

Public Works (1899) Department.

RAILWAY BRANCH.

G.O., No. 881-82 *Ry*

DATED *8th Aug 1899.*

[Despatch Abstract.]

Supply of railway sleepers

Ordered that a copy of pros in the Rev
Dept recording with an expression of Con-
currence in the views expressed by the B.
of Rev on the letter from the Conservator
of Forests, Santal Circle, reporting the result
of further enquiries made by him with
regard to the — from the Forests in his
circle, be commd to the Agents, M.S. & Ry. &
a copy of the pros forwarded to the Govt.
of India.

I forwarded

[illegible]

Public Works (1899) Department.

Communicated to
the Agents Marine and
P. L. Railways for
information. A copy of the
Proceedings will be forwarded to the Govt. of India
in continuation of Encl. No. 343 R
Dated 27.3.99.

Received 24th — do —

Registered _____ do _____

Enclosures

Spare copies

Regarding, with remark, Board's
Proceedings, passing orders on letter
from the Conservator of Forests,
Southern Circle, reporting the result
of further enquiries made by
him with regard to the supply of
railway sleepers from the
forests in his circle.

From

7th

31/7/44

FURTHER PAPERS.

1899.

(Land Revenue),

MADRAS.

Printed June 29th.

Proceedings, Forest No. 245, 14th June 1899.

JUNE.

Passing orders on letter from the Conservator of Forests, Southern Circle, reporting the result of further enquiries made by him with regard to the supply of railway sleepers from the forests in his circle.

PROCEEDINGS OF THE BOARD OF REVENUE
(LAND REVENUE).

READ—the following letter from H. A. GASS, Esq., Acting Conservator of Forests, Southern Circle, to the Secretary to the Commissioners of Land Revenue, dated Coimbatore, 21st April 1899, Dis. No. 894:—

With reference to paragraph 2 of Board's Proceedings, Forest No. 26 of 11th January 1899, I have the honour to report as follows on the subject of the supply of railway sleepers from this circle.

2. The railways and extensions to be served and the number of sleepers required in each case are the following:—

	Construction sleepers.		References.
	Broad gauge.	Metre gauge.	
Calicut-Cannanore	..	136,000	Government Order, No. 715, Railway, dated 12th May 1898, embodied in Board's Proceedings, Forest No. 17, dated 7th January 1899. <i>Serial 35-715</i>
Shoranur-Cochin	..	164,000	Do. do.
Madura-Pamban	..	225,000	Board's Proceedings, Forest No. 447, dated 23rd November 1898.
Tinnevely-Quilon	..	..	Length of this line and number of sleepers required not known.
Muttupet-Avadaiyarkóvil	..	..	Do. do.

	Annual renewals.		References.
	Broad gauge.	Metre gauge.	
Madras Railway	3,222	..	Government Order, No. 1141, Railway, dated 16th September 1898. <i>518</i>
South Indian Railway	..	30,000	Do. do.
East Coast Railway	100,000	..	Do. do. Required in a few years' time.
Calicut-Cannanore	..	10,000	Government Order, No. 715, Railway, dated 12th May 1898. Rising in ten years' time to 30,000 and standing at that figure permanently.
Shoranur-Cochin	..	10,000	Do. do.
Muttupálaiyam-Calicut (metre gauge conversion).	..	3,613	If ordered. Government Order, No. 53, Railway, dated 11th January 1899, embodied in Board's Proceedings, Forest No. 64, dated 3rd February 1899.
Calicut-Balyapattam	4,662	..	Do. do.

Summed up therefore—leaving out Tinnevely-Quilon and Muttupet-Avadaiyarkóvil extensions,—the immediate requirements during the next three years are—

	Broad.	Metre.	
Original	* 4,662	525,000 † 3,613	* If the Calicut-Balyapattam extension be ordered to be on the standard broad gauge. † If the conversion into metre gauge from Muttupálaiyam to Calicut be ordered.
Renewals	9,666 3,222 100,000	150,000	Madras Railway. East Coast Railway. South Indian Railway.
Future annual renewals		30,000 30,000 30,000	Shoranur-Cochin. Calicut-Cannanore.

Of the above, the construction and renewal sleepers for the Shoranur-Cochin line would doubtless be supplied from the Cochin State through which the line runs, and the forests of which appear to be equal to a heavy demand—*vide* correspondence attached to Government Order, No. 1141, Railway, dated 16th September 1898. The figures given by the Diwan in his letter of 15th August 1898 will, however, not bear scrutiny as his assumption, that a log containing between 40 and 50 cubic feet would be capable of giving 30 sleepers of $1\frac{1}{2}$ cubic feet each is quite wrong. It might possibly, but rarely, give 10. Roughly estimated, I should consider that to produce 164,000 sleepers, not less than 650,000 cubic feet or 14,444 logs of 45 cubic feet each would be required.

I presume also that the bulk of the sleepers—original and renewals—required for the Tinnevely-Quilon line would be supplied from the Travancore State forests through which it passes.

4. *Sizes of Sleepers.*—The sizes of broad gauge sleepers required by the Madras Railway vary from $10' \times 10" \times 5"$ to $16' \times 12" \times 6"$ for different purposes—the Government of India standard dimensions being $9' 6" \times 9" \times 5"$ with $8' 11" \times 8" \times 5"$ as a minimum. In a letter to me of 19th August last, the District Engineer, Madras Railway, at Podanur asked for a supply of some trial sleepers of $9' \times 10" \times 5"$.

The metre gauge sleeper required by the South Indian Railway is $6' 6" \times 9" \times 4\frac{1}{2}"$ —the Government of India standard dimensions being $6' 6" \times 7" \times 4\frac{1}{2}"$ with a minimum of $5' 9" \times 6" \times 4"$. In the demi-official letter of 3rd August 1898 to the Resident of Travancore printed with Government Order, No. 1141, Railway, dated 16th September 1898, sleepers of $6' \times 8" \times 4\frac{1}{2}"$ are referred to, and in paragraph 5 of his letter printed in Board's Proceedings, Forest No. 64, dated 3rd February 1899, the Chief Engineer requires sleepers of $6' \times 7" \times 4\frac{1}{2}"$ for the Calicut, Cannanore line. In his letter, No. 3158 of 19th November 1898, on the subject of the Madura-Pamban line sleepers, the Consulting Engineer for Railways does not mention sizes, and in issuing instructions in the matter to District Forest-officers, I gave the Government of India standard metre gauge dimensions.

In paragraph 2 of Board's Proceedings, Forest No. 17, dated 7th January 1899, the Board has remarked that "definite information as to the size of the sleepers required for the proposed new railways is still awaited," and it is a matter of some importance as it involves not merely the question of cubic contents of sleepers, but the dimensions of trees to be felled and consequent provisions of Working Schemes. The smaller the sleeper, the easier it will be to meet the demand.

5. A considerable correspondence has taken place, and I have also personally discussed the question of supply with all but the Madura District Forest-officer, and I have issued detailed instructions with reference to—

Dimensions,
Exact requirements in quality and shape,
Suitable timbers,
Trial sleepers,
Capacity of each division,
Felling timber for seasoning and subsequent conversion.

6. In his letter to me of 19th August, the District Engineer, 2nd District, Madras Railway, has stated that a sleeper must be "straight, sound and well-seasoned, sawn uniformly, square throughout its length, and free from holes, shakes, cracks, sap, and other imperfections", and that of the west coast timbers, the following timbers only were accepted at present:—

- (a) Irumbankam (*Hopea parviflora*),
(b) Karamardu (*Terminalia tomentosa*),
(c) Irul (*Xylia dolabriformis*),

and that before any new timbers were accepted, they would require to be thoroughly tested.

7. The following timbers appeared likely to be suitable for sleeper purposes, in addition to the three named above:—

(d) <i>Anogeissus latifolia</i> .	(n) <i>Calophyllum elatum</i> .
(e) <i>Mesua ferrea</i> .	(o) <i>Bassia longifolia</i> .
(f) <i>Pæciloneuron Indicum</i> .	(p) <i>Adina cordifolia</i> .
(g) <i>Pæciloneuron parviflorum</i> (now added and only recently identified on the Anamalais).	(q) <i>Stephegyne parvifolia</i> .
(h) <i>Eugenia jambolana</i> .	(r) <i>Aglaua Mimitifolia</i> .
(i) <i>Hopea wightiana</i> .	(s) <i>Acrocarpus fraxinifolius</i> .
(j) <i>Balanocarpus utilis</i> .	(t) <i>Albizia odoratissima</i> .
(k) <i>Vitex altissima</i> .	(u) <i>Artocarpus</i> .
(l) <i>Terminalia paniculata</i> .	(v) <i>Dillenia Indica</i> .
(m) <i>Lagerstræmia microcarpa</i> .	(w) <i>Eucalyptus globulus</i> , } old trees (x) <i>Acacia dealbata</i> , } only.

Of the above, I still consider that (a) to (j) may be found to be suitable timbers, though some of them are scarce as (h), but I am now very doubtful of k to x, in some cases, it is true, on account of the small number to be found as (r), (s), (u), and (v).

I have not included teak and vengai (*Pterocarpus marsupium*) both of which are first-class timbers, and abundant in some parts. There is a certain market for these woods, and it would be a distinct loss to attempt to convert them into sleepers.

8. Of the above, specimens of the following were sent to Madras to be tested by the Professor of Engineering with the results set opposite to each, so far as the modulus of rupture is concerned.

	Modulus of rupture.
(b) <i>Terminalia tomentosa</i>	802.0
(c) <i>Xylia dolabriformis</i>	753.9
(d) <i>Anogeissus latifolia</i>	866.6
(e) <i>Mesua ferrea</i>	725.3
(f) <i>Pæciloneuron Indicum</i>	802.0
(l) <i>Terminalia paniculata</i>	914.0
(o) <i>Bassia longifolia</i>	455.4
(q) <i>Stephegyne parvifolia</i>	588.8

The highest result of all is that of *Terminalia paniculata* and this may, I hope, prove to be an acceptable timber, though I am very doubtful of its durability. *Lagerstræmia microcarpa* was not tested in Madras. Mr. Gamble gives the value of P. in three different specimens as 619, 939 and 542—an average of 700. This tree is abundant in several divisions, and is highly esteemed in some. I see little prospect, however, of its acceptance as a suitable timber on account of its liability to split. An attempt made to obtain ten sleepers at Mount Stuart proved so disastrous, financially, that it would be very unwise to persist in converting it.

9. In paragraphs 25, 26 and 44 of my Inspection report on South Canara—extracts of which were sent to the Board in this office Dis. No. 813, dated 29th March 1899, I have referred at length to the tree identified as *Pæciloneuron Indicum* which grows so abundantly and looks such a promising timber, of which I have great hopes on account of facility of transport and carriage by sea. In a recent demi-official from the District Forest-officer, he informs me that there is much sapwood, though there is little difference between it and the heartwood in regard to colour. The wood is hard and closegrained, but its durability remains to be tested.

In paragraphs 15 and 16 of my notes on the Punachi evergreen forests of the Anamalais—extracts from which were submitted to the Board in this office Dis. No. 810, dated 29th March 1899, I have referred to the *Pæciloneuron pauciflorum* which will doubtless prove to be a valuable timber, if it be possible to extract it profitably.

10. The results of testing the *Mesua ferrea* specimen sent to Madras, which weighed 77.93 lb. per cubic foot, compare unfavourably in regard to transverse strength with the figures given in the extract quoted by the Consulting Engineer for Railways in Government Order, No. 1311, Railway, dated 21st October 1898, printed in Board's Proceedings, Forest No. 17, dated 7th January 1899. I have, in paragraph 14 of my notes referred to above, spoken of the want of durability of this timber used as uprights and door frames, in the house of a planter there—the portions below ground having been entirely destroyed by dry rot in two years' time, due possibly to the ground being saturated with fungus. I obtained specimens of the posts and door lintel taken above and below ground, and, if called upon to do so, will send them to the Board for inspection. The portions above ground were so hard that it was difficult to make any impression on them with a heavy aruvál which goes to show that the air should not be excluded from any part of the wrought timber. This is opposed to the experience of another planter on the Anamalais, and to the information given by the Consulting Engineer for Railways in paragraph 5 of his letter dated 3rd December 1898, printed in Board's Proceedings, Forest No. 64, dated 3rd February 1899. I consulted Mr. Colin Mackenzie, an old resident of the Wynaad and the Nilgiris, whose knowledge of and experience in the use of timber trees, is extensive, and he informed me that it was generally found that this timber if covered in is liable to rot. How far this would interfere with its value for sleepers, or whether the current of air on the top, sides and ends of each sleeper would be sufficient to preserve it, can only be ascertained by a prolonged test. In appearance nothing could be more favourable, and it might be held to be absolutely indestructible.

11. The tree is abundant on the Anamalais and grows to a large size. In paragraph 14 of my inspection note, I have stated that the older trees appear to be usually decayed, which can be ascertained by an inspection of the trees felled on the road side, and in the clearings, and the trees appear to suffer much from heart-shake and to crack badly. There is, however, a large stock of smaller trees which ought to yield excellent timber which though costly and difficult to work and transport, is not so much so, I hope, that it will not be possible to extract it profitably hereafter in some form or another—the smaller the better.

12. The Board in its demi-official No. 15, dated 17th February 1899, suggested that "nothing would be lost by instructing Forest officers who are likely to have this wood on hand to seek for a market for it on the East Coast Railway, &c." It occurs on the Anamalais only in this circle in any quantity, and till the road and other arrangements for developing a market are more advanced, it is quite impossible to exploit them; hence no further action has been taken on the demi-official quoted.

13. The extracts from my Anamalai notes submitted to the Board will show the impressions I received from my recent visit there, and I now only repeat my conviction here, that on account of the long distance for which carting will have to be done at high rates, and the configuration of the ground, the working of the forests will be most difficult, even with the aid of machinery and it will take a very long time before anything practical can be proposed.

In this connection, I may mention that orders to saw and remove 40 trial sleepers took several months to carry out and then at great trouble and expense the sleepers having had to be carried by coolies for the most part.

For the present, the utmost that can be done is, after careful inspection, to select and permanently exclude from application for planting purposes, such portions of the forests as are adapted to timber operations, with reference to abundance of suitable timber, facilities for erecting machinery, &c., and distance from Vannanthorai at the foot of the Anamalais on the one side and Mount Stuart ghaut on the other.

14. As regards the road now in course of construction, there was some correspondence with the Superintending Engineer on the subject, which I continued, and in his last reference, dated 3rd December 1898, that officer informed me that it would take from two to three years to complete the road from Vannanthorai to Sirukundru, and I believe the present intention is to construct it as far as Paralai, and a bridle-path

from there to Sirukundru. I have, however, no accurate information on the point. I presume that objection would be taken to the passage of timber-laden carts over the road till it is quite finished.

15. At present, as indicated in the correspondence printed on page 4 of Board's Proceedings, Forest No. 64, dated 3rd February 1899, it is difficult to undertake the supply of a very limited number of sample sleepers, till the new undertaking is properly organized and the suitability of the various timbers, unknown at present, has been fully tested, it is perhaps somewhat premature to discuss the capabilities of the several divisions of this circle which can only be done, with reference, for the most part, to the stock of acceptable timbers, the present staff of subordinates and available manual labour supply. These facts must therefore be borne in mind in considering the following remarks, which are based upon personal inspection and reports from District Forest-officers.

16. North Coimbatore.—There is a considerable stock of *Terminalia tomentosa* in parts of Satyamangalam and Kollegal taluks and of *Acha-Hardwickia binata* in parts of Kollegal and Bhavani taluks, if it be found profitable to work this valuable timber for sleepers. The distance sleepers would require to be carted and want of labour. make the successful working of the *Terminalia tomentosa* very problematical. It might be possible to undertake a limited supply to the Southern Mahratta line on the Nanjangode side. The question of undertaking departmental operations is under enquiry and report.* It is possible that an arrangement may be made to exploit these forests by means of a contractor.

* Report since received and précis attached. The matter is not, of course, finally disposed of by it.

ENCLOSURE.

PRÉCIS of office note from District Forest-officer, North Coimbatore, Reference on Current No. 390, dated 10th April 1899.

Xylia delabriformis and *Hopea parviflora* do not occur.

The rate of Rs. 5 a sleeper is not enough for timber of such excellent quality as *Hardwickia binata*. A better market can be obtained for the timber in another form.

The same remarks apply to *Pterocarpus marsupium*.

Terminalia tomentosa occurs in large quantities on the hills east of Talamalai plateau and in Minchiguli valley and Geddasal plateau. If the Erode Nanjangode Railway be brought over the Talamalai plateau, a number of the trees in the former locality could be utilized; otherwise, in both cases, the inaccessibility and distance from labour market must render the undertaking unsuccessful.

A contractor may possibly work part of the Geddasal forest under certain conditions.

17. South Coimbatore.—The valuable forests of this division cannot be relied upon for the present for any supply at all. The timber trees of the evergreen forests have first to be given a fair trial and the leased forest, which is deciduous, is too limited in extent and with too short a season to be capable of yielding any but a small supply of 2 or 3,000 sleepers per annum, and further, it is doubtful whether, with the machinery now set up, it will not be more profitable to sell the timber to the public in the shape of planks, boards and small scantlings. The supply of timber in other parts of the division is too limited to consider.

18. North Malabar.—I have in my recent inspection note of this division—extracts from which are now being submitted to the Board—stated that it is capable of meeting a heavy demand for timber and the supply of *Terminalia tomentosa* is so large that a constant supply of not less than 30,000 sleepers per annum of this timber might be kept up from one reserve alone. The distance that timber has to be transported by cart must always operate as a great disadvantage in this division.

19. South Malabar.—This division is favourably situated with regard to water carriage and operations on a large scale can be conducted. At the present time, according to a report of the District Forest-officer, dated 23rd February 1899, there are 78,100 cubic feet of *Terminalia tomentosa* and 23,800 cubic feet of *Xylia* cut ready for conversion and of this 63,000 cubic feet consist of seasoned wood, and the total quantity would probably cut up into 35 or 40,000 metre-gauge sleepers and the division could, as stated in my report No 1377, dated 31st December 1898, be relied upon to yield 45,000 sleepers annually in subsequent years.

20. South Canara.—In paragraph 42 of my inspection note on this division, I have referred to its possibility in the supply of sleepers, and taking the two acceptable trees—*Xylia* and *Hopea*—only into consideration, I believe South Canara would be capable of yielding not less than 20,000 narrow-gauge sleepers per annum, and as stated in paragraph 44, if the *Pæciloneuron indicum* be found to be a suitable timber, the supply could be very largely increased.

21. The Nilgiris.—This is a more difficult division to operate in. There is a large supply of *Terminalia tomentosa* in Mudumalai and Benne forests, and as a result of a recent discussion with the District Forest-officer it seems feasible to work this timber, and cart to Calicut via Sultan's battery which is 63 miles and less than from Chedleth range in North Malabar, from which the large supply of sleepers I have referred to above, would be drawn principally. I am doubtful of the possibility of converting the *Eucalyptus globulus* and *Acacia dealbata* trees into sleepers; but I think the matter is worthy of trial, as if found suitable, the question of how to dispose of the large stock of Australian wood on the Nilgiris would be nearer solution than it is at present. None but the largest trees nearest to maturity would, of course, be worked after thorough seasoning. No figures have been furnished by the District Forest-officer, but the total annual supply may be entered at 5,000 for the present.

22. Madura.—Nothing can be done in this division. The supply of timber is limited and in inaccessible parts of the district.

23. Tinnevely.—In paragraph 3 of my report to the Board, dated 31st December 1898, I have stated that this division could supply about 35,000 sleepers annually, but none of the timbers are those named by the Madras Railway as acceptable ones and they will first have to be thoroughly tested before any arrangements for supply can be made.

24. Summed up, therefore, the following supplies of acceptable timbers might be made during the next three years if the necessary organization can be made in the meantime:—

South Coimbatore	...	...	...	...	...	...	...	7,500
North Malabar	...	...	...	...	...	...	...	90,000
South Malabar	...	...	...	...	...	...	...	125,000
South Canara	...	...	...	...	...	...	...	60,000
The Nilgiris	...	...	...	...	...	...	...	15,000
Total	...	...	...	...	...	...	...	297,500

and of timbers still to be tested, large supplies could be made of the following, if found suitable:—

<i>Mesua ferrea</i> ,	<i>Balanocarpus utilis</i> ,
<i>Pæciloneuron indicum</i> ,	<i>Vitex altissima</i> ,
<i>Pæciloneuron pauciflorum</i> ,	<i>Anogeissus latifolia</i> ,
<i>Hopea Wightiana</i> ,	

from South Coimbatore, South Canara and Tinnevely.

25. In order to advance matters as far as possible, detailed instructions have been issued to the following District Forest-officers and funds placed at their disposal to fell trees for seasoning and subsequent conversion into sleepers:—

North Malabar.	The Nilgiris.
South Malabar.	Tinnevely.
South Canara.	

I have not yet been furnished with full information, and can only give details for—

North Malabar ...	1,500 trees = probably 65,000 cubic feet.
South Canara ...	25,000 cubic feet.
The Nilgiris ...	100 blue gum and acacia = probably 5,000 cubic feet.
	100 <i>Terminalia tomentosa</i> = probably 5,000 cubic feet.

In South Coimbatore, about 12,000 cubic feet are reported to have been cut previously.

26. The necessity for supplying the Railway Companies with sample sleepers for testing in the road has not been overlooked, and detailed instructions were issued on the subject to the District Forest-officers of—

North Coimbatore ...	For ten <i>Albizia odoratissima</i> broad-gauge sleepers.
South Coimbatore ...	For different kinds of timber, broad and narrow gauge, ten of each.
South Malabar ...	For ten <i>Terminalia paniculata</i> broad-gauge and ten <i>Xylia dolabriformis</i> narrow-gauge sleepers.
South Canara ...	For ten <i>Pæciloneuron indicum</i> broad-gauge sleepers.
Tinnevelly ...	For different kinds of timbers, narrow-gauge, 10 of each.

27. The trial sleepers received from North Coimbatore were very poor specimens of a good timber, and though sawn straight and uniformly by hand, possessed defects which according to the specification quoted in paragraph 6 should have been avoided. They were all rejected. Those from South Coimbatore were on the whole exceptionally bad and possessed practically all the defects which sleepers could possess. Ten *Lagerstræmia* sleepers were originally ordered to be sent in, but it proved to be impossible to get them from the three logs sawn up, and the instructions were accordingly not carried out. One hundred and five sleepers were supplied according to the following statement, of which 61 were accepted and 44 were rejected:—

STATEMENT showing the sleepers accepted and rejected by the Railway Department.

Particulars.	Pollachi range.										Tunacadavu range.										Grand total of broad-gauge sleepers.	Grand total of broad and narrow-gauge sleepers.
	Broad-gauge sleepers.										Broad-gauge sleepers.					Narrow-gauge sleepers.						
	<i>Mesua ferrea</i> (Suruhi).	<i>Caioophyllum elatum</i> (Poesepar).	<i>Bassia longifolia</i> (Uppai).	<i>Eugenia jambolana</i> (Nagai).	<i>Cullenia eximia</i> (Koranthuvarai).	Total.	<i>Terminalia tomentosa</i> (Kernaradu).	<i>Stephagm parvifolia</i> (Nekandambai).	<i>Adina cordifolia</i> (Manjakkandabai).	<i>Terminalia paniculata</i> (Pillamaradu).	Total.	<i>Mesua ferrea</i> (Suruhi).	<i>Terminalia tomentosa</i> (Kernaradu).	<i>Anogeissus latifolia</i> (Vellamagai).	Total.							
Total supplied ..	10	6	10	9	5	40	10	10	10	10	40	5	10	10	25	80	105					
Accepted ..	5	3	..	3	2	13	6	10	8	7	31	3	6	8	17	44	61					
Rejected ..	5	3	10	6	3	27	4	..	2	3	9	2	4	2	8	36	44					

Insufficient care was taken in the matter, and the result has been most unfortunate in giving a bad impression of timbers we are anxious to bring forward and which are virtually condemned untried.

In speaking of the accepted broad-gauge sleepers, the District Engineer, Mr. Thompson, informed me that most had been taken in order to give them a trial, and that there were few among them which would have been taken from a contractor. In order to fairly test *Mesua ferrea* he has asked for a further supply of five, and at my request, for a further supply of seven *Eugenia*, that timber being a hard and good one, and I have issued the necessary instructions to the District Forest-officer though I find now there is little prospect of being able to supply many of the latter, as the tree is not so common as I supposed. Within two years it is possible that some sort of opinion can be expressed about the durability and suitability of the timbers.

28. Summed up, the following sleepers have been supplied to the Madras Railway for testing:—

From South Malabar ...	(a) 10 <i>Terminalia paniculata</i> .
	(b) 5 <i>Mesua ferrea</i> .
	(c) 3 <i>Calophyllum elatum</i> .
	(d) 3 <i>Eugenia jambolana</i> .
From South Coimbatore ...	(e) 2 <i>Cullenia excelsa</i> .
	(f) 6 <i>Terminalia tomentosa</i> .
	(g) 10 <i>Stephegam parvifolia</i> .
	(h) 8 <i>Adina cordifolia</i> .
	(i) 7 <i>Terminalia paniculata</i> .
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(a), (c), (e), (g), (h) and (i) are hardly likely to be acceptable timbers I fear.

(i) was ordered not to be sent from South Coimbatore as a supply had already been made from South Malabar.

The ten *Pæciloneuron indicum* sample sleepers from South Canara have not been received as yet. They are expected very shortly and will only be handed over to the Madras Railway for testing if really good ones.

29. The following narrow-gauge sleepers have been sent to the South Indian Railway for trial:—

From South Malabar ...	10 <i>Xylia dolabriformis</i> .
	3 <i>Mesua ferrea</i> .
From South Coimbatore ...	6 <i>Terminalia tomentosa</i> .
	8 <i>Anogeissus latifolia</i> .
	6 <i>Hopea wightiana</i> .
From Tinnevelly ...	8 <i>Balanocarpus utilis</i> .
	6 <i>Vitex altissima</i> .
	3 <i>Aglaia mimitifolia</i> .
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They have all been acknowledged by the Chief Engineer who had promised to give them a trial in the line, but states that it will take a few years before any opinion can be expressed. Most of the above will, I hope, prove to be suitable timbers.

30. Some expenditure has been incurred in supplying the above sleepers which will be debited to forest funds.

31. Tenders were invited recently for an immediate supply of 27,000 sleepers for the South Indian Railway. South Malabar is the only division with a stock of seasoned timber. As I had ascertained from the District Forest-officer that it would not be possible to float timber till after the rains in June, I wired to him that he need not tender at all, and in reply to a wire from Mr. Brown, the timber merchant of Calicut, stated that we could not let him have any sawn sleepers and referred him to the District Forest-officer for the purchase of timber.

32. I have little doubt that the soundest method of exploiting the Government forests for sleepers is to hand the work over to contractors charging a royalty per sleeper. Forest officers have neither the necessary knowledge nor experience for organizing work of this description on a large scale. I received a visit from Mr. Randolph Morris who is anxious to take up a supply contract for the Southern Mahratta Railway, working portion of our forests in North Coimbatore for *Terminalia tomentosa*.

I see no objection to a small contract being given to him experimentally. I had some correspondence with, and also received a visit from, Mr. Cass of the firm of Cass & Co., railway sleeper contractors of Cuttack in Orissa. His object was to make enquiries, and I furnished all possible information to him and am awaiting further developments. He has had large experience, and should be able to do work on a large scale.

The difficulties in the way of any early contract with his firm are the following:—

The demand for sleepers is large and immediate.

Seasoned wood is insisted upon of particular timbers, of which we have a very limited stock only.

No new timbers will be accepted till they have been fully tested.

Failing an early arrangement in this country, it appears likely that Chief Engineers will obtain their supplies from Australia and elsewhere.

33. In saying that sleepers of accepted timbers could be produced at the rate of about 100,000 annually, during the next three years, I have under rather than overstated what the extensive stock of timber is equal to constantly, and not merely during the limit of time to which reference has been made in the correspondence and orders. In North Malabar, I am considering the operations in one block alone, whereas as they develop, work will be carried on in several blocks at once.

The organizing of work will be the difficulty. The following points have to be considered:—

(a) Provision of a large stock of seasoned timber.

(b) Elephants for dragging.

(c) Labour and machinery for conversion.

(d) Transport-water, roads, tramways and wire ropeways.

(e) Increased and competent staff.

(f) Risk of rejections—*vide* paragraph 3 of Board's Proceedings, Forest No. 65, dated 3rd February 1899.

34. (a) This is of course not difficult, but it will take time to get several hundred thousand cubic feet of timber felled for seasoning.

(b) Elephants are essential for dragging logs to and arranging them in depôt and turning over for sawing, &c. The stock is at present insufficient owing to numerous recent casualties and few captures during the current season, which will necessitate new purchases of suitable animals for all divisions except Tinnevely.

(c) Felling and sawing labour is fairly abundant along the West Coast, and no great difficulty on their account need be anticipated. The question of machinery I shall deal with below.

(d) Water-carriage can only be obtained in South Malabar, though as stated in paragraph 75 of my inspection note of South Canara it may be possible to provide it by clearing channels in river beds. This, however, is a matter for investigation.

The districts of North and South Malabar, South Canara and I might add the Nilgiris to a certain extent, could depend on water-carriage from the West Coast ports to distant ports both by steamer and native craft.

Roads.—In the evergreen forests of the Anamalais, where timbers which have still to be tried alone are to be found, nothing can be done till the roads are opened.

In North Malabar repairs and improvements to roads are required and some new traces also.

In South Malabar, South Canara, the Nilgiris and Tinnevely, temporary roads and repairs to existing roads will be required.

Tramways.—When it is possible to seriously consider the working of the evergreen forests on the Anamalais, it may be advisable to lay some tramways, but I do not know of any other division where I would advise the incurring of the heavy expenditure required for the present, and if anything at all be done in this direction, I should recommend the use of Ewing's single rail tramway described by me in full in paragraphs 66 and 67 of my inspection note on North Malabar.

Wire ropeways.—It is pure speculation to discuss what may or may not be possible in the evergreen forests of the Anamalais, but when operations can be started, it will no doubt be advisable to use wire ropeways from the crest of the hills to

the plains. I have seen no places in any other division where such a means of transport could be advantageously employed excepting in South Canara, where these wire ropes set up cheaply for temporary use with wooden blocks or runners could be used for conveying *Pæciloneuron indicum* sleepers from the steep slopes of the ghauts to the plains.

(e) *Staff.*—I need hardly point out the great importance of securing the services of an efficient staff for supervision both in the cases of contract and departmental work and directing the conversion of individual logs, so many of which are unsound. My experience of the South Coimbatore trial sleepers showed me that, where the District Forest-officer had failed to devote personal attention to selection of timber and passing of sleepers, the services of an untrained range officer were worse than useless. The work would involve constant attendance and the necessary experience would be gradually gained. Selected officers only should be put in charge of the work, and they would be required in each division.

(f) *Risk of rejections.*—This would have to be provided against most carefully by supplying none but the best qualities of timber and sleepers answering in all respects to specification. The initial loss of wood in the preparation of really sound sleepers will be very great and not less than 50 per cent., and the risk of further loss by rejection must not occur, as such pieces of timber would be almost unsaleable and the decision of the railway authorities would be final.

35. *Machinery—South Coimbatore.*—As soon as it is possible to make practical suggestions for working the evergreen forests of the Anamalais, they will no doubt include the erection of machinery of various kinds, but I fear this will take a long time, and until a good main road is opened throughout with feeder roads, no heavy plant can of course be taken to the hills at all.

The machinery in the leased forest is in working order and a considerable quantity of timber will be sawn up during this next season, but it is not probable that any large number of sleepers will be turned out by it, as it will pay better to use it for other purposes.

36. *North Malabar.*—In paragraphs 55 to 64 of my inspection note on North Malabar, I have given details of a scheme for setting up sawing machinery to be worked, like that at Mount Stuart, by means of a Pelton water wheel, in a portion of the forests where the stock is so large, that it could be most profitably used for conversion into sleepers on a large scale and all kinds of sawn wood. The scheme is a perfectly sound one and, if approved of, no time should be lost in procuring the plant so as to be able to get it all erected before the monsoon of 1900.

The division has numerous advantages for setting up machinery, over South Coimbatore and amongst others, accessibility, for the plant could be brought by rail to Nanjangode within 50 miles of the saw mill site or better and cheaper still, by sea to Calicut, within 70 miles of the place where it would be erected.

37. It would not be possible to employ machinery advantageously in South Malabar, South Canara or the Nilgiris, but it is possible that it might be usefully set up in Tinnevely though the District Forest-officer is not in favour of it. I can only decide this point after a critical inspection of the district and after it is known if the timbers from which the trial sleepers have been sawn prove to be acceptable.

38. *Rates.*—I do not think it is necessary to discuss rates here, inasmuch as when the department is able to commence operations, I have little doubt that district by district we should be able to supply sleepers at an average rate of Rs. 3 to Rs. 5 for metre and broad-gauge, respectively, and obtain a reasonable margin of profit, charging a cubic foot rate for the sleepers in excess of standard dimensions required for bridges and crossings.

If any contractor come forward, a royalty per sleeper could be demanded, calculating at the rate of about As. 4 per cubic foot.

39. Assuming the demand to be immediate, and failing a contractor paying a royalty on all sleepers removed, I do not consider that the Forest Department will be in a position to compete for the supply of construction sleepers for a considerable time. Any attempt to embark now on this new undertaking on a large scale would probably end in complete failure. In the course of a year or two, when the initial

difficulties have been overcome, roads have been opened, machinery erected in North Malabar and some experience has been gained, we shall certainly be able to contribute largely to the railway requirements in the way of renewals, of which a large and ever increasing number are and will be wanted.

I propose therefore for the present to continue the accumulation of a stock of seasoned timber of accepted trees and to prepare a definite scheme for working such of the districts as are capable of meeting a demand, and, as an experiment, to start the sawing of sleepers by hand in South Malabar from the stock of seasoned timber there. Work will therefore necessarily be conducted on a small scale at first, but it will be sufficiently large for our present purposes, to show us what we can do and what we have to expect in the way of wastage from our usually unsound trees.

40. *The Haskinizing process of preserving timber.*—A description of this process is given in a note communicated with Board's Proceedings, Forest Mis. No. 175, dated 22nd March 1898, and some further notes on the same subject were communicated with Board's Proceedings, Forest Mis. No. 467, dated 19th July 1898, and some correspondence relating to it is printed in Board's Proceedings, Forest No. 64, dated 3rd February 1899.

If everything be possible that is claimed for this process, the question of supplying sleepers would be made simpler, as practically all timbers would be suitable. I have suggested in paragraph 64 of my inspection note on North Malabar that it would be an advantage if the District Forest-officer, who is proceeding on leave to Europe, should study this system of preserving timber in the event of the necessary plant ever being introduced into this country by private enterprise, for I can hardly presume that Government would seriously contemplate the installation of such costly plant, which with initial cost and terms of patentees, would probably approach 2½ lakhs of rupees and there would be the grave difficulty that all wood to be treated would have to be brought to the works and possibly carried hundreds of miles back again. The royalty suggested by the Haskin Wood Vulcanizing Company is also excessive and inaccurate, for if a rate of 1d. were charged per cubic foot 1½d. and not 2d. should be asked for a metre-gauge standard sleeper, and even this royalty would materially reduce profits. Further, there is always the risk that the process would become out of date in a few years and that electricity or some other agency would be employed in the preservation of timber.

41. Before closing this long report, it may not be out of place to refer to other means of utilizing the valuable timber trees of this circle which have suggested themselves.

Wood-paving blocks.—Mr. Thompson, the District Engineer, Madras Railway, once spoke to me about a proposal to lay some wood-paving blocks on the platforms of the larger stations on the line. Some correspondence ensued, and I requested him to send a sample block and a specification to the District Forest-officer, South Coimbatore, and the latter to furnish him with a number of specimen blocks of different suitable timbers. I understand now that nothing has come of this, but the District Forest-officer has collected about 20 blocks in the office for the District Engineer's inspection. I shall see that the matter is not lost sight of.

42. When Mr. Cass visited Coimbatore, I discussed the question of supplying the London market with wood-paving blocks, and in a recent letter to me, he wrote—

"Every one who has seen the Penciloneuron specimen quite agrees with me that it is likely to prove a valuable wood * * * I am very keen in trying to run it for wood-paving at home * * * I am sure that apart from sleepers that this wood pavement is the market for your hard woods—if not where will you sell them? * * * I am anxious to get permission to put down specimen bits of roads at the entrances in the Paris exhibition with Indian hard woods as wood-paving. I wonder if Government here would help in any way. I am pretty sure an enquiry for the better woods would result."

43. I addressed the Board on the same subject in my No. 1256 of 23rd November 1898, and the correspondence is disposed of in Board's Proceedings, Forest Mis. No. 76, dated 8th February 1899. I have taken no further action, as I had in the meantime seen a lengthy correspondence with South Canara about wood-paving blocks

and have since learnt of the preference for the Australian Jarrah wood. I understood from Mr. Cass that what is most sought after is a fibrous wood which is less slippery for horses than a wood with a very hard and unyielding surface.

44. Briefly stated, the Board in Board's Proceedings, Forest Mis. No. 787, dated 14th June 1894, approved of an expenditure of Rs. 1,000 in South Canara for preparing and sending certain specimens of wood to London. A change of officer led to a change of plan, and before spending a large sum of money a trial consignment of 326 paving blocks was sent home through the agency of Messrs. Peirce Leslie & Co., who undertook to get them brought to notice and a report on them was promised.

It was received in a letter from the London Office, dated 3rd July 1896, and I quote it *in extenso* below:—

Extract from London Office letter dated 3rd July 1896.

* "*Tiruca paving blocks.*—The Forest-officer would be still more disappointed were we to give him a sanguine report on the possibility of this business and get him to cut a large quantity and then find that nothing could be done. C. and S. are doing their best to get the vestries to make a trial of those sent by † Glenfruin, but as we repeatedly pointed out before, the vestries,

† Steamer.
corporation and contractors throughout the United Kingdom are so inundated with offers of new paving woods that their general answer is to offer to allow a portion of the street to be paved with it to enable them to determine whether it is suitable or not after a year or two's wear. We have not the least doubt that the wood would be suitable, but it is one thing for us to believe this and another to get others to do so. The favourite kind of wood at present is the Australian Jarrah which is sold at about £ 5 per load of 50 cubic feet delivered. This does not leave very much for felling and hauling the timber and for cutting the blocks. Those sent per Glenfruin are badly squared; it is essential that these should be absolutely uniform throughout."

This was not encouraging, and the experiment was not proceeded with. Messrs. Peirce Leslie & Co. were making enquiries as to the number of blocks necessary to be put down to give a fair trial and also of the cost of the operation, but apparently no further reply has been received from them.

45. The point that strikes me as most serious is the low price which has to be competed against £ 5 or say Rs. 80 for 50 cubic feet of wrought paving blocks delivered in London—about Rs. 1-10-0 a cubic foot. The 326 blocks or about 27 cubic feet cost Rs. 65, according to the District Forest-officer, but whether this means cost, minus or including, freight, I do not know, but probably the former. This comes to Rs. 2-5-0 a cubic foot, and the blocks were objected to on account of bad squaring and want of uniformity. The only possibility therefore of entering upon this new field would be to employ machinery, and I have therefore suggested in paragraph 64 of my North Malabar report that enquiries should be made at home for the best type of machine for cutting paving blocks.

46. *Railway Keys.*—There has also been correspondence with reference to the supply of teak wood keys for the Madras Railway Company disposed of in Board's Proceedings, Forest Mis. No. 218 of 27th March 1899. There is little doubt that we could compete for a large supply of teak keys from South Coimbatore, North and South Malabar, but as I pointed out in my letter to the Board, No. 1834 of 20th January 1899, a special machine would be required, and in paragraph 62 of my North Malabar notes, I have suggested that such a machine should be enquired for and purchased.

47. *Timber for the Kolar Gold Mines.*—I had some correspondence with the Secretary to the Mysore Gold Mining Companies and ascertained that the annual requirements were very heavy and between 250 and 300,000 cubic feet. On my visit to South Malabar in November last, I went into the question and give an extract from my inspection notes:—

"Paragraph 20—*Timber in log to gold mines.*—I have enquired into the question of competing for the supply of timber in log to the Mysore gold mines which runs to over 20,000 cubic feet a month, and the bulk, if not the whole of which, is supplied from the West Coast. Different kinds of timber, including teak, have been named as being required, but I have little doubt that any hard wood would be accepted. I understand, however, there are serious difficulties and the logs must be very large and absolutely sound to be safe from rejection, and delivery must be made at Bowringpet and other stations in Mysore before inspection."

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3. Paragraphs 16 to 25 of the report.—One or more of these timbers are to be found in considerable quantities in fairly accessible localities in the districts of South Malabar, North Malabar, South Canara, the Nilgiris and South Coimbatore and detailed instructions have been issued to the District Forest-officers concerned to fell trees for seasoning and subsequent conversion into sleepers. The Conservator's action is approved. Trees merely felled and left to season *in situ* should not, of course, be brought into the stock accounts until the timber reaches a regular forest or sale depot (*vide* section 94 of the Forest Code).

4. Paragraphs 32 to 39.—In a few localities it is thought that it may be feasible to undertake the conversion of the timber into sleepers departmentally and in such cases detailed proposals will be submitted separately. Generally speaking, however, the Conservator has no doubt that the soundest method of exploiting the Government forests for sleepers is to hand the work over to contractors, charging a royalty per sleeper, as Forest-officers have neither the necessary knowledge nor the experience to organize work of this description on a large scale. In this view the Board concurs and would add that although knowledge and experience might be gained by Forest-officers, they cannot afford to spare the necessary time without neglecting other important work, and special officers can be appointed only in cases in which operations are to be carried on a very large scale. In dealing with contractors it might of course be preferable in some cases to carry out the felling departmentally and possibly also to transport to a convenient depot from which sleeper-contractors could obtain the timber.

5. Paragraphs 8 to 16 and 26 to 31.—The Conservator is of opinion that many more of the timbers procurable in abundance in the forests of his Circle are well adapted for sleepers than is at present known to be the case, and with the view of arriving at a conclusion he has had samples of various woods tested at the Engineering College, and has supplied sample sleepers to the Madras and South Indian Railways. The Board would be glad to see these experiments continued on a scale and in a manner which would leave no room for doubt that the conclusions formed from them may be accepted as final. The figures given in paragraph 27 show very clearly that if they are to be of any real value all samples forwarded to the Railway officials must be passed by a superior officer of the Forest Department before despatch. In one case deplorable results followed from a District Forest-officer, leaving the matter to a subordinate under the impression apparently that nothing more was required than to secure that the sleeper was made of a particular wood, a point which no doubt might safely have been left to a Ranger or Forester.

6. Paragraph 40.—The Board concurs with the Conservator in considering that it would not at present be advisable for Government to undertake so costly an enterprise as the installation of the plant required for the Haskinizing process of preserving timber. The operations of the Forest Department are scattered over too wide an area.

7. Paragraphs 41 to 50.—The enquiries instituted with regard to the possibility of developing the resources of the forests in connection with the supply of teak keys for Railways, wood-paving blocks, and timber for the Kolar mines should be continued. In conclusion the Board has to thank Mr. Gass for the hearty interest he has taken in this matter and the thoroughness of his investigations.

(True Copies and Extract.)

(Signed) LIONEL DAVIDSON,
Acting Secretary.

(True Copy.)

(Signed) V. A. PARTHASARATHI MUDALIYAR,
Forest Assistant.

To the Secretary to Government, Revenue Department.
" the Conservator of Forests, Southern Circle.
" Collectors (District Forest-officers) of all districts, except Madras.
Copy to other Conservators.
Exd. Md. Pahlwan.

PROCEEDINGS OF THE MADRAS GOVERNMENT

Read—Proceedings of the Board of Revenue, Land Revenue, Madras,
dated 14th June 1899, No. 245, Press.

Order thereon, No. 2626 miz, dated the 18th July 1899.

Recorded with an expression of
Concurrence in the Board's views.

(True Extract.)

J. H. Williams
Frsg. Secretary to Government.

To the Board of Revenue, L.R.

P.W.D. (Ry: Br.) ✓

L.N.

Gobt. of {189 } Madras.

REVENUE.

To

THE BOARD OF REVENUE,

Dated

Reed.

Encl.

Mis. G.O.,
R.

189 , No.

SUBJECT.