads are not to be expected. In fact it would be well to go further. This extension is only four miles long, and ends up at a creek, which from the small scale map available, appears to be about half a mile across at that point, so that it hardly seems likely that it would form part of the permanent alignment for a railway from Cannanore to Mangalore. Also any such permanent line is at present exceedingly problematical. Under these circumstances, there seems no need at present for this extension to be made up to a permanent or first class standard; it will serve its purpose equally well if made of a temporary character with the lightest possible works, and a ruling grade certainly not easier than 1 in 80 which will enable the engines to take half the loads they do on 1 in 150. If so laid out a saving of perhaps 1½ to 2 lakhs can be effected.

5th January 1899.

C. W. HODSON.

6 P Calicut-Cannanur Railway

The section from mil 26 to mil 60.

Comments of the Consulting Engineer for Railways, Madras on the Note, dated 5th July 1911
of the Director of Railway Construction

It seems evident that the D.R.C. thought that the plan and section which he was critically prepared to be part of a "Project". Such however was not the case. The preparation of the project was as still in hand. The intention of this Govt. letter No. 1452. P. dated 29th Nov. 1908 was to supply to the Govt. of India sufficient information to show that the previous line had been immensely improved, and that for at least as far as Cannanur 1 in 150 was the proper grading. There was no such suggestion ~~from~~ that the grading of the section had been prepared in detail or that improvement in detail alignment was not yet to go on. On a first visit November last further improvement in alignment on the ground was seen on, as well as of the grading in the office. All that was wanted was that before time was spent on what might afterwards prove infraction the Govt. of India should broadly say whether or not they had accepted the general 1 in 150 grading up to Cannanur and 1 in 100 beyond. I would desire it to be clearly understood once for all that up till the last moment of actually starting work upon a given ^{section} ~~part~~ the improvement of every detail of ~~the~~ the works on that ^{section} ~~part~~ are being attended to. No help for length is allowed to be started until the working drawing and estimate has been seen and approved, and no contract made its type has been approved. There was no need to send the section to India for instruction as to the minor details of grading &c. to which the chief part of the D.R.C. staff has been directed. All this is in a state of progress ^{here, excepting} ~~and the~~ general supervision. I now go through the Hyderabad note submitted.

- (1) I did not suppose that estimates were required in November last. They were then in hand; but it seems desirable that first the outline of the 1 in 150 should be accepted by the Govt. of India, and just enough information, and no more, sent

7 P
set up a second meeting for this object. Since then as I think it is a
little longer has been prepared, also minor bridge & many other details. All are
in a state of movement; but, in England, no individual work is touched until I
have seen it drawing & estimate. All those who actually collect will form
the "Details Review Committee". The question of work between Canning &
Balingston was not given, but the saving between 1 in 150 & 1 in 100 was given.

(2). Mr Hodson could not have been expected to realize that a good deal of
the hill sketching & the plan was very poor. plans being constantly shown
of the draughtsmen in Indian hills which ought to have been shown in red.
He said a country in this, densely covered for the greater part of it surface with
coconuts, garden, religious buildings & houses. good plan - telling is
very expensive. But some confidence must be due to the Engineer, & they may
be convinced in some way likely to have done the above thing that a draughtsmen
sketchy hill shading would lead to the belief that they had done.

Another point on which I wish to lay stress is that although the
original draughtsmen survey plans are covered in places, sometimes for miles at a
time, with alterations that have been made, there has not been set up
to India. It seems extraordinary that they should be so set, ^{for} I have been
through them all with the Engineer's Engineer with great thoroughness two or three

(4) (a) (f) (k). The details regarding will be seen to. The Railway Engineer
has been instructed. (b) This has already been attended to. The section which was
up of stone bridges incidentally, it was of course to enable the broad gauge of 7 ft 6 in.
a 1 in 150 to be built with. Each individual bridge is being dealt with as it was
built. There is no such thing as building a bridge just because it is found on the section.

(c), (d), (e), (f), (g), (h), (i), (j). These are matters of details pending which will be attended to with
numerous others which are a loss. The section is already explained but no preliminary to be
a finished product. (i) This is the section on the south approach to Canning station.

where the whole organism is englobed by growing though densely jagged subunits.

It is under contemplation to move the railway station further away from the town & junctions in this way the section can be more easily improved, but perhaps not. It is to be surveyed. (2) This has already been very greatly improved with a saving of ~~about~~ ^{some} half a mile of survey. in the ordinary course of the work that is going on. (3) There but there is from miles of country have been surveyed & sections & cross sections in every direction of the Canon who after his experience of part of the A.B.R. is quite capable of picking the best available line. I have seen the country. It is extremely difficult, & I believe that the best line has been got. The adoption of a grade of 1 in 80

bill of lower than the center. The original plan shows perhaps 2 third line in
plan 3. with very ^{by} numerous low sections.

(5) Drawings of cutting; the foundation of bridges & all other details ^{the} is in full process of being attended to; whole of scheme ready. $\frac{1}{2}$ stages ready on $\frac{1}{2}$ cross draining or otherwise, as engineering considerations may require. Further economy in shipment & improvement in detail are all going on whenever there seems any chance of securing it. But it must be realised that it may not be ^{either seeking work to exhibit} change from ^{on a plan on walls} ~~to pay~~ ~~plans~~ but detail ^{on a plan on walls} ~~on a plan on walls~~ that the few details will be ^{done} that the professional man on the ground sees at a glance.

(7) The Traffic estimated for may not be enough to fill the head gear
trains per day. however, naturally, it has been based, under a vicious system of
traffic present, on existing cost & past traffic instead of, as engineers would
insist to be ^{the} ^{cost} ^{of} ^{the} ^{traffic}, on density of population & the probability of their travelling &
~~judgment~~ ^{behind} ~~judgment~~ that the promoters of the early Panama line reckoned on a very small
Panama traffic. Everyone who knows anything about the Panama canal judges
that a line costing under a million will have right to be on 8 or 10 per cent

(8) I have read the Govt. of India's order, as contained in the last paragraph of their No. 194. D.C. dated the 3rd February 99, that the ~~proposed~~ ^{proposed} beyond Commission ~~and~~ ^{must} have a policy grant of ^{1.25 per cent.} ~~1.25 per cent.~~. These orders must of course be accepted unless the Govt. of India should see fit to alter them. They are based however on the argument advanced in the last paragraph of Mr. Hodgson's Nt. and I do not think that these arguments are valid for the purpose in view. I cannot admit that attention paid to Mangalore is exceedingly problematical. Indeed so far as can be known the traffic prospects of an extension to Mangalore are but little inferior to those of the Calicut line, that is if built for under a lakh - for which it ought to pay say from 5 to 7 per cent. That which ^{is} ~~is~~ of great ^{value} is one of the richest parts of India if seen. Moreover the Government of India has adopted the definite policy of endeavouring to get railway communication for Mangalore as well as for Coorg and by means the Mysore plateau wherever access can be found to it. If you have been down not in a railway project under sanction for Mangalore it is quite certain that the Government have not seen it built.

Now so far as I can learn without an actual detailed survey the point at which the Common Beligata line hits the Beligata creek is the one spot at which the Mangalore extension is likely to cross the creek. and the only one without a circuit of some miles to the east hit difficult country where the extension would have more than twice the cost of bridging the long straight wide but almost unbroken country at Beligata. That crossing through 2000 feet wide will need no more than 1000 ft of 40 ft bridging and no training works to speak of. It is a more shallow barometer for help it has, and its width is due to the softness of the material composing it and its banks. A little way up

10 P - stream it is only half as wide. but the plan is almost invariable a coast
of the town, & to go there would necessitate a siding down to the present station
sit at the creek, because the object of going to the town is to top the
large timber trees for which the station must be done on the river bank flats.
I cannot of course say - yet whether the Behington Shingler
County is a 1 in 80 country or a 1 in 100 country. My impression from
beginning is a study of the map is that it may prove to be 1 in 100
~~if not better~~ country, & I therefore think that the Common Behington
section may ultimately have to be regarded as 1 in 100. However, this
can change to some extent with no very serious ^{loss of money} ~~expense~~ if found necessary. If
therefore the fact of this does not change their mind it must for the
present be regarded as 1 in 80. ^{Perhaps} ~~if~~ ^{the} ~~fact~~ ^{map} ~~is~~ ^{is} good a buffer
out of Behington as to demand the use of a shanty again as a problem.
~~But what~~ ^{But what} ~~is more likely~~ ^{is more likely} is that timber from Behington will be worked up to Common
with a separate engine making extra trips. & this is not very far from the 1 in 100
at Common.

I shall now give instructions in the above sense to the officers of
the Hudson R. Co.

F.R.S.
17/1/97

Form No. 1.

PUBLIC WORKS DEPARTMENT,
RAILWAY BRANCH.

Papers to be read in Proceedings:—

Again G.O., dated *No: 1451-52 Ry d 24.11.98*, No. *189*, No. *189*

Again G.O., dated *189*, No. *189*

Current No. of 189, dated, from

" " " 189, " " "

" " " 189, " " "

No. 1451-52 Ry d 24.11.98 17-1-99 11 P

ORDER.

The Commr. Secy for Railways

*The Consulting Engineer for Railways will
issue the necessary instructions to the Dy. Secy for R.C.
copies of these Proceedings will be forwarded to the
Genl. of R.C.*

*FWS
17/1*

*Forwarded
FWS
17/1/99*

2nd part 22/2/89

12-0-12

RAILWAY.

Government {1899} of Madras.
PUBLIC WORKS.

12-0-12

Recd.

Regd.

} 1899.

Enclosures

Spare copies

*Approved
Chief Officer
J.H.*

G.O., Nos. 22, 27 Ry., February 1899.

FEBRUARY.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read again the following paper:—

G.O., Nos. 1451-52 Ry., dated 24th November 1898.

Read also the following papers:—

Telegram from—The Joint Secy. to the Govt. of Madras, P.W. Dept., Ry. Branch.
To—The Secretary to the Government of India, Public Works Department.
Dated—Madras, 14th January 1899, No. 5 B.

Agent Madras Railway says Mr. Upcott is under the impression that there is no obstacle to acquisition Cannanore land beyond mile 26. But in your 1607 R.C. progress beyond that mile was forbidden and no reply yet received to my 1152 Ry. November 24th forwarding finally revised alignment and asking for orders so that land might be acquired. Please wire whether land acquisition may proceed.

Telegram from—The Secretary to the Government of India, Public Works Dept.
To—The Joint Secretary to the Government of Madras, P.W. Dept., Ry. Branch.
Dated—Calcutta, 25th January 1899, No. 010 R.C.

Your telegram numbered and dated as follows, 5 B. 14th instant, and your letter numbered and dated as follows, 1452 Ry. 24th November last. Grading 1 in 150 accepted from mile 26 to 56 but long and undrained cuttings should be avoided. Between miles 56 and 60 steep grades to be adopted. Acquisition land, collection material and commencement work may now proceed. Letter follows.

From—The Secretary to the Government of India, Public Works Department.
To—The Joint Secretary to the Government of Madras, P.W. Dept., Ry. Branch.
Dated—Simla, 3rd February 1899, No. 194 R.C.

I am directed to confirm the Public Works Department telegram quoted in the margin, conveying the sanction of the Government of India to the adoption of a

grade of 1 in 150 on miles 26 to 56 of the Calicut-Cannanore Railway, and of steeper grades on miles 56 to 60; also to the acquisition of land, the collection of material and the commencement of so much of the construction work of the line as will not prejudice the gauge question.

2. I am at the same time to forward herewith, for consideration, copy of a note by the Director of Railway Construction, dated 5th January 1899, on the project from miles 26 to 59, and to say that the alignment between miles 56 and 60 should be laid down with a ruling grade of 1 in 80 as indicated in the last paragraph thereof.

ENCLOSURE.

Note, dated 5th January 1899, by the Director of Railway Construction on the Project from Miles 26 to 44 and 44 to 59 of the Calicut-Cannanore Extension.

Only plans and sections of the line have been submitted, but no estimates at all except a priced table of quantities of the earthwork for miles 26-44 and of the land for same. No quantities are given for miles 44-59.

2. The information given on the plan is exceedingly meagre, as apparently little or no plan-tableing was done, and no index plan has been sent, so it is very difficult to scrutinize the alignment. Judging, however, from the information given on the plans, it does not seem that the line has been located with that detailed carefulness by which alone an economical alignment can be obtained in a country such as this appears to be. The love of long straight lines is evident on nearly every sheet of the project, though the introduction of more curvature would apparently often conduce to economy (e.g., at miles 26½, 27, 27½, 33½, 37½ perhaps, 49½, 51, 54½, 55 and 58, and perhaps other places, but the information on the plans is too meagre to show it with certainty).

3. The sections are graded to 1 in 150, and the Consulting Engineer says that he considers this to be the proper grade for the country; but the banks and cuttings are usually heavy and in some cases very heavy, and there is no doubt that the adoption of a steeper gradient would save a great deal of earthwork. It would also seem that in a country like this, and with such a heavy rainfall, it is very desirable to avoid long cuttings and to arrange that such cuttings as are unavoidable shall be so graded as to give thoroughly efficient drainage.

4. The following alterations in alignment and grading suggest themselves:—

- (a) Miles 26½ to 27½.—Judging from the plans, work might be saved by slowing the alignment to the west at cutting 86 and to the east at mile 27; the curvature need not be excessive, and crossing the Murat river slightly skew to the alignment selected need be no disadvantage.
- (b) Bridge No. 88.—A 60-foot girder in a 14-foot bank seems an extravagant design. The channel crossed looks very unimportant on the plan. A 3×20 feet would probably be cheaper.
- (c) Cutting No. 87 might be graded both ways to 1 in 100 with advantage, both to drainage and cost; and unless headway for boats is required at bridge No. 88, the grade might be run down and bank No. 86 made 4 or 5 feet lower.
- (d) Mile 30½.—Cutting No. 91 is nearly 3,000 feet long without a single cross outlet. It might be much shortened by grading to 1 in 100 with advantage.
- (e) Mile 31½.—Cutting No. 93 is 1,600 feet long usually level without a single outlet. It should be graded both ways to facilitate drainage. This would also save work, especially if 1 in 100 be adopted.
- (f) Miles 33 and 34.—If the meagre details given on the plans indicate what they would seem to do, the introduction of a little more curvature would reduce work at cuttings 94, 96 and 98 and probably on the intermediate bank and perhaps elsewhere.
- (g) Mile 36.—Mahé station seems to fall in a very awkward place, and is graded in the lower and level end of a cutting, 2,200 feet long, which would give trouble with heavy rainfall. The pencil grading seems preferable and could be adopted even with 1 in 150 grades.
- (h) Mile 37½.—Cuttings 109 and 110 should be regraded to reduce work in the cuttings even if it be increased in the banks. Here and elsewhere the advisability of utilizing the spoil of the cuttings in the banks, and thereby saving money both in land and earthwork, appears to have been overlooked.
- (i) Mile 42.—Cutting No. 119 is 4,000 feet long, of which 3,300 feet is graded in one direction without a single outlet for drainage, and it intersects a large number of deeply-sunk pathways which must be nullahs in heavy rain. Reverse grades at a higher level should be adopted to improve drainage and, if 1 in 100 be adopted, would save work.
- (j) Mile 45.—Cutting No. 124 is 3,200 feet long, graded both ways. But if the 1 in 150 grade be taken straight across bridge 124, and there is no reason why it should not, the formation could be raised 6 to 8 feet and work saved and drainage improved.
- (k) Miles 49 to 50.—The reason for crossing the Yerana river 3 times is not evident and the alignment looks susceptible of improvement. Also bridge No. 139 with two spans of 40 feet in a 10-foot bank seems extravagant. Four spans of 20 feet would surely be equally efficient and certainly cheaper.
- (l) Miles 51 and 52.—The work here is very heavy, containing cutting No. 129, 2,200 feet long and 46 feet deep on a curve, and bank No. 130, 4,000 feet long and 22 feet deep, and must surely admit of better alignment, though the plan is too meagre to show exactly how. If realignment is impossible, the adoption of a 1 in 100 grade would probably save at least Rs. 24,000 and be much easier maintained.
- (n) Miles 54 to 55.—Realignment seems possible here also to reduce the big bank No. 137 and perhaps the cuttings too; and if 1 in 100 is adopted at mile 51, it should be adopted here, and a saving of at least Rs. 10,000 effected thereby.

(o) Miles 56 to 59.—This is very heavy, and the adoption of a 1 in 100 grade would save at least Rs. 60,000 on the selected alignment. But it is difficult to understand what sort of country this can be where heavy cuttings, such as this, cannot be avoided or largely reduced by more careful alignment and sharper curvature.

5. From the above remarks it is clear that although a very noticeable improvement has been already effected on the original project (which was estimated to cost Rs. 82,03,482 for 59 miles, i.e., an average of Rs. 1,39,042 per mile), yet there is still room for further economy in alignment and considerable improvement in detail, particularly in the drainage of cuttings; and the Consulting Engineer should be directed to have the matter further investigated.

6. As regards grading, I think it may be taken that the adoption of 1 in 100 instead of 1 in 150 ruling grade would save, in round numbers, about Rs. 50,000 between miles 28 and 50; and also Rs. 1,00,000 more between miles 50 and 59½ in earthwork alone; and probably about Rs. 25,000 and Rs. 30,000 more, respectively, in Land and Bridgework, or say Rs. 75,000 and Rs. 1,30,000 altogether, respectively.

7. On the other hand, the steeper gradients would reduce the loads with existing engines (5' 6" gauge) by about 30 per cent., i.e., three trains would be required on the 1 in 100 for every two required on 1 in 150, unless the trains were banked over the steep parts or more powerful engines obtained for the branch. The traffic estimated for is not enough to fill two broad gauge trains per day, so that the decrease of load would not be of much importance at first; but the traffic will probably grow rapidly so that it is not safe to assume that the difference between the two ruling gradients would long remain less than one broad gauge train each way per diem. The cost of working an extra daily train between Calicut and Cannanore, 55 miles, would be not more than Rs. 100 per train mile, i.e., Rs. 110 per day, say Rs. 40,000 per annum, which at 3½ per cent. would be equivalent to a capital expenditure of about Rs. 11,50,000. It is clear, therefore, that it is not worth while to steepen the grades between Calicut and Cannanore to such an extent as would necessitate so many extra trains to be run.

8. This, however, does not apply to the short extension between Cannanore and Baliapatam where the Consulting Engineer (paragraph 9 of his note) admits that a large saving (estimated by him at Rs. 94,000 for earthwork alone) can be obtained by using 1 in 100 grade and where full loads are not to be expected. In fact it would be well to go further. This extension is only four miles long, and ends up at a creek, which from the small scale map available, appears to be about half a mile across at that point, so that it hardly seems likely that it would form part of the permanent alignment for a railway from Cannanore to Mangalore. Also any such permanent line is at present exceedingly problematical. Under these circumstances, there seems no need at present for this extension to be made up to a permanent or first-class standard; it will serve its purpose equally well if made of a temporary character with the lightest possible works, and a ruling grade certainly not easier than 1 in 80, which will enable the engines to take half the loads they do on 1 in 150. If so laid out a saving of perhaps 1½ to 2 lakhs can be effected.

Comments of the Consulting Engineer for Railways, Madras, on the Note, dated 5th January 1899, by the Director of Railway Construction.

It seems evident that the Director of Railway Construction thought that the plan and section which he was criticising purported to be part of a "Project." Such however was not the case. The preparation of the project was and still is in hand. The intention of this Government's letter No. 1452 Ry., dated 24th November 1898, was to supply to the Government of India sufficient information to show them that the previous line had been immensely improved, and that, for at least as far as Cannanore, 1 in 150 was the right grading. There was no suggestion that the grading of the section had been perfected in detail or that improvements in alignment were not still to go on. As a fact since November last further improvements in alignment on the ground have gone on, as well as of the grading in the office. All that was wanted was that, before time was spent on what might afterwards prove infructuous, the Government of India should broadly say whether or not they had accepted the general 1 in 150 grading up to Cannanore and 1 in 100 beyond. I would desire it to be clearly understood once for all that up till the last moment of actually starting work upon a given section the improvement of every detail of the works on that section is being attended to. No bridge, for example, is allowed to be started until the working drawing and estimate have been seen and approved, and no culvert until its type has been approved. There was no need to send the section to Simla for instructions as to the minor details of grading, &c., to which the chief part of Mr. Hodson's note has been directed. All this is in a state of progress here, under my general supervision. I shall now go through Mr. Hodson's notes *seriatim*.

(1) I did not suppose that estimates were expected in November last. They were then and are still in hand; but it seemed desirable first that the adoption of the 1 in 150 should be accepted by the Government of India/ and just enough information, and no more, was sent up as seemed necessary for this object. Since then an earthwork estimate on both gauges has been prepared, also minor bridge and many other estimates. All are in a state of movement; but, as explained, no individual work is touched until I have seen its drawing and estimate. All these when eventually collected will form the "Detailed Revised Estimate." The quantities of earth between Cannanore and Baliapatam were not given, but the saving between 1 in 150 and 1 in 100 was given.

(2) Mr. Hodson could not have been expected to realize that a good deal of the hill sketching on the plan was very poor, places being constantly shown by the draughtsman as isolated hills which ought to have been shown as ridges. In such a country as this, densely covered for the greater part of its surface with cocoanuts, gardens, religious buildings and homesteads, good plane-tableing is very expensive. But some confidence surely is due to the Engineers, and they may be assumed as ~~scarcely likely to have done the absurd things that a draughtsman's sketchy hill shading would lead to the belief that they had done.~~ *have not really done the f*

Another point on which I wish to lay stress is that although the original survey plans are covered in places, sometimes for miles at a time, with alternative trial lines and cross sections, these were not sent to Simla. It seemed supererogatory that they should be so sent, for I have been through them all with the Company's Engineers with great thoroughness time after time.

(4) (a) (f) (k). These detailed realignments will be seen to; the Railway Engineers have been instructed. (b) This had already been attended to. The section which went up only showed bridges incidentally; it was only meant to enable the broad question of 1 in 100 or 1 in 150 to be dealt with. Each individual bridge is being dealt with on its own merits, and there is no such thing as building a bridge just because it is found on the section. (c), (d), (e), (h), (i), (j). These are matters of detailed grading which will be attended to with numerous others which are in hand. The section as already explained had no pretensions to be a finished graded section. (n) This is the section on the south approach to Cannanore station where the whole alignment is complicated by passing through densely peopled suburbs. It is under contemplation to move the railway station further away from the town and perhaps in this way the section near here may be improved, but perhaps not. It is to be surveyed. (l) This has already been very greatly improved in the ordinary course of the work that is going on, with a saving of nearly half a lakh of rupees. (o) These last three or four miles of country have been surveyed and sectioned and cross sectioned in every direction by Mr. Anson who, after his experience of parts of the Assam-Bengal Railway, is quite capable of picking the best available line. I have seen the country; it is an extremely difficult one, and I believe that the best line has been got. The adoption of a grade of 1 in 80 will of course ease the earthwork. The original plans show everywhere two trial lines, and in places three, with very long and numerous cross sections.

(5) Drainage of cuttings; like foundations of bridges and all other details, this is in full process of being attended to; whether by reverse grading, or by steeper grading or by cross draining or otherwise, as engineering considerations may dictate. Further economy in alignment and improvement in detail are all going on whenever there seems any chance of securing them. But it must be realised that it may not be always practicable, without weeks of work, to exhibit such detail on a plan as will show to the far distant critic what the professional man on the ground sees at a glance.

(7) The traffic estimated for may not be enough to fill two broad gauge trains per day, because under a vicious system the traffic forecast has been based on existing cart and foot traffic instead of, as experience would indicate to be the correct method, on density of population and the probability of their travelling. I believe that the forecasters of the early Burma lines reckoned on a very small traffic. Everyone who knows anything about the Malabar coast judges that a line here costing under a lakh a mile ought to be an 8 or 10 per cent. investment.

(8) I have read the Government of India's order, as contained in the last paragraph of their No. 194 R.C., dated the 3rd February 1899, that the alignment beyond Cannanore must have a ruling gradient of 1.25 per cent. These orders must of course

be accepted unless the Government of India should see fit to alter them. They are based, however, on the arguments adduced in the last paragraph of Mr. Hodson's Note, and I do not consider these arguments to be valid for the purpose in view. I cannot admit that extension to Mangalore is exceedingly problematical. Indeed, so far as can be learnt the traffic prospects of an extension to Mangalore are but little inferior to those of the Calicut line; that is, if built for under a lakh a mile it ought to pay from 5 to 7 per cent. That whole belt of coast, though narrow, is one of the richest parts of India. Moreover, the Government of Madras has adopted the definite policy of endeavouring to get railway communication for Mangalore as well as for Coorg and up towards the Mysore plateau wherever access can be found to it. If five years hence does not see a railway project under sanction for Mangalore it is pretty certain that ten years hence will see it built, and we must keep looking forward.

Now, so far as I can learn without an actual detail survey, the point at which the Cannanore-Baliapatam line hits the Baliapatam creek is the one spot at which the Mangalore extension is likely to cross the creek; indeed the only spot, without a circuit of some miles to the east into difficult country, where the extra cost would far more than cover the cost of bridging the comparatively wide but almost currentless estuary at Baliapatam. That estuary though 2,000 feet wide will need no more than 1,000 feet of 40 feet bridging and no training work to speak of. It is merely a shallow back-water for half its breadth, and its wideness is due to the softness of the material composing its bed and its banks. A little way up-stream it is only half as wide; but the place is almost inaccessible on account of the town, and to go there would necessitate a siding down to the present station site at the creek, because the object of going to the town is to tap the large timber trade which necessitates the station being down on the river bank flats. I cannot of course say as yet whether the Baliapatam-Mangalore country is a 1 in 80 country or a 1 in 100 country. My impression, from enquiries and a study of the maps, is that it may prove to be a 1 in 100 country, and I therefore think that the Cannanore-Baliapatam section may ultimately have to be regraded to 1 in 100. However, this can always be done with no very serious waste of money if hereafter found necessary. Should the Government of India therefore not change their mind, it must for the present be graded at 1 in 80. Perhaps there may be so good a traffic out of Baliapatam as to demand the use of a shunting engine as a pusher. But what is more likely is that traffic from Baliapatam will be worked up to Cannanore with a separate engine making extra trips, and that trains will be made up for the 1 in 150 run at Cannanore.

ORDER—No. 228 Ry., dated 23rd February 1899.

The Consulting Engineer for Railways will issue the necessary instructions to the Agent, Madras Railway Company. A copy of these Proceedings will be forwarded to the Government of India.

[Here enter No. 229 Ry., dated 23rd February 1899.]

(True Extract.)

To the Consulting Engineer for Railways. ✓

FRANCIS J. E. SPRING,
Joint Secretary.

ENDORSEMENT—No. 229 Ry., dated 23rd February 1899.

Forwarded. ✓

(By order.)

Joint Secretary.

Ext. P. Seetharam.