

- M.R.O. 1-1002-10 5-40.
- (1) Number of pages _____
- (2) Date of repair _____
- (3) Initials of the Referencer _____

MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

G.O. No.	1365-66 (Ry)	Press
B.P. No.		Mis.—
Dated	1-6-	1876

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
1st June 1876.*

Read the following papers :—

No. 18. From Lieutenant-Colonel J. H. M. SHAW-STEWART, R.E., Consulting Engineer for Railways, to Major-General G. W. WALKER, R.E., Secretary to Government, Public Works Department, dated Madras, 9th May 1876, No. 232 A.

I HAVE the honor to lay before Government a Note by the Deputy Consulting Engineer upon the progress of the works under construction on the Northern Extension of the South Indian Railway, between Madras and Tanjore.

2. It will be seen that Major Smith is of opinion that the date of opening the line between Madras and Tindivanam must once more be postponed, and that this event cannot now be expected before the 1st September, instead of the 1st July. The necessity for this further postponement is attributed to several causes: the delay in erecting the girders at the Karangooly bridge, owing, it is said, to the ironwork not having been fitted together before being shipped from England; the unexpected delay in the receipt of the girders for seven 20 feet openings, which reached Negapatam, as I have since learnt, upon the 8th instant; and the backward condition of the station buildings generally, which may in great measure be attributed to the late dates upon which the Engineers along the line were supplied with drawings and instructions to begin the buildings. The further postponement of the date for opening this section of the line must cause disappointment, both to Government and to the public; but I agree with Major Smith that, in present circumstances, the 1st July can no longer be counted upon.

3. As regards the remainder of the Northern Extension, Major Smith is of opinion that, if everything goes well, the under-mentioned sections may possibly be opened to the public on the 1st January 1877 :—

From	To	Distance.
Tindivanam	Cuddalore and Porto Novo	70 miles.
Tanjore	Shealli	55 "

leaving a gap of about 18 miles between Porto Novo and Shealli; of which 6 miles, between Shealli and the Coleroon river, would probably be closed by the 1st July 1877; while the closing of the remainder, from Porto Novo to the Coleroon, 12 miles, would depend upon the completion of the Vellaur and Coleroon bridges. Major Smith is however by no means confident that the whole work upon the line can be completed as above; and he names the dates as the earliest possible upon which the respective sections can be finished under favorable circumstances. The section between Tindivanam and Cuddalore includes three large bridges, over the Thondyar, the Panar, and the Guddelum; and in this country it is not easy to predict with certainty the completion of such large works. In the event, however, of any of these bridges being unfinished by the 1st January, there would be no difficulty in carrying traffic on a temporary road laid across the bed during the early months of the year.

*Proceedings of the Madras Government, Public Works Department,
1st June 1876.*

4. I understand that Mr. White, the Acting Chief Engineer, now anticipates the opening of the several sections upon the following dates:—

From	To	Miles.	Date.
Madras	Tindivanam	76	1st September 1876.
Tanjore	Mayaveram	43	1st January 1877.
Tindivanam	Porto Novo	70	1st July "
Mayaveram	Coleroon	18	1st July "

leaving, as above, the gap of 12 miles between Porto Novo and the Coleroon to await the completion of the Vellaur and Coleroon bridges.

5. The only difference of serious importance between Major Smith's and Mr. White's anticipations is with reference to the section between Tindivanam and Porto Novo, a distance of 70 miles. Major Smith is of opinion that, by making use, if necessary, of temporary roads across the beds of one or more of the large rivers, this part of the line might safely be opened upon the 1st January 1877; while Mr. White considers that July 1877, the date named in my letter No. 183 of the 10th April, cannot be anticipated. The opening of this section will, without doubt, greatly influence the traffic returns. It passes through many large centres of trade, such as Villapooram, Panrooty and Cuddalore, and acts upon a large tract of populous country. I agree with Major Smith that every effort should be made to secure the opening of this section at the earliest possible date; and the Railway Engineers should be urged, with this object, to push on as fast as possible the bridge over the Paravanar, a large stream between Cuddalore and Porto Novo, which it would be difficult to cross by means of a temporary road. Over the three large rivers to the north of Cuddalore traffic might without difficulty be worked, as mentioned above, upon temporary roads during the dry months, in the event of the bridges being unfinished.

6. The proposal to use temporarily, for other purposes, certain portions of the Palar bridge ironwork, alluded to in paragraph 3 of Major Smith's Note, is in my opinion, open to serious objection. The arrival within the last two days of the seven pairs of 20 feet girders removes all necessity for this arrangement, so far as those openings are concerned; and, with regard to the temporary road across the Palar, I trust that means will be found to substitute other girders. I am now awaiting receipt of a plan showing the proposed arrangements at the temporary crossing.

7. I cordially agree in the views expressed by Major Smith in paragraphs 14 and 15 of his Note, with reference to the advantages which may fairly be expected to follow the substitution of the "piece-work" system instead of payment for daily labor, and from a general use of the tender system in obtaining large supplies of materials. My views upon these two points have been brought to the Acting Chief Engineer's notice, but I regret that he does not share them.

8. Waste of masonry, such as is brought to notice in paragraph 18 of Major Smith's note, is much to be regretted. With reference to platform walls and urinals, the two points in which this waste occurred, the attention of the Railway officers had

*Proceedings of the Madras Government, Public Works Department,
1st June 1876.*

previously been drawn to the importance of economising masonry, by placing the kerb-stone upon a shallow trench filled with broken brick, and by removing the urinals off the platform to the level of the ticket office. The drawings of the proposed station arrangements between Madras and Tindivanam were however received in this office at so late a date that it was impossible to subject them to scrutiny without risking delay in opening the line.

Note on the present state of the Works on the South Indian Railway Company's Northern Extension inspected between the 12th April and 5th May 1876.

THERE is, in my opinion, no reason to doubt the completion, by the end of June, of all bridges and culverts between Madras and Tindivanam, with the exception of the bridge over the Palar river. There are a few culverts and small girder bridges to be built up from floor level in the low rice-fields near Madranticum; a small girder bridge in a tank, concerning which there has been some discussion, and a culvert or two here and there to be built; these works are all in progress, with ample material at site to complete them.

2. The girder work is not so forward, the Carangooly bridge has six pairs of girders in situ, but owing, as I understand, to the ironwork not having been fitted together before leaving the shops in England, much extra drilling work has been thrown upon the Resident Engineer, and it is estimated that the remaining five pairs cannot be placed, and this bridge opened for an engine, before the end of this month (May).

3. Of the other bridges, there are seven single 20 feet spans for which no girders have yet been received in this country; it is proposed to open them temporarily with portions of the ironwork (the booms) for the Palar bridge; but looking to the general progress of the works, and to the inconvenience of substituting girders hereafter when the line is open, I am not disposed to approve of the arrangement, unless the proper girders are likely to be some months still undelivered.

The temporary crossing of the Palar river deep-bed, on 12 feet wells sunk into the clay at 20 feet intervals, spanned by sections of the Palar ironwork, is, I think, a good arrangement, but it is certainly a risky one, and I question whether the Palar booms should be used unless no other girders are available on the Madras Railway or elsewhere; if a fresh carried one away, or twisted it, it might seriously delay the opening of the bridge. The work is well forward, the end of this month should see it complete.

4. The permanent-way is laid and spiked throughout to Tindivanam, 76 miles from Madras, except for about 4 miles; this material is very nearly all delivered, and the 15th May is reasonably assigned as the probable date of completion. The remaining girders, except those referred to in paragraph 3, are now at Tindivanam awaiting the completion of the permanent-way, but they are rivetted up, and the end of May, or at the latest the 15th June, should see them on their beds.

I do not therefore much expect to learn that the first engine has run through before the 15th June. It is possible that the 1st June may see it, but it is unlikely. There will then remain some miles of top ballasting to be done, the exact quantity is difficult to arrive at, as, to prevent delay, the side pits are drawn upon and the bottom ballast at least is pushed forward by service wagons or ordinary labor.

5. I will not particularize here the several buildings and their state of progress, but I can safely assert that by the end of June the station buildings of the various stations between Madras and Tindivanam will not be roofed in and ready for the traffic and locomotive departments. Every effort has been, and is being, made to complete them, but there is not now sufficient time left to enable it to be done; and assuming that the first engine will run through on the 15th June, and looking to the season of the year, and the description of the banks near Madranticum, I hardly think it wise to urge any longer the attempt to open by the 1st July, or fifteen days from the running of the first engine.

*Proceedings of the Madras Government, Public Works Department,
1st June 1876.*

6. His Grace the Governor in Council has approved of the list of requirements which it was agreed should be fully supplied before any section of the line is opened for public traffic; and seeing that these cannot be fully met by the date named, I would recommend that the pressure be removed which may now be held to justify the use of inferior materials and the expenditure of money for such things as, transporting rolling stock from Negapatam to Madras, or bridge work by road, &c., which would not otherwise be needed. It may be said that the fixing of an early date is needed as an incentive to increased exertions on the part of the Resident staff, but I am quite sure no such pressure is needed. All have done, and are doing their best; and the fixing of the date of opening two months later, or say, the 1st September, will enable a better class of brick to be supplied to the Madarantium and Acherawak station buildings, more room for the selection of ballast, and ensure the completion of the works in a more thorough and efficient manner.

The attempt to build more masonry in a certain time than the usual sources for the supply of material can provide for, would be likely to lead to the purchase of inferior or costly material; and there is much work remaining to be done that can be far better, and more economically, carried out with the aid of an engine, if the date named be one that will admit of such work being somewhat postponed.

7. The oversight in sending out bridge-work to this country that had not been fitted, by postponing the opening of the Carangooly bridge, may on this account prove costly to the Company.

8. It is not gratifying to have the reason to offer, but I may add that, from all I could learn, there is not a very heavy traffic in passengers or goods to be looked for as long as the line ends at Tindivanam. This fact, however, diminishes considerably the weight of the argument for early opening, based on the hoped for returns to the Company on capital outlay lying idle; it is not probable that this short section will do very much more than pay its working expenses during the first month.

9. The further extension of the open line to Villapooram is dependent to a great extent upon the completion of the Vicravandy and Tondiaur bridges, and this again on the depth to which it is thought necessary to carry the foundations, a point on which considerable difference of opinion may exist among Engineers.

If my recommendations on this point are accepted, the masonry may, I think, all be completed in time to open by, say, the 1st January 1877, with a temporary road over the Tondiaur, as the ironwork will not have been received.

10. The permanent-way between Tindivanam, the 76th, and Villapooram, the 99th mile, a distance of 23 miles, is about half laid; but the engine already runs from Cuddalore, the 127th mile, about 24 miles to the north; and with the permanent-way led by train both to Tindivanam and to the 103rd mile, the intervening space yet unlaid, some 12 miles or so, can quickly be finished off.

11. The extension to Villapooram, as it will bring the terminus of the line within easy reach of Panrooty, the 111th mile, and other trade centres, ought to secure the through goods traffic of the neighbourhood; and every effort should be made to expedite the completion of this section.

12. In the section from Villapooram to Cuddalore the Panar drainage is the difficult point; but the underlying strata in the main river-bed have proved so favorable for foundations, that the opening through to Cuddalore may possibly not be very long delayed beyond that to Villapooram. The best of the brick-burning season being over, it is probable that the supply of material will fall short.

13. Looking to the work between Madras and Cuddalore generally, it may, I think, be regarded as fairly satisfactory. Over a considerable length of line good brick earth cannot be found, and stone has in consequence been substituted in places at nearly double the first cost of

*Proceedings of the Madras Government, Public Works Department,
1st June 1876.*

brickwork. Bricks have also been necessarily led long distances to secure better material; this will add unavoidably to the cost of the line.

14. The substitution, whenever possible, of piece-work in lieu of work paid by daily labor has been lately urged on the Company's officers, and wherever I found it in vogue, as might be expected, its advantages are duly appreciated. The Acting Chief Engineer, however, in a recent communication to the Consulting Engineer, has, in opposing the suggestion, overlooked entirely the one object of it, *viz.*, the securing of the self-interest of the labor, and the consequent saving in time. A daily-paid man performs the task allotted, but this is necessarily only a moderately fair day's work for the average man of his class, and in some cases it can hardly be that, while the longer his work lasts the better for him; the man paid by the piece may be counted on in this country to do his best and earn the greatest possible. One of the Resident Engineers lately told me he saved 20 per cent. in the cost, and 50 per cent. in the time, by an arrangement of the kind. The economy of the system cannot in fact for one moment be questioned; its introduction is difficult and dependent upon the circumstances of the work, but also to some extent upon the views held by the Engineers themselves. It is to be regretted therefore, I think, that it did not meet with the cordial support of the Acting Chief Engineer.

15. The system of inviting tenders for the supply of large quantities of materials has also been suggested, for the supply for instance of lime, brick-fuel, carts, &c. It very likely might, in some places, result in no saving; it might induce no reply even in others; but it could do no harm. The present system could be fallen back upon if it failed, the principle is undoubtedly a right one and receives the sanction of English and Continental practice, and, in my opinion, should be persistently encouraged in the hope of ultimate adoption. The suggestion has not, however, met with support, and it would certainly fail unless it secured the real sympathy of the Chief of the staff. The mode of publication would differ with the locality, and perhaps it is asking too much to expect a temporary staff to exert themselves in establishing principles of work which cannot be shown to result in good to the work in hand.

16. The fence-bund between Madras and the Palar river will, some of it, have to be done over again; or, which perhaps will be the wiser plan, allowed to subside. Where the pits are so close to the toe of the slope, that there is no room for the bank, it ought not to have been put; and where the room was only just sufficient, the laborers ought not to have been allowed to undermine it by still further deepening the excavations on the side nearest the line. Where the Contractors have done so, evidently with a view to avoid carrying the soil in baskets, and to make more out of the contract rate, the work ought not to be paid for.

17. Iron curbs recently received from England are lying at Cuddalore and Chingleput, the former having been landed three weeks; and I am afraid, although the southern river works are stopped for want of them, they will not reach their destination yet a while; each section weighs, I was told, 2 tons, and can only be moved by special appliances; had it been notified to the manufacturers when ordering them they could as easily have made them in four sections as in two.

18. At Acherawak and Madarantium may be seen an illustration of outlay which, in my opinion, might well have been saved. At the latter station a wall of masonry 13 feet 6 inches high, 4 feet wide at foot, 1 foot 6 inches wide at top is being built 300 feet in length to provide a bearing for a kerb stone 15 inches in height, the kerb-stone might, in my opinion, have been laid, as it has been on some of the northern railways, on a trench filled with broken brick, or perhaps concrete. The walls of the urinal will have to be carried to the same depth, in order that it may be on the bank, level with the passenger shed, instead of below, level with the ticket office, in my opinion nearly as good a position for it; and at all other stations, in a lesser degree, is this same outlay to be incurred.

19. It may seem unimportant or even *irritating* to Engineers to urge economy in small matters such as these; but for the Government who pay the guarantee it is of importance; and if the principle of rigid economy be once infringed, there is no other line to draw; engineering perfection becomes the next limit; architectural proprieties the next, and so on, and a

*Proceedings of the Madras Government, Public Works Department,
1st June 1876.*

cheap, serviceable line becomes impossible. With these and some minor exceptions, which will be brought to the notice of the Acting Chief Engineer, I consider the work generally satisfactory.

20. From Cuddalore to the Coleroon the section of line is well forward, the completion of the Vellaur, Paravannaur, and old Coleroon bridges, will determine the date of opening.

I think it possible it may be found worthwhile to open to Porto Novo, with a flag station half-way to Cuddalore, for the accommodation of the district south and west of Chellambaram. It could, I have no doubt, be done by the 1st January 1877, if thought advisable.

It is too early yet to assign any probable date for the completion of the Coleroon and Vellaur bridges. The materials prepared and under preparation by the present Resident Engineers are excellent, and well-sinking is just commenced; both bridges are delayed for want of curbs.

21. From Shealli to Tanjore I think the line may possibly be opened by the 1st January 1877. I am not very sanguine as to this date, it depends upon the season. The work in this section is, I think, very satisfactory, the materials are good, and the foundations do not appear to me to have been carried down unnecessarily deep, an error I have observed elsewhere; the building season has been a favorable one, and the rates seem moderate. Several bridges, at the time of my inspection, were delayed for want of wooden kerbs. These might have been given out on contract in Madras or elsewhere, and have been held in readiness; that a certain number would be required must have been known. It is, I believe, intended to open only to Mayaveram with the first section; but I hope an effort will be made to extend the line to Shealli if possible; the break between it and Porto Novo will not then be a difficult one (18 miles).

22. I do not anticipate that the foundations of any large bridges west of Mayaveram will remain to be put in next year; but the numbers of smaller culverts take time, and the working season proper, owing to the cultivation, appears in Tanjore to be limited to about four months, a fact to which perhaps sufficient weight has not been given in fixing dates of opening hitherto.

23. This section of the line may fairly be looked forward to as remunerative, and each month's delay in opening will be a direct loss to Government; but I can suggest no measures for hastening the work, which is being pushed forward evenly and steadily over the whole length. In fact, in my own mind, I very much question the policy of urging a date for completion which necessitates extraordinary measures towards the close of the period; the regularity of the working arrangements is upset, high rates as premia for completion are offered, the quality of the work is liable to fall off, and the staff that all along has worked at high pressure becomes discouraged. English practice is always quoted by the Railway staff in support of the system, but unfortunately the early remuneration which rewards such efforts in England seldom finds its counterpart in this country.

MADRAS,
8th May 1876.

(Signed) C. J. SMITH, Major, R.E.,
Dy. Cong. Engineer for Railways.

No. 18 A. Endorsement of the Consulting Engineer for Railways, dated Madras,
12th May 1876, No. 239.

From W. S. BETTS, Esq., Agent, South Indian Railway, to Lieutenant-Colonel
J. H. M. SHAW-STEWART, R.E., Consulting Engineer for Railways, dated
Negapatam, 10th May 1876, No. 1,637.

In forecasting the completion of the work to Tindivanam the arrival of the ship *Kingdom o' Fife* at Cuddalore, with the girders for a portion of the line between Chingleput and Tindivanam, had to be calculated upon. This vessel left London on the 13th of January last, and had this voyage occupied the same length of time as her previous one she would have reached Cuddalore on the 9th ultimo, but she arrived there only on the 8th instant—one month late. The Acting Chief Engineer informs me he cannot yet say whether the time so lost will render the opening on the 1st July impossible, but he thinks it right you should know that the late arrival of this ship adds greatly to the difficulty of completing the work by that time.

*Proceedings of the Madras Government, Public Works Department,
1st June 1876.*

SUBMITTED for the information of Government with reference to paragraph 2 of this office letter No. 232 A, dated the 9th May 1876.

(Signed) J. H. M. SHAW-STEWART, Lt.-Col., R.E.,
Consulting Engineer for Railways.

No. 19. ORDER THEREON, 1st June 1876, No. 1,365.

RAILWAY, No. 3.

HIS GRACE the Governor in Council is much disappointed to find that still further delay in the opening of portions of the Northern Extension of the South Indian Railway for traffic is anticipated, and cannot but characterize the position of affairs disclosed in this Report as most unsatisfactory. The arrangements at home for shipping girders evince, in the opinion of His Grace in Council, considerable want of foresight. To this cause must be attributed much of the delay in opening the several sections of the line crossing large rivers, which would otherwise have been ready at much earlier periods than is at present possible. Want of supervision on the part of the Engineers at home is also apparent by the fact of allowing girders to be sent out without having been properly fitted, thus entailing extra labor and loss of time in drilling and fitting them in this country.

2. The waste of masonry brought to notice by the Deputy Consulting Engineer in paragraph 18 of his Report is little creditable to local management, and entails not only an unnecessary expenditure of money and material, but loss of time in completion of the line. The delay in the supply to Resident Engineers of the necessary drawings and instructions for the commencement of station buildings indicates defective arrangements. It is in the correction of defects of this kind that the supervising agency of the Chief Engineer is most wanted, and where its usefulness can be most effectively employed. The Company have, however, most unfortunately been deprived of Mr. Logan's services by his having gone home at this critical period of the progress of the works.

3. His Grace the Governor in Council resolves to forward, for communication to the Board of Directors through the Secretary of State, copies of these papers, and of previous correspondence reviewing the progress of the works, with a view to suitable notice being taken by the authorities in England of the mismanagement commented on.

(True Extract.)

(Signed) G. W. WALKER, Major-General, R.E.,
Secretary to Government.

No. 20. (DOCKET No. 1,366, dated 1st June 1876.)
COPY of the above forwarded for the information of the Government of India.

(True Extract.)

(Signed) G. W. WALKER, Major-General, R.E.,
Secretary to Government.

Exd. S. T. Austin.
Spare Copies

S P 7

note on the present state
of the works on the South Indian
Railway Company's Northern Extension
inspected between the 12th April and
5th May 1876

There is, in my opinion,
no reason to doubt the completion, by
the end of June, of all bridges and
culverts between Madras and Trinco-
manur, with the exception of the
bridge over the Palay river. There
are a few culverts and small girder
bridges to be built up from floor
level, in the low rice fields near
Madanthur; a small girder bridge in
a

to tank, concerning which there has been some discussion, and a culvert or two here and there to be built; these works are all in progress, with ample material at site to complete them.

2. The girder work is not so far advanced, the Karangool bridge has six pairs of girders in situ, but owing, as I understand, to the iron-work not having been fitted together before leaving the shops in England, much extra drilling work has been thrown upon the Resident Engineer, and it is estimated that the remaining 5 pairs cannot be placed, and this bridge opened for

an engine, before the end of this month / May.

3. Of the other bridges, there are seven single 20 feet spans for which no girders have yet been received in this country; it is proposed to open them temporarily with portions of the iron-work / the booms / for the Palar bridge; but looking to the general progress of the works, and to the inconvenience of substituting girders hereafter when the line is open, I am not disposed to approve of the arrangement, unless the proper girders are likely to be some months still undelivered.

The

The temporary crossing
of the Palar river deep bed, on 12 feet
wells sunk into the clay at 20 feet
intervals, spanned by sections of the
Palar iron work, is, I think, a
good arrangement, but it is certainly
a risky one, and I question whether
the Palar beams should be used -
unless no other girders are available
on the Madras Railway or elsewhere,
if a push carried one away or twisted
it, it might seriously delay the open-
ing of the bridge. The work is
well forward, the end of this
month should see it complete.

The

4. The permanent way
is laid and spiked throughout to
Indevannam, 76 miles from Madras,
except for about 4 miles; this material
is very nearly all delivered, and the
15th May is reasonably assigned as the
probable date of completion. The re-
maining girders, except those referred
to in paragraph 3, are now at Inde-
vannam awaiting the completion of
the permanent way, but they are
rivetted up and the end of May
or at the latest the 15th June should
see them on their beds.

I do not therefore
much expect to learn that the first engine
has

has run through before the 15th June. -
It is possible that the 1st June may
see it, but it is unlikely. There
will then remain some miles of
top ballasting to be done, the exact
quantity is difficult to arrive at,
as, to prevent delay, the side pits are
drawn upon and the bottom ballast
at least is pushed forward by service
wagons or ordinary labour.

5. I will not partic-
ularise here the several buildings
and their state of progress, but I can
safely assert that by the end of June
the station buildings of the various
stations

stations between Madras and ^{By 16} Vind-
ravur will not be roofed in and
ready for the Traffic and Locomotive
departments. Every effort has been,
and is being, made to complete them,
but there is not now sufficient time
left to enable it to be done; and
assuming that the first engine
will run through on the 15th June, and
looking to the season of the year, and
the description of the banks near
Madravur, I hardly think it
wise to urge any longer the attempt
to open by the 1st July, or 15 days
from the running of the first
engine.

His

6. His Grace the Governor in Council has approved of the list of requirements which it was agreed should be fully supplied before any section of the line is opened for public traffic; and seeing that these cannot be fully met by the date named, I would recommend that the pressure be removed which may now be held to justify the use of inferior materials and the expenditure of money for such things as, transporting rolling stock from Nagapattam to Madras, or bridge work by road, &c., which

which would not otherwise be needed. It may be said that the fixing of an early date is needed as an incentive to increased exertions on the part of the Resident staff, but I am quite sure no such pressure is needed. All have done, and are doing their best; and the fixing of the date of opening two months later, or say the 1st September, will enable a better class of brick to be supplied to the Madras and Acherawath station buildings, more room for the selection of ballast, and ensure the completion of the works in a more thorough and efficient

efficient manner.

The attempt to build
of more masonry in a certain time
than the usual sources for the sup-
ply of material can provide for, would
be likely to lead to the purchase of
inferior or costly material; and there
is much work remaining to be
done that can be far better, and
more economically, carried out with
the aid of an engine, if the date
named be one that will admit
of such work being somewhat
postponed.

No 7.

The oversight in
sending out bridge work to this
country

country that had not been fitted,
by postponing the opening of the
Barangooly bridge, may on this
account prove costly to the Company.

8. It is not gratifying
to have the reason to offer, but I
may add that, from all I could
learn, there is not a very heavy traffic
in passengers or goods to be looked for,
as long as the line ends at Chide-
vanum. This fact, however, diminishes
considerably the weight of the argu-
ment for early opening, based on the
hoped for returns to the Company
on capital outlay lying idle; it is
not probable that this short section
will

will do very much more than pay
its working expenses during the first
month.

9. The further extension
of the open line to Villapooram is de-
pendent to a great extent upon the com-
pletion of the Viceramandy and Tondiar
bridges, and this again on the
depth to which it is thought necessary
to carry the foundations, a point
on which considerable difference of
opinion may exist among engineers.

If my recommendation
on this point are accepted, the
masonry may, I think, all be completed
in time to open by say the 1st January

1877, with a temporary road over the
Tondiar, as the iron-work will not
have been received.

10. The permanent way
between Tindivanam the 76th and
Villapooram the 99th mile, a distance
of 23 miles, is about half laid; but
the engine already runs from Cudda-
lore the 124th mile, about 24 miles
to the north; and with the per-
manent way led by train both to
Tindivanam and to the 103rd mile,
the intervening space yet unlaid,
some 12 miles or so, can quickly be
finished off.

11. The extension to
Villapooram

Villapooram, as it will bring the terminus of the line within easy reach of Parooty, the 111th mile, and other trade centres, ought to secure the through goods traffic of the neighbourhood; and every effort should be made to expedite the completion of this section.

12. In the section from Villapooram to Cuddalore the Puar drainage is the difficult point; but the underlying strata in the main river bed have proved so favourable for foundations, that the opening through to Cuddalore may possibly not be very long delayed beyond that to Villapooram.

The

14
The best of the brickburning season being over, it is probable that the supply of material will fall short.
13.

Looking to the work between Madras and Cuddalore generally, it may, I think, be regarded as fairly satisfactory. Over a considerable length of line good brick earth cannot be found, and stone has in consequence been substituted in places at nearly double the first cost of brickwork. Bricks have also been necessarily led long distances to secure better material; this will add unavoidably to the cost of the line.

The

14 The substitution, —
whenever possible, of piece work in lieu
of work paid by daily labour has
been lately urged on the Company's
officers, and wherever I found it in
vogue as might be expected its ad-
vantages are duly appreciated.

The Acting Chief Engineer, however,
in a recent communication to the
Consulting Engineer has, in opposing
the suggestion, overlooked entirely
the one object of it, viz. the securing
of the self interest of the labour,
and the consequent saving in
time. A daily paid man —
performs

15 performs the task allotted, but this
is necessarily only a moderately —
fair day's work for the average man
of his class, and in some cases it can
hardly be that, while the longer his
work lasts the better for him; the
man paid by the piece may be
counted on in this country to do his
best and earn the greatest possible. One
of the Resident Engineers lately told
me he saved 20 per cent in the cost,
and 50 per cent in the time, by an
arrangement of the kind. The
economy of the system cannot, in
fact, for one moment be questioned;
its introduction is difficult and
dependent

14 dependent upon the circumstances of
the work, but also to some extent
upon the views held by the
Engineers themselves. It is to be
regretted therefore, I think, that it
did not meet with the cordial
support of the Acting Chief Engineer.

15 The system of inviting
tenders for the supply of large quanti-
ties of materials, has also been sug-
gested, for the supply for instance
of lime, brick, fuel, carts, &c. It
very likely might, in some places,
result in no saving; it might induce
no reply even in others; but it could
do

do no harm. The present system
could be fallen back upon if it failed,
the principle is undoubtedly a right
one and receives the sanction of
English and Continental practice, and,
in my opinion, should be persistently
encouraged in the hope of ultimate
adoption. The suggestion has
not, however, met with support, —
and it would certainly fail unless
it secured the real sympathy of
the chief of the staff. The mode
of publication would differ with the
locality, and perhaps it is asking too
much to expect a temporary staff to
assert themselves in establishing principles
of

deg of work which cannot be shown to
result in good to the work in hand.
May 16.

The fence-bund
between Madras and the Palar
river will, some of it, have to be done
over again; or, which perhaps will
make the wiser plan, allowed to sub-
side. Where the pits are so close
to the toe of the slope, that there is
no room for the bank, it ought
not to have been put; and where
the room was only just sufficient,
the labourers ought not to have
been allowed to undermine it by
still further deepening the excavations

on the side nearest the line. ¹³ Where
the contractors have done so, evidently
with a view to avoid carrying the
soil in baskets, and to make
more out of the contract rate, the
work ought not to be paid for.

Iron curbs recently re-
ceived from England are lying at
Cuddalore and Chingleput, the
former having been landed three
weeks; and I am afraid, although
the Southern river works are stopped
for want of them, they will not
reach their destination yet awhile;
each section weighs, I was told, 2 tons
and can only be moved by special
appliances

appliances: had it been notified to the manufacturers when ordering them they could as easily have made them in four sections, as in two.

18. At Acherawak and Madrantium may be seen an illustration of outlay which, in my opinion, might well have been saved. At the latter station a wall of masonry 13'6" high, 4 feet wide at foot; 1'6" wide at top is being built 300 feet in length to provide a bearing for a Kerb stone 15 inches in height, the Kerb stone might, in my opinion, have been laid as it has been on some of the Northern

18
Northern railways, on a bench filled with broken brick or perhaps concrete. The walls of the animal will have to be carried to the same depth, in order that it may be on the bank, level with the passenger shed, instead of below, level with the ticket office, in my opinion, nearly as good a position for it; and at all other stations, in a lesser degree, is this same outlay to be incurred.

19. It may seem unimportant or even irritating to engineers to urge economy in small matters such as these; but for the Government who pay the guarantee it is of importance

importance; and if the principle of rigid economy be once infringed, there is no other line to draw; - Engineering perfection becomes the next limit - Architectural proprieties the next and so on, and a cheap serviceable line becomes impossible. With these and some minor exceptions, which will be brought to the notice of the Acting Chief Engineer, I consider the work generally satisfactory.

20 From Buddalore to the Coleroon, the section of line is well forward, the completion of the Vellaur

19 Vellaur, Paravannaur, and old Coleroon bridges, will determine the date of opening.

I think it possible, it may be found worth while, to open to Porto Novo, with a flag station halfway to Buddalore for the accommodation of the district - south and west of Chellambaram. It could, I have no doubt, be done by the 1st January 1877, if thought advisable.

It is too early yet to assign any probable date for the completion of the Coleroon and Vellaur bridges. The materials prepared

prepared and under preparation by the present Resident Engineers are excellent, and well sinking is just commenced; both bridges are delayed for want of curbs.

21. From Phealli to Tanjore, I think the line may possibly be opened by the 1st of January 1877. I am not very sanguine as to this date, it depends upon the season. The work in this section is, I think, very satisfactory, the materials are good, and the foundations do not appear to me to have been carried

carried down unnecessarily deep ^{to} an error I have observed elsewhere; the building season has been a favourable one, and the rates seem moderate. Several bridges, at the time of my inspection, were delayed for want of wooden kerbs. These might have been given out on contract in Madras or elsewhere; and have been held in readiness; that a certain number would be required must have been known. It is, I believe, intended to open only to Mayavaram with the first section; but I hope an effort will be made to extend the line to Phealli.

1 Rhealli, if possible; the break between
it and Porto Novo will not then be
a difficult one (18 miles)

22. I do not anticipate
that the foundations of any large
bridges west of Mayavaram will
remain to be put in next year; but
the numbers of smaller culverts
take time, and the working season
proper, owing to the cultivation,
appears in Tanjore to be limited
to about four months, a fact to
which perhaps sufficient weight
has not been given in fixing dates
of opening hitherto.

23. This section of
the line may fairly be looked

forward to as remunerative, and
each month's delay in opening
will be a direct loss to Government;
but I can suggest no measures for
hastening the work, which is
being pushed forward evenly and
steadily over the whole length.
In fact, in my own mind, I very
much question the policy of fixing
a date for completion which
necessitates extraordinary measures
towards the close of the period; the
regularity of the working arrange-
ments is upset, high rates as premia
for completion are offered, the
quality of the work is liable to fall
off

off, and the staff that all
along has worked at high pressure
becomes discouraged. English practice
is always quoted by the railway
staff in support of the system, but
unfortunately the early remunera-
tion which rewards such efforts in
England seldom finds its counter-
part in this country.

Madras, 8 May 1876.
J. H. M. Shaw-Stewart, Major R.E.
Dyson, Engineer for Rys.

RAILWAY DEPARTMENT.

CONSULTING ENGINEER'S OFFICE,

Madras, 9th May 1876.

No. 232 A

From

LIEUT.-COLONEL J. H. M. SHAW-STEWART, R.E.,
Consulting Engineer for Railways,

To

MAJOR-GENERAL G. W. WALKER, R.E.,
Secretary to Government,
Public Works Department,
Fort Saint George.

SIR,

I have the honour to
lay before Government a note by
the Deputy Consulting Engineer upon
the progress of the works under con-
struction in the Southern Extension of
the South Indian Railway, between
Madras and Tanjore.

It will be seen that Major
Smith is of opinion that the date of
opening the line between Madras
and Tanjore must once more
be

be postponed, and that this event cannot now be expected before the 1st September, instead of the 1st July. The necessity for this further postponement is attributed to several causes: the delay in erecting the girders at the Harangooly bridge, owing it is said to the ironwork not having been fitted together before being shipped from England, the unexpected delay in the receipt of the girders for seven 20 feet openings, which reached Negapatam, as I have since learnt, upon the 8th instant; and the backward condition of the station buildings generally, which may in great measure be attributed to the late dates

2
dates upon which the Engineers along the line were supplied with drawings and instructions to begin the buildings. The further postponement of the date for opening this section of the line must cause disappointment, both to Government and to the public; but I agree with Major Smith that, in present circumstances, the 1st July can no longer be counted upon.

3. As regards the remainder of the Northern Extension, Major Smith is of opinion that, if every thing goes well, the under-mentioned sections may possibly be opened to the public on the 1st January 1877. —

From

From.	To.	Distance.
Tindivanam	Cuddalore	70 miles
	and Porto Novo	
Tanjore	Shealli	55

leaving a gap of about 18 miles between Porto Novo and Shealli; of which 6 miles, between Shealli and the Coleroon river, would probably be closed by the 1st July 1877; while the closing of the remainder, from Porto Novo to the Coleroon, 12 miles, would depend upon the completion of the Vellaur and Coleroon bridges. Major Smith is however by no means confident that the whole work upon the line can be completed as

above

above; and he names the dates as the earliest possible upon which the respective sections can be finished under favourable circumstances. The section between Tindivanam and Cuddalore includes three large bridges, over the Thondyar, the Parar, and the Guddelum; and in this country it is not easy to predict with certainty the completion of such large works. In the event, however, of any of these bridges being unfinished by the 1st January, there would be no difficulty in carrying traffic on a temporary road laid across the bed during the early months of the year.

4. I understand that Mr. White, the Acting Chief Engineer, now anticipates the opening of the several sections upon the following dates:

From.	To.	Miles.	Date.
Madras	Tindivanam	76	1 st September '76
Tanjore	Moyaveram	43	1 st January '77
Tindivanam	Porto Novo	70	1 st July 1877
Moyaveram	Coleroon	18	1 st July 1877

leaving, as above, the gap of 12 miles between Porto Novo and the Coleroon to await the completion of the Vellaur and Coleroon bridges.

5. The only difference of serious importance between Major Smith's and Mr. White's anticipations is

is with reference to the section between Tindivanam and Porto Novo, a distance of 70 miles.

Major Smith is of opinion that, by making use if necessary of temporary roads across the beds of one or more of the large rivers, this part of the line might safely be opened upon the 1st January 1877; while Mr. White considers

that July 1877, the date named in my letter No. 183 of the 10th April, cannot be anticipated.

The opening of this section will, without doubt, greatly influence the traffic returns. It passes through many large centres of

trade, such as Villapooram, Panrooty, and Cuddalore; and

acts upon a large tract of populous country. I agree with Major

Major Smith that every effort should
be made to secure the opening
of this section at the earliest pos-
sible date; and the Railway
Engineers should be urged, with
this object, to push on as fast as
possible the bridge over the Para-
vanar, a large stream between
Cuddalore and Porto Novo, which
it would be difficult to cross by
means of a temporary road. Over
the three large rivers to the north
of Cuddalore, traffic might with-
out difficulty be worked, as mentioned
above, upon temporary roads during
the dry months, in the event of the
bridges being unfinished.

The proposal to use
temporarily, for other purposes, cer-
tain portions of the Palar bridge
ironwork,

ironwork, alluded to in para-
graph 3 of Major Smith's note,
is in my opinion open to serious
objection. The arrival within the
last two days of the seven pairs of
20 feet girders removed all necessity
for this arrangement, so far as
those openings are concerned; and
with regard to the temporary road
across the Palar, I trust that means
will be found to substitute other
girders. I am now awaiting receipt
of a plan showing the proposed
arrangements at the temporary
crossing.

I cordially agree in the
views expressed by Major Smith in
paragraphs 14 and 15 of his note
with reference to the advantages
which may fairly be expected to
follow

follow the substitution of the piece-work system instead of payment for daily labour, and from a general use of the tender system in obtaining large supplies of materials. My views upon these two points have been brought to the Acting Chief Engineer's notice, but I regret that he does not share them.

Waste of masonry, such as is brought to notice in paragraph 18 of Major Smith's note, is much to be regretted. With reference to platform walls and urinals, the two points in which this waste occurred, the attention of the Railway officers had previously been drawn to the importance of economising masonry, by placing the kerb stone upon a

shallow trench filled with broken bricks, and by removing the urinals off the platform to the level of the ticket office. The drawings of the proposed station arrangements between Madras and Tindivanam were however received in this office at so late a date that it was impossible to subject them to scrutiny without risking delay in opening the line.

I have the honour to be,
Sir,

Your most Obedt Servant,
Munthum
H. G. R. E.

Genl. Engr. for Railway

27th Sept/75 No. 1168.
 15th Augt. 2287
 25th Jan'y/76 198
 9th May 1155
 28 March/76 784
 17 Feb'y/76 489
 5 Feb'y/76 374 & 8
 19 Aug 1778 2388
 30 July/75 2188

W 1876 Sept
 No: 3463

South Indian
 GREAT SOUTHERN OF INDIA RAILWAY
 AGENT'S OFFICE,
 NEGAPATAM, 10 May 1876
 No. 1637
 From
 THE AGENT,
 South Indian
 Great Southern of India Railway,
 To The Consulting Engineer for Railways
 Madras

SIR,

In forecasting the completion of the work
 to Tindivanam the arrival of the ship Kingdom of
 at Coimbatore with the orders for a portion of the
 line between Chingleput and Tindivanam had to be
 calculated upon. This vessel left London on the
 15th of January last, and had this voyage occupied
 the same length of time as her previous one, she
 would have reached Coimbatore on the 7th ult.
 but she arrived there only on the 8th inst. one month
 late. The Acting Chief Engineer informs me he can
 not yet say whether the time so lost, will render
 the opening on the 1st July impossible, but he thinks
 it right you should know that the late arrival
 of this ship adds greatly to the difficulty of com-
 pleting the work by that time.
 I have the honor to be
 Yours obedient servant
 W. Williams Agent

No 18-

Cir 27/5. Dtd 1-6-76
 Cir 20/5/76
 Despatch 16-5-76

Submitting
 a note by the Deputy
 Consulting Engineer
 upon the progress of the
 work under construction
 on the Southern Railway
 of the S. B. Co. between
 Madras and Tanjore

Dated 9th May 1876
 Received 13th May 1876
 E. 10/13 No. 232A
 The Secretary to Government,
 P. W. Department,
 Fort Saint George.
 The Consulting Engineer
 for Railways,
 RAILWAY DEPARTMENT.

M. 3457/76

No. 239

24

SUBMITTED FOR THE *information* OF GOVERNMENT.

*with reference to paragraph 2
of this office letter No 232-A
dated the 9th May 1876.*

Mantleworth

R. E.

CONSULTING ENGINEER'S OFFICE,
Madras, 12 May 1876.

Consy. Engineer for Railways.

To

The Secretary to Government,

Public Works Department,

Fort Saint George.

From

Mr. Clerk

J. M. R.

Mr. Secy. Genl.

for Railways

10 May 76

12 May 76

10 May 76

Mr. Secy. Genl.

for Railways

8. W. 1876 Sept.
RAILWAY DEPARTMENT.

From 1876.
No. 8467
The Consulting Engineer
for Railways,

To
The Secretary to Government,
P. W. Department,
Fort St. George.

Dated 12 } May 1876.
Received 13 }

E.1. No. 239.

Enclosures.

Submitting letter
from the Agent S. A. B. re-
garding the arrival of
quinders for a portion of
the Northern Extension
between Ching Lepet
and Linderanum.

No 1800

Oct 27/5. P.W.D. 676

Jan 20/6

Despatch 13-5-76

Letter from the Consulting Engineer for Railways
No 232 A dated 9th May 1876.
— do — do — No 239 of 12th May 1876.

FOR ORDERS.

Major Genl. R. C.
Secretary to Govt. P. W. D.

Recd of 9/11

To The Most Noble
the Secy. of State
for India.

My Lord Marquis.

We have the honor
to forward for your
Lordship's information
and for communication
to the Board of Directors
of the South Indian Rail-
way the accompanying
report, by Major C. J.
Smith R.E., Deputy Com-
muting Engineer, on the
progress of the Northern
Extension of the line,

Bd 29/5

*up to which
I have not yet
of having seen
last of them in
a year ago
at least*

1/11

Made after an inspection
 of the works between the
 middle of April and
 the beginning of May.
 We particularly desire to
 draw your Lordships' attention
 to the evident want of foresight evinced
 by the Railway Authorities
~~in England~~ in the matter
 of the supply of girders
 for the large bridges. It
 will be seen that much
 of the delay in opening
 out the line for traffic
 is due to the backward
 state of the bridge work
 which it is not possible
 to carry out to completion
 without the requisite
 girders from home.
 In some cases
 even after their receipt

of O. No. 1168 of 27 April 1875
 2138 of 26 July
 2388 of 19 Aug
 309 of 6 Feb 76
 304 of 5 do
 439 of 17 do
 784 of 28 March
 1155 of 9 May
 1365 of 1 June 1876

still further loss of time
 occurs owing to their being
 shipped ^{in England} without being
 properly fitted and drilled.

A perusal of the
 Correspondence quoted
 in the margin, which is
 enclosed for reference,
 will show how ^{unreliable and} disap-
 pointing have been the
 forecasts made of the
 opening of the several
 sections, and how much
 delay has, through de-
 fective arrangements,
 been allowed to occur.

At this juncture, and
 while the Deputy Commis-
 sioner's report
 discloses urgent need
 of close local super-
 vision, the Company
 have been deprived

of the services of these
 Chief Engineers under whom
 the works have been so far
 planned and executed
~~to~~ Mr. Logan having
~~without reference to~~
~~Government and without~~
~~the slightest opinion~~
 been allowed to embark ^{by the Board}
 for England. We trust
 that your Lordship
 will, in bringing the
 subject of this corres-
 pondence to the notice
 of the Board, ^{impress upon their decision}
~~highly unsatisfactory~~
 the position of affairs,
 past and present, ~~as~~
~~suitable persons~~

on 12 months furlough

I am, Sir, with

being a...
 at...
 3/6

11/

Catacamund
Railway Department

Letter to the most Honorable

Forwarding with certain
observations a Report
by Major C. J. Smith M.
by Comdant on the pro-
gress of the works under
construction on the
Northern extension of
the Santa Fe Indian R.
between Madrid &
Tombine -

No 18

No 707

Erratum

In para 19 of Major C. J. Smith's
Report recorded with C. No 1365 dated
1st June 1876.

For "indicating"

Read "irritating"

Subd. George
16 June 1876

Sol W Farnwell Co. L.
offg. Under Secy to Genl
D. P. W.

The Consulting Engineer
for Railways

PROCEEDINGS of the MADRAS GOVERNMENT.

Under date the 18th June 1876

Read the following:—

From the Comtee. for Railways (H.E. No 232 A of 9 May 76)
Do. Do. 239 of 12th — do —

PM

111

His Grace the Governor in Council is much disappointed to find that still further delay in the opening of portions of the Northern Extension of the South Indian Railway for traffic is anticipated and cannot but characterize the position of affairs disclosed in this report as most unsatisfactory. The arrangements at home for shipping

PM

From No. 1407

girders since in the opinion of this face in Council, considerable want of foresight. To this cause must be attributed much of the delay in opening the several sections of the line crossing large rivers which would otherwise have been ready at much earlier periods than is at present possible. Want of supervision on the part of the Engineers at home is also apparent by the fact of allowing girders to be sent out without having been properly fitted; thus entailing extra labor and loss of time in drilling and fitting them in this country.

2. The waste of money brought to notice by the Deputy Consulting Engineer in para 18 of his report is little creditable to local management, and entails not only an unnecessary expenditure of money and material, but loss of time in completion of the line. The delay in the supply to Resident Engineers of the necessary drawings and instructions for the commencement of station buildings indicates defective arrangements. It is in the correction of defects of this kind that the supervising Agency of the

Chief Engineer is most
wanted, and where its
usefulness can be most
~~effectively~~ employed.
The Company have how-
ever most unfortunately
been deprived of Mr.
Logan's services by his
having gone home at
this critical period of
the progress of the works.
3. His Grace the Governor
in Council resolves to
forward for communi-
cation to the Board of
Directors, through the
Secretary of State; copies
of these papers, and of
previous correspondence
reviewing the progress
of the works, with a view

of suitable notice being
in due time, by the authorities
in England of the mis-
management ~~which has~~
~~been~~ commented on.

No 1366

Doc 4 No 1366/19 June/76

Copy of the above
forwarded for the in-
formation of the Govt
of India.

Desd 15/6/76

C. E. for Ryo. Desd 15/6/76

3463
3467
Gobt. of 1876 Madras.
PUBLIC WORKS.

The Cons Eng for M

1 June 1865/1366

1870
17
1870

Northern Extension of
the Inter Archway of

Passing orders on
letter from the Comdgr
for Rs submitting a
note by the Dy Comdgr
upon the progress of the
works under construction
on the — between Madras