

No 42-
0000

Sup^d Engrs Office & D^r
Manipal
11th July 1865.

From Sub Col J. T. Winscom R.E.
Sup^d Engineer and D^r
To Colonel C. A. O. R.E.
Secretary to Government
D. S. E.

Sir: With reference to your Memo
No 116 of 6th inst. I have the honor
to inform you that the maintenance
grant of Rs 5,600 for the Road
from the Doremal Cops to Kistna:
patam in the Bellare District
has been divided as follows.

• Bellare Range	1900
• Centre Range	2100
• Western Range	1600
	5600

I have the honor to be
Sir
Yours most Obedt Serv^t

Quorniscom Sub Col R.E.
Sup^d Engineer and D^r

L. M.
Engr

No 576. Supr^y Engineer's Office 82^d.
 Palamcottah 14th July 1865
 From, Lieut Colonel F. J. Moberly R.E.
 Superintending Engrs 8th D^o.
 To, Colonel C. A. Orr R.E.
 Secretary to Government
 D. F. M.

Sir, In reply to G.O. No 50, dated
 26th June 1865, I have the honor to report
 that the late Sub Overseer Soobrama-
 na Pillay was appointed in suc-
 ception of Overseer Yagambra Naik
 deceased; & Gopall Pillay to complete
 the number of Overseers sanctioned for
 Madurai, vide para 4 of G.O. No 1137
 28th April 1865.

June 1865.
 I have you
 J. Moberly June 1865
 Superintendent of the

Mr. Charles Hayward
 Esq. Boston
 The Secretary to Grand
 Lodge A. O. U. W.
 dated 11th July - 1845 -
 Received - 17 "
 I am sorry that the amount
 enclosed is small & am
 sure you will be
 satisfied with the
 amount of the
 18th July 1845
 No 36

No 32-
0000

Supr Engineer's Office
St. George's
12th June 1865

To
Lieut Col. G. W. Mason R.E.
Supr Engineer St. George's
J. Col. G. W. Mason R.E.
Secretary to Govt St. George's

Sir,

With reference to para 2
of G.O. No 1443 of 29th ultimo, I have
the honor to inform you that I have
appointed Overseer Mahomed Hoppin
to replace the Overseer, Sergeant
Rankin deceased. to have effect
from the 6th June 1865.

G. Prateron has been appointed
as Overseer from the same date, to
complete the establishment in the Western
District.

I have the honor to be
Sir
Your Most Obedt Servt
Commissioner R.E.
Supr Engineer St. George's

Ch.

15-51
1125
7th 1865
Conf. for July
St. George's
Off. Supr Eng
St. George's

To
The Secy to Govt
St. George's
Dated 14th July
Received 19th July

Mis.

Affords his explanation
to G.O. No 50 of 24th
1865 regarding the appoint-
ment of certain labor
Overseers in the Western

District. - No 112
St. George's
20th July 1865

No. 461
of Officers acting as Assistant Engineers and a
resolution in Council passed to them in May 1865.

Names of Officers.	Rates of Depu- tation Allow- ances	Amount Paid	Remarks.
H. C. Smith Acting Asst. Sergeant Major's Clerk	50 per cent on the average salary	150	" "
C. Cunningham Acting Asst. Sergeant Major's Clerk	50 per cent on the average salary	150	" "
H. C. Smith Acting Asst. Sergeant Major's Clerk	50 per cent on the average salary	150	" "
R. J. Crookman Acting Asst. Sergeant Major's Clerk	50 per cent on the average salary	150	" "
R. A. Vining Acting Asst. Sergeant Major's Clerk	50 per cent on the average salary	150	" "

Secy of the Comptroller of
Publ. & W. & A. Accounts
London 13th June 1865

Captain R. S.

Comptroller of Public Works Accounts.

To the Secretary to Government. W.D.
with reference to his Bureau No. 102
dated 17th Instant.

[illegible]

N^o 55

Sir,

Captain, J. Mullins, R.E.
Civil Engineer for L.C. Co.

To,

The Secretary to Government,
Department of Pub Works.

Sir,

1. With reference to the Order of Government
N^o 1883 of the 3rd instant, I have the honor to
request that the error noticed below, and which
has been pointed out by the Agent and Manager
Madras Irrigation and Canal Company may be
rectified.

2. The last item but one of the sums given
in para. 6 of my letter, printed in the Proceeding
of Government, was expenditure made on a
distinct sanction and consequently there was
no unauthorized expenditure on timber, and
the paragraph was unnecessary; and in the
margin of para 4 the entry opposite the "Agm"
in the column headed "without sanction" should
therefore be Rupees 7,139-6-7, and the total
under that head Rupees 31,436-7-3 instead of
Rupees

No. 11 1865 22/10/65

For J. Mullins

Secretary to Govt.

Records.

To J. Mullins, R.E.

For J. Mullins, R.E.

Printed by

Read 20 3/4 June 1865

161

Chief of Office

acting as Assistant Engineer

in charge of the works

of the canal

at the head of the

canal at the head of the

canal at the head of the

Rupers 37,325.10.8 as shown.

3. It is only fair to the Agent to state that this mistake ought not to have been made, as he did in the first instance furnish the particulars of the sanction under which the expenditure was incurred.

I have the honor to be,
Sir,
Your most obedt servant,
Whitburning Captain, R.E.
Contract Engineer & C. Company

Ed M. Street

Respect to that the error
mentioned within and
which has been pointed
out by the Agent & may be
corrected. I did not
know of it until 12th July 1865

Dated 17th July 1865

To the Secretary to Government

No 524
From

Supt: Engrs Office 6th 12th
Tanjore 12th July 1865

Captain R. F. Baker R.E.
As: Supt: Engineer, 6th 12th
To,
Colonel G. A. Dyer R.E.
Secretary of Government
Public Works Department

Sir,

In reply to Memo No 120 of the
8th Instant I have the honor to state that
Col: Greenaway was requested in May last
to report whether the Earth Sewage System
was being experimented upon at Trichinopoly
and if so to submit Plans & Estimates
for Earth stores and Cart loads where they
might be required, the subject was referred
to the Military authorities and Col: Greenaway
in his letter of the 1st June No 209 reports
that the Major General had received no
orders from Government on the subject of
Earth Sewage and was consequently unable
to afford any information on the points
referred to him to enable this Department
to carry out the Order of Government
noted marginally.

No 1130
dated 27 April
1865

2 To further communication
on the subject has since been received
and the matter is in obedience.

Home

Shew the honor the
Sir,

Your Most Obedient servant

V. F. Baker Capt. R.E.
Asst. Supt. Engineer, 6th Div.

V.F.B.

No 496 Memo

The undersigned has the honor
to report that he is about to proceed
(by steamer due on 18th) on circuit
in the Godanery District & to
request that all covers to his
address may be directed to Dow-
leshweram till further notice.

Superintending Eng^r
Office 1st Division
Dattair 10th July 1865
J.M.

V. F. Baker Capt. R.E.
Superintending Eng^r 1st Div.

The Secretary to Government
D. P. W.

The duty: compare

6th 19th 12

To
The Secretary to Govt

P. M. 19th 12

Dated 12th 12
Kao 19th 12, July 1865

c/o 524

in conformity with
to G. O. No. 1130-27 dated
regarding the limit
whereas no one that the
outpost has been reported
of the office in the
for the year 1865
17th 19th 12
Shankar

No 76

Superintending Engineer's office
Bellary 13th July 1865.

From

Captain A. S. Roberts (Royal Engineers)
Supdy Engr 3rd Division

To

The Secretary to Government
P. W. D.

Sir

I have the honor to inform you that
Mr. Pance Supervisor in charge of the Gumbum Range
in the Tumkur District has applied to me for 6 months
leave on Private Affairs, and as he has had no leave
since the 22nd February 1858, I am granting it pro-
vided you approve of the following arrangements to
take effect from 1st September next. the date from
which he applied for leave.

Mr. G. W. Lewis Supervisor 2nd grade to act as Super-
visor 1st grade vice Mr. Pance

Mr. Taluk Oversee G. T. Tardow to act as Super-
visor 2nd grade vice Mr. Lewis and to have charge
of the Gumbum Range during Mr. Pance's absence

I nominate Tardow to act as Taluk Overseer vice
Mr. Tardow.

I have &c &c

A. S. Roberts Captain R.E.
Supdy Engr 3rd Div

1865
The Superintendent
First Division

The Secretary to
P. W. D.

Dated 10th

Dec. 17th

Dec. 18th July

Cuckoo house

No 496

Requesting that
Covers to his address
be directed to Dowd
till further notice

No 40

Fort St. George
19th July 1865

To

1841-
1842

Super Engineer Office
at D^{ca} Casapala
8th July 1865

From

Vincent G. V. Masson
Super Engineer at D^{ca}

J. Robert C. Orr, Esq.
Secretary to Genl. D^{ca} M^{ca}

Sir,

With reference to G.O.
No. 1846 of 1st instant I have
the honor to inform you that
there are no commissioned
Civil Engineers employed
in this Division.

Have the honor to be,
Your Most Obedt Servt.
C. P. M^{ca}
Super Engineer at D^{ca}

C. P.

1

Superintendent
of the Division 3rd 1865

Secretary to Government
P. M. D.

Oct 1865

Recd. 17 July 1865

1846

submitting explanation of leave
applications for leave and
certain promotions in the
Department

For the 18th 32
18th 32
18th 32

William S. S. S.

The Superintendent

Engineer 3rd Division with the

informed that on his report

the date from which the leave

applied for by Supervisor. Leave

is to take effect, arrangements

will be made by Government

for filling up the temporary

vacancies in the grades of upper

and 1st and 2nd class respectively

according to the opinion of the
Members of the Board.

Very Respectfully,
J. R. M^{ca}
18 July 1865

W. S. S.

100 - 100. July 29

00000
Presm. No 2
The Supd. Eng
De Liza

To the Secretary

Paid 8th July -
 Received 18 "

Informing that
no Commanded Lieut.
were Employed in
Division—

Fort St. George No 29
14th July 1851

No 565.

From,

S

Superintending Eng'g Office S. B.
Palmerston 12 July 1865

Lieut. ^{Adj.} Colonel - F. J. Mosher by R. &
Superintending Engineer 8th Division

Colonel C. A. Orr, R. E.
Secretary to Government

Sir,

R. P. H.

With reference to G. O. No 1776,
dated the 27th ultimo, I have the honor
to report that the following arrangements have
been made, in order to relieve Captain. Payne
from charge of the 1st Range, Madura.

Name:	From what Range transferred.	To what Range posted.
Superintendent Engraving P. Lly.	New appointment	4 th Range Tinianelly
Acting Deputy Assistant		
Commissionary J. Gray	4 th Range Tinianelly	3 rd do Madura
Conductor H. H. Bywater	3 rd do Madura	1 st do do.

I have you

A. Hubbs, Lieut. Col. R. C.
Superintending Engineer & In

affett. l'oy. to the giving in order 1881

27

Ordered that the following certificate

18 July 1966

No 23

Madras water works Office
Church Park, Mount Road
26th July 1865

From

W. Fraser Esq^r C.E.

Special Ex: Engineer

To

Colonel G. A. Orr C.E.

Secretary to Govt P.W. D.

Sir

I have the honor to request that
you will be good enough to direct to be sent
to me the following Blue Book which I
understand can be had in the Military
department.—

"Suggestions in regard to Sanitary
"works required for improving Indian
"Stations: 1864"— It contains a
large amount of information which would
be very useful to me

I have the honor to be

Sir

Your most Obedt Servt

William Fraser C.E.

W. Fraser Esq^r C.E.

106

Superintending Engineer's Office
Camp Belknap 18 July 1865.

From,

Lieut. Col. J. H. Mather, R. E.

Superintending Engineer 7th Div.

To,

Colonel C. H. Orr, R. E.

Secretary to Govt. S. P. M. Mather.

Sir,

J. O. M. 1884 of 5th July not having dis-
posed of the subject of para 12 of my letter printed at
it, and Lieut. Col. Mather having subsequently
appeared as detailed to an appointment in Madras, I
take the liberty of requesting that arrangements may be
made for filling up his vacancy in the 7th Division if
he is not likely to rejoin before the 1st week in September.
I'll then I would willingly await the return of a good an-
cient officer; but should his health require entire
change of climate and work, he should be replaced in
time to enable his successor to make the most of the
short working season on the West Coast.

I have the honor to be

Sir

Yours Most Obedient Servant,

Wm. Mather, Lieut. Col. R. E.

Superintending Engineer 7th Div.

From W. P. 2783

Mr. Officer Engineer

Spec. Engr. Engr

To

Col. R. D. Currier

Secret. to Govt

Dep. Secy

Oct 26th

Dec 27th July 1865

No 23

Requesting to direct to

be sent to him the within

mentioned Blue Book

which he understands, and

the files in the building of the

first of August 1865

W. P. 2783

San Diego 29th 22

Wm. The Secretary to Genl.
A. W. H. Warner

1866.

Dated 18th July 1865
Received. A. W. H. Warner

Requests to make arrangements
must be put up the owners
of land situated as the road and
also have been appointed in
advance, if these officers
and the Secretary (General) are
not known of the
San Diego 29th 22
25th July 1865

No 429

Superintending Engrs Office
1st Division Malabar
19th July 1865

From

Captain J. C. Jones R.E.

Superintending Engrs 1st Divn

To

Colonel F. A. Orr R.E.

Secretary to Government S.P.W.

Madras

Sir

Referring to para 2 of L. O. No 1906 of
y^e instant I have the honor to state that the
Appropriation Returns of this Division for May
last were duly despatched to the Controller's
Office on the 28th and 29th ultimo. The appa-
rent delay in their transmission was due to
the non receipt in time, from the Range Officers,
of the Lists of Unexpended balances of esti-
mates of works in progress in past year.

2. The Appropriation Returns for June were sent
on

Banjum 11th July

Vizayapatam - 9th Do

Kodanery - 13th Do

*for reappropriation
in May

I have the honor to be

Very

Your Most Obedient Servant

J. C. Jones Capt. R.E.

Superintending Engrs 1st Divn

1000

1000

1000

1000

1000

1000

1000

1000

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1000

1000

1000

1000

Revenue Department.

No.
Proceedings of the Board of Revenue
dated 27th July 1865.

Read Memorandum from
the Secretary to Government Public Works
Department dated 24th July 1865 No. 120.

Communicated to the Col.
lector of Nellore who is requested to
expedite the despatch of the Statement.

(True Extract)

Signed R. A. Dalzell
By Secretary.

To J. W. B. Dykes Esq.
Collector of Nellore.

(True Copy)

~~W. Dalzell~~
By Secretary

To
Colonel C. A. Orr R.E.
Secretary to Government
Public Works Department.

C. C. Compuffe
By C. C. Compuffe

From Mr. C. C. Compuffe
The Secretary, Government
Public Works Department
to Mr. Dalzell Esq. Secretary
Nellore
Recd 19th 20th July 1865
Recd

No. 129,

Report the details of the
of the Government
from and since 1865 of
the District.

For Mr. Dalzell
28th July 1865
By C. C. Compuffe

No. 36

PUBLIC WORKS DEPARTMENT.

ON THE

AS COMPARED WITH

GREAT BRITAIN AND IRELAND.

Calcutta:
PUBLIC WORKS DEPARTMENT PRESS:
1865.

37 1805 Delmar
 14th July
 1805
 No. 2803
 Proceedings of the
 Board of Revenue
 Dated 21st
 Decr. 27
 July 1805.

July 1865

Respecting the Collection
of Money to expedite the
discharge of the statement
showing the effects of the Can-
-non Law on the
cultivators and land revenue
-one of the District for
1804-05
for the
28 July 1805

34

Extracts from Reports of the Head Officials of the various Indian Railway Companies, on the relative advantages of the Indian gauge as compared with the English narrow gauge for Railways.

MADRAS.

No 278, dated 15th October, 1864

*Extract from a letter from—W B WRIGHT, Esq, Locomotive Superintendent,
To—Agent and Manager, Madras Railway Company.*

I beg to inform you that, in my opinion, the Indian gauge for Railway possesses decided advantages over the English narrow gauge

2 The chief of these is the steadiness with which the vehicles composing trains run at high speeds over the Indian gauge, which steadiness, as compared with that of vehicles running at like speeds on narrow gauge Railways, cannot fail to be remarked. This is no doubt due to the greater breadth of the wheel base, and the increased stability due to this

3. This gauge offers other advantages in the construction of locomotives, the greater breadth of gauge allowing of a broader fire-box, and in cases of inside cylinder engines allowing greater width between the cranks, the boilers can be kept lower than on the narrow gauge, thus giving the double advantage of a lower centre of gravity, and at the same time a broader base

4 No one who has travelled on inside cylinder narrow gauge engines at high speeds, and on a similar class of engine on the Indian gauge can fail to observe the difference between their relative steadiness, and there can be no doubt but that the wear and tear both to permanent way and locomotives must be very considerable, in consequence of this oscillation on the narrow gauge, which is almost entirely done away with by the well proportioned engines and stock which the Indian gauge admits of.

5 The only advantage that the narrow gauge possesses is, that the stock can travel more easily round curves, but for all practical purposes the 5' 6" gauge is, in my opinion, the best gauge extant

No 570, dated 20th September, 1864

*Extract from a letter from—W. G SMART, Esq, Chief Engineer,
To—Agent and Manager, Madras Railway Company.*

PARA 2—In calling for the opinion of Railway officers on this subject, the Government does not, I imagine, contemplate the revival of the discussions known as the Battle of the Gauges which took place some 18 or 20 years ago, as they have access, no doubt, to Parliamentary evidence and other publications giving full and accurate information on all points connected with the question. The intention, I presume, is merely to obtain an expression of opinion based on observation of the merits of the Indian gauge. The only merit it appears to me to possess over the 4' 8" gauge is that it imparts greater stability to the vehicles, whereby the comfort of passengers is very much increased, the friction caused by the flanges of the wheels being thrown against the rails diminished, and the liability to derailment, or the escape of the wheels from the rails, reduced. On the other hand, when curves of small radius have to be used, the narrow gauge would be productive of less friction in passing round them. As regards the other advantages and disadvantages said to appertain to the narrow and the broad gauges, by their respective advocates, it has been proved that they have very little force

3 If I were called upon to initiate a system of Railways in a new country susceptible of long straight lines and curves of large radius, I shall adopt the Indian gauge. In a country like Ceylon, where it is necessary to adopt extremely sharp curves, I should prefer the narrow English gauge

BOMBAY.

No 128, dated 21st July, 1864

*Extract from a letter from—J BROUGHTON, Esq, General Manager,
To—Secretary, G. I. P. Railway Company*

I have the honour to inform you that for many years past, I have been in a position to judge of the merits of the different gauges, so far as regards the working, and the cost of working, of the following gauges, viz —

			Feet	Inches
The English broad gauge of	...	...	7	0
The English narrow gauge of	...	...	4	8½
And the Irish gauge of	...	...	5	3

The "Battle of the Gauges" has, in England, been fought over and over again, and there is no doubt about it in my mind that the majority of practical Railway men have hitherto agreed that the broad or 7 feet gauge is a mistake.

That the 7 feet gauge enables a company to run their passenger trains at a greater speed with less risk of accident, than can be run on a narrow gauge line, will, I think, be generally admitted by all Railway men, but that advantage (and especially if an advantage at all in such a country as Australia) is, I consider, more than counterbalanced by the large additional capital outlay requisite in the taking of land, the building of culverts and bridges, the heavier class of rail required to be laid down, the increased cost and maintenance of the rolling-stock, and the general unwieldiness of the stock when at stations, the latter rendering it necessary to keep a larger staff of men employed for the moving about of waggons and carriages in the ordinary every-day working, or compelling the use of *additional* shunting horses, or the very expensive use of shunting engines at stations.

In making these remarks I have of course not forgotten the extra carrying capacity of the broad gauge vehicles over the narrow gauge, but such extra carrying capacity is, I consider, fully counterbalanced by the decreased number of vehicles conveyed in any one train on a broad gauge Railway.

It may be supposed that the broad gauge engines are constructed to enable them to move the same number of vehicles (under similar circumstances of gradients, &c) as a narrow gauge engine on a narrow gauge line moves, but in practice such I have found not to be the fact.

Thus, taking the Great Western of England Railway from my observation and recollection, I should say the average number of vehicles by a passenger train does not exceed 10, the maximum number being from 15 to 18, whereas on the Lancashire and Yorkshire Railway (a narrow gauge line) the average vehicles by a passenger train on the main line may be taken at from 16 to 18, the maximum number being from 25 to 28. Again, take the two lines in comparison with regard to goods trains of loaded waggons. The Great Western average load may be taken at 25 waggons, the maximum load being 35, whereas on the Lancashire and Yorkshire line the average (on ordinary gradients) may be taken at about 35 waggons, and the maximum load at not less than 40 waggons. In both instances I of course speak from memory, but also from personal observation of both Railways for many years past.

A general consideration of the respective merits of the broad and narrow gauge system of Railways has brought me to the conclusion that the narrow gauge is preferable to the broad gauge, looking at a Railway in a commercial point of view.

The merits of the *Irish* narrow gauge system of Railways, viz, a 5 feet 3 inches gauge, should not be lost sight of, and years ago a Special Commission of eminent men came to the conclusion that that gauge was the most useful one. It entails little or no additional outlay in construction either in the extent of land required, or of roadways, and it does not entail a heavier class of rail being laid down than the 4 feet 8 inches narrow gauge road,—it does not entail any heavier rate of maintenance than the narrow gauge, and, as a rule, there is less oscillation in the running of a 5 feet 3 inches passenger train than in one of the lesser gauge. It to some extent enables what many Locomotive Superintendents think a great advantage, viz, the better adoption of engines with outside cylinders. It also gives an increased carrying capacity to all classes of vehicles of about *one-fourth*, without adding a corresponding increase in the working expenses, either in the movement of trains or in the work necessary to be done at the stations.

I have here attempted to give a few reasons in favour of the narrow gauge system of Railways over the broad, and from my general experience I prefer the 4 feet 8½ inches gauge to the 7 feet gauge, but again I prefer the 5 feet 3 inches gauge to either of the others.

I believe that the eminent (deceased) English Engineer Brunel, may fairly have been considered the father of the broad gauge system of Railways; but I also believe that when he died, the belief in the utility of the broad over the narrow gauge died with him, and that the broad gauge system will never be extended in England, and so far back as 1858-9, the Great Western of England had begun to lay down very extensively the narrow gauge, or third rail, and I think with *that Company*, it is only a question of time the line becoming an entirely narrow gauge one, as the *broad* gauge stock works out.

I hope that these few remarks may assist in the general enquiry now being instituted by the Government.

Dated 31d August, 1861

Extract from a letter from—E. W. WEST, Esq, Acting Chief Resident Engineer,

To—Secretary, G. I. P. Railway Company.

I have the honour to state that the comparative advantages of broad and narrow gauges for lines of Railway is not a matter which has engaged much of my attention.

I am decidedly of opinion that any gauge wider than 5 feet 6 inches is merely a source of increased expense, especially in rolling-stock, without any really compensating advantage. I shall, therefore, confine my observations to the comparative advantages of the 4 feet 5½ inches and 5 feet 6 inches gauges.

The Great Indian Peninsula Railway has a 30 feet width of formation for a double line of 5 feet 6 inches gauge, with a width of 6 feet between the lines. Comparing this with some of the older 4 feet 8½ inches gauge lines in England, it does not appear that either our earth-work or bridges are heavier, as a general rule. The cost of the construction of the line has therefore been very slightly affected by the adoption of the wider gauge.

Rolling-stock for the wider gauge must necessarily be of heavier construction, the weight, and therefore cost, increasing in a higher rate than the increased capacity of carriage, and this appears to be the chief objection to the wider gauge. On the other hand, it has been almost admitted by the advocates of the narrow gauge, that a few extra inches in width would be a great convenience in the construction of powerful engines, although they can manage to construct them without it.

The wider gauge admits of steadier running of trains, and any imperfection in the level of the permanent way is less felt in the proportion that the wider gauge exceeds the narrower.

On the whole, I am of opinion, that the 5 feet 6 inches gauge was judiciously selected by the East India Company as the gauge for Indian Railways, in preference to the 4 feet 8½ inches gauge, although Railways might have been constructed and stocked more cheaply if of the narrower gauge. This advantage of the 4 feet 8½ inches gauge on the score of expense, however, would probably not have lasted for many years if the line had to carry a very heavy traffic.

No 415, dated 9th July, 1861

Extract from a letter from—S. GLOVER, Esq, Acting Locomotive Superintendent,
To—Secretary, G. I. P. Railway Company.

I have not had any experience on the broad gauge system, and am not able therefore to speak from my own knowledge of the relative merits of each. I may say that I prefer the 5 feet 6 inches Indian gauge to the 4 feet 8½ inches narrow gauge. The machinery of the engine is not so confined, and better to get at, and the rolling-stock runs much steadier.

No 2682

Extract from a letter from—J. B. LANE, Esq, Managing Agent, B. B. and C. I. Railway,
To—Secretary to Government of Bombay, Railway Department.

I am myself of opinion that whatever the gauge may be, it is of the first importance that in every Province and part of the same country it should be uniform.

2 As to the width to be chosen, the circumstances of each country must (within certain limits) be considered in coming to a decision.

3 The broad gauge of the English Great Western is now, I believe, generally admitted to be too broad for any country, whilst the narrow gauge will also find many disapprovers, and the adoption of the third foot tram-road, where a railroad at all is required, is condemned by every practical man of experience as a mistake.

4 The gauge (5 feet 6 inches) determined upon for India, has so far proved itself suitable to every requirement. It admits of well-proportioned, useful, and powerful locomotives, as well as commodious waggons and carriages capable of running safely at high speed with a dead weight of ten or more tons.

5 I think the *Irish* gauge is wide enough, there may be a question whether the *Irish* gauge of 5 feet 3 inches may not be wide enough. It certainly has answered very well there. The *Irish* lines have been worked with very few accidents. The Great South and Western Railway of Ireland is not inferior to any line I know in stability of both wayworks, and stock. It has now been open throughout some 14 years, and the northern portion of it even longer, whilst its maintenance is, and always has been, low, and its dividends good.

6 I should myself be in favour of a 5 feet 2 inches or 5 feet 3 inches gauge for a new country such as Australia.

No 1003, dated 6th August, 1861.

Extract from a letter from—F. MATTHEW, Esq, Chief Resident Engineer,
To—Managing Agent, B. B. and C. I. Railway

I have the honour to report that for a great trunk line of Railway, the working capabilities of which might be the only limits to its traffic, I would advocate the adoption of the broad gauge as affording more room for future improvement, as admitting of higher speed and

the use of larger and stronger and more safe vehicles, but considering that the gauge is not merely wanted for such a trunk line, but for also probably a much greater length of tributary Railways, on all of which the wider gauge would involve a greater outlay on works and rolling-stock, I am of opinion that, for a general system of railways, the Indian gauge, 5 feet 6 inches, is, on the whole, a safe gauge for a 'option

2 The Indian gauge has been found to afford sufficient width for passenger and goods vehicles, and for the machinery of locomotives suited for such a rate of travelling as can be economically maintained

3 An inch or two in width of gauge, I do not look on as of material consequence; the Indian 5' 6" is a good gauge, the Irish 5' 3" is a good gauge, and the greatest merit of the arrangement in each case is that the gauge is uniform all over each country.

4 The experience in England should warn us against allowing different or mixed gauges. However extensive a country may be, or however great the physical obstacles to communication, I am of opinion that one gauge only should be allowed in any country, as even though a system of Railways may become too vast to be worked as one, yet even in that case the disadvantage of a break of gauge would more than counterbalance any advantage to be derived in any one case from a small alteration from a dimension previously adopted in other provinces of the same country

No 2117 A, dated 23rd July, 1864

From—G. N. ANDERSON, Esq., *Locomotive and Carriage Supdt.*,

To—*Managing Agent, B. B. & C. I. Railway Company*

I have the honour to inform you that my practical experience in locomotive engineering extends over a period of 15 years, and that time has been divided almost equally between the broad, medium, and narrow gauge Railways

To decide upon the width of gauge in introducing the iron road into our colonies, one thing to be considered is the description of traffic, and another the quantity or amount of traffic we may expect will have to be carried over the line when in its full prosperity, say 15 or 20 years hence

Should this anticipated traffic not exceed half that conveyed over some of our greatest narrow gauge English lines, for instance the London and North Western, then it is my opinion the narrow gauge line would be the most preferable of the three, the only objection to the width of gauge on that and other narrow gauge lines is this, that in order to be able to convey all the traffic brought to the line, they have been obliged to go on increasing the power of their engines from year to year, so as to take full loads at high speeds, and they find that in doing so there is but little scope for adding to the power of the engine consistently with stability,* and that there is a greater amount of danger attending a high speed on the narrow gauge than on the broader gauges, hence the objection in *England* to the present narrow gauge. But suppose the daily traffic of a line will admit of the speed of each train being reduced to a maximum of 20 or 25 miles an hour, these objections to the narrow gauge that I speak of, would not exist. Every facility on the narrow gauge is afforded us for turning out a properly proportioned engine to run at a speed of 25 miles an hour with a load of about 15 vehicles. I do not consider that it pays to take longer trains than this, unless it be with *through* traffic with but few stoppages.

The cost of constructing the narrow gauge line is so much less, and the cost of rolling-stock, the maintenance of permanent way, and the working of traffic is also very much less, as regards working traffic, cheaper. I base my argument on this, that of the three gauges for almost any description of goods, (unpressed cotton, wool, and a few other sorts of material being the exception) a narrow-gauge waggon has room enough in it to contain a full load without being stacked too high. What I mean by a load is what the present broad and medium gauge waggons are constructed to carry, but the narrow gauge waggons being so much narrower than the other, they are consequently so much lighter, so that by as much as the waggon weighs less, it will carry more paying weight. Wheels, bearings, and springs being of the same strength, the difference between the weight of the broad and narrow gauge waggons of equal length is about one ton

Fewer porters are required to load and unload narrow gauge waggons, and to move them to and fro.

No doubt locomotive engineering may undergo such a revolution that even the 7 feet gauge may be considered much too narrow. We have, I think, got to the maximum length

* The system of working the boilers to a very high pressure, is now being resorted to, but this I think objectionable, unless the water is very good

a train ought to be, but it is very possible we may not have attained the width; still rails, tyres, and bearings, &c., may bring about this revolution to some extent. On lines where there is a large stock of each particular article to forward daily, it would be a great object to be able to stow the whole of it in as few waggons as possible, but it happens that on any of the three gauges we have on an average seldom more than two-thirds of a load (this is excluding empties), should traffic be more in one direction than another, so that the conclusion I come to is this, that as far as our present locomotive practice has extended, the narrow gauge meets all the requirements, provided the traffic does not increase to such an extent that we must get up high speed, which has not as yet paid. Rather than high speed, let us have extra loads at a reasonable speed.

No 1888 of 1864

Extract from a letter from—T. G. NEWNHAM, Esq., *Engineer in charge of Open Line,*

To—*Agent, Sind Railway Company, Kurrachee*

PARA. 2—It is universally allowed that the 4 feet 8½ inches gauge is too narrow for the gearing and cylinders of goods engines within the wheels, whilst the 5 feet 6 inches gauge gives room enough with nothing to spare, so far then as the engine is concerned, the 5 feet 6 inches gauge seems very suitable, and it is equally suitable for trucks for various kinds of merchandise, but when the bulk of the traffic is in raw material, such as cotton and wool unpressed, and in sufficiently large quantities, a wider gauge might be used with advantage.

The width of the trucks will regulate that of the carriages, and it would be desirable in fixing the width of the trucks to consider the convenience of the passengers. The Indian carriages are of such width as to accommodate four passengers. Any increase of this width should be sufficient to seat another passenger, and the 7 feet gauge just allows of this

An engine built for the 7 feet gauge need not necessarily be much heavier than if built for the 5 feet 6 inches, but if the traffic required it, much more powerful as well as heavier engines could be used on the 7 feet gauge, which appears to possess many advantages over either of the narrow gauges where the goods traffic is great and of a bulky nature

No 488, dated 16th July, 1864

Extract from a letter from—J. BROWN, Esq., *Acting Locomotive Supdt, Sind Railway.*

With reference to your endorsement No 1735 of the 9th instant, I have the honour to inform you that, of the three gauges of Railways, viz, 4 feet 8½ inches, 5 feet 6 inches, and 7 feet in my opinion the 5 feet 6 inches is the most suitable

An engine for a 4 feet 8½ inches gauge rather confines the gearing, cylinders, and fire-box, and, if run at a high speed, will tend to oscillate

An engine for the 5' 6" gauge, I think, will run steadier at a high speed, and is well arranged for the working parts of the engine.

The 7 feet gauge would require a much heavier engine than either of the above gauges, and the cost of keeping up the repairs and maintaining the permanent way be much higher.

BENGAL

No. 624, dated 26th July, 1864

Extract from a letter from—D. W. CAMPBELL, Esq., *Locomotive Superintendent,*

To—*Agent, East Indian Railway Company*

I beg to inform you that after the experience I have had on Railways in England and in India, not only of the working, but also of the construction of the rolling-stock, I am quite of opinion that the 5 feet 6 inches gauge laid down by rule of the late Hon'ble East India Company as the fixed gauge for guaranteed Railways in India, is decidedly the best.

In England the 4 feet 8½ inches gauge certainly does very well, but at the time it was fixed it was more by rule of thumb than from any possible practical experience, it in fact was arrived at merely by following up what had been used by carts on tramways, whereas, before Indian Railways were commenced to be made, the Engineers had all the benefit of the working of English and other European lines.

With regard to the locomotive stock for the 4 feet 8½ inches gauge, great difficulty is found in designing it so as to arrange the different working parts without cramping them together into an unhandy space. Then, again, in increasing the power, it can only be done by interfering with and altering the angle of stability or safe running of the machine. Now, with the 5 feet 6 inches gauge no such evils are to be met with, the width or space being ample for all requisite or reasonable purposes, and much more powerful engines can be made suited to run with safety at a far higher speed than what can be designed and placed on the narrow or 4 feet 8½ inches gauge lines.

With reference to the carriage and waggon stock, the 5 feet 6 inches gauge is of equal advantage in handiness of construction, as the additional 9½ inches of width gives the builder space enough to make a much better class of vehicle, and to that may be added the fact that the carrying power is increased considerably without the weight being much interfered with.

In advocating the advantages of a 5 feet 6 inches gauge over a 4 feet 6 inches gauge, the question might be asked, why not go to 7 feet 6 inches at once like what Mr Brunel introduced on the Great Western Railway in England? To that I would simply say, that in fixing such a wide gauge, Mr Brunel went quite to an unnecessary, an extravagant, and uncalled for extreme, quite as much so as the Indian Light Railway Company have gone the other way in laying down the 4 feet narrow gauge line between Nullahtee and Moorshedabad.

No. 3789, dated 5th August, 1861

Extract from a letter from—The Chief Engineer,

To—Agent, East Indian Railway Company

I cannot reply to your enquiry respecting the relative advantages of broad and narrow gauge Railways in terms more expressive than those which I heard used by the late Mr Rendel when giving evidence in opposition to the Great Western, or broad gauge line, before a Committee of the House of Commons on the Bientford line. His words were as follows—

“It must be admitted that in respect of speed, safety, and economy of traction, the Great Western or broad gauge line is unrivalled.”

But great as the advantages of a broad gauge may be, uniformity of gauge is still more important, and although it can, I think, be shown that a broad gauge line can be constructed as cheaply as the ordinary narrow gauge sleeper line, and worked far more economically, nevertheless, if any great length of narrow gauge Railway has been constructed in Australia, it would not be prudent to alter the gauge. The evils of a break of gauge are so great, that the strongest advocates of the broad gauge in England are forced to admit the necessity for its removal, and ere many years the broad gauge will have ceased to exist.

No. 414, dated 14th July, 1861

Extract from a letter from—A. W. MURDOCH, Esq., Chief Resident Engineer,

To—Agent, Eastern Bengal Railway.

In comparing the broad 7 feet gauge, and narrow (4 feet 8½ inches) gauge, the advantages accruing to the former appear to be—

1st—It enables the engines to be built of greater power with inside cylinders, and at the same time gives ample room for the working parts, and which, owing to their not being cramped for room, are the more easily got at for repairs.

2nd—That through the facility thus afforded for the adoption of inside cylinders, the engine is less subject to oscillation than is the case with outside cylinder engines, thus causing fewer concussions, and consequent less wear and tear to the rolling-stock, permanent way and works, reducing the cost of maintenance to a minimum, and, in addition, to their being the cause of trains running more safely, particularly at high speeds.

3rd—The increased width of base and the possibility of using more powerful engines, allow the attainment of a high rate of speed with greater security, especially in passing round curves.

The disadvantages shown by the broad gauge system, when compared with the narrow, are—

1st—Increased cost of construction owing to the greater base requiring wider banks (and consequently more land to be taken up), wider bridges and works, and heavier permanent way.

2nd—Greater expense in construction of rolling-stock.

In comparing the Indian 5 feet 6 inches gauge with the English broad and narrow gauges, the former appears to me to possess the following advantages—

It allows the application of inside cylinders leaving ample room for the working parts as in the broad gauge.

It gives greater base, and, therefore, greater steadiness than in the narrow gauge.

It requires but very little more land or wider structures than is required for the narrow gauge, the permanent way is not required to be heavier, so that the cost of construction will be about the same as is required for the narrow gauge.

In conclusion, I think that the Indian gauge avoids the defects of the broad gauge, whilst it adopts most of the advantages belonging to the narrow gauge.

No. 463, dated 6th July, 1861.

Extract from a letter from—H. CARRICK, Esq., Locomotive Superintendent,

To—Agent, Eastern Bengal Railway

As far as my experience of the Indian or 5 feet 6 inches gauge goes, I have no hesitation in saying that I consider it much better suited for Railways than the English narrow gauge. It gives more room for the arrangement of the gear of an engine, which, in the narrow gauge, is cramped and difficult of access, without adding materially to their weight.

If engines are built suitable to the gauge they have to work, it will be found that an engine, if properly designed for the Indian gauge, can be constructed so as to bear as good a proportion of weight to the permanent way as one for a narrow gauge, so that the cost for upholding the permanent way need not be more than for the narrow gauge. Increased steadiness is also obtained by the 5 feet 6 inches gauge.

I would not, however, be in favour of a wider gauge than the 5 feet 6 inches, with the present construction of permanent way.

The narrow gauge was, in the first instance, adopted in the north of England, from the old tramways made of wood, and was carried out for Railways, on the adoption of the locomotive, for the purpose of facilitating the working of lines running into each other. There is, however, nothing in the 4 feet 8½ inches gauge to recommend it over the advantages of the Indian gauge, and I therefore give it as my opinion that the Indian gauge is most suitable for Railways as at present made.

No. 196, dated 5th July, 1861

Extract from a letter from—A. SHANKS, Esq., Resident Engineer,

To—Agent, C & S. E. Railway Company.

I have given the subject my careful attention, and beg to report upon it as follows.—The narrow or 4 feet 8½ inches gauge is used for all Railways in England, with, I believe, only one exception. I consider one of its principal disadvantages applies to locomotives, for, if these are made with inside cylinders, so little room is left between them, that the working gear is very difficult of access for examination or repair, while, if they are made with outside cylinders, their overhanging weight materially lessens their steadiness when running at a high speed.

A line with this gauge has, however, the advantage of cheapness of construction in cases where it passes through valuable property as is generally the case in England. It is tolerably well known that George Stephenson, who introduced the narrow gauge, in his after experience found that a broader one would have answered better, that he was too late in arriving at this conviction to carry it into effect in England. On the other hand, Brunel, by adopting a 7 feet gauge for the Great Western, constructed a line remarkable for its magnitude and well adapted to the primary object he had in view, viz., very high speed, but in other respects it has been far from a successful undertaking.

Between these two extreme gauges we have one of 5 feet 6 inches in general use in India, and I can unhesitatingly express my most favourable opinion of it. So well adapted do I consider it to be for either this country or Australia, where, with the greater part of the land at the disposal of Government, and in a country offering few engineering difficulties of importance, the cost of construction of a line in addition to that required for the narrow gauge is comparatively trifling, bearing in view the advantage it possesses in giving ample scope for the construction of engines of better proportions, roomy and airy carriages suitable to the climate, and waggons of greater carrying capacity, in addition to which a speed sufficiently high for all practical purposes can be obtained with perfect safety on a line with a 5 feet 6 inches gauge.

NORTH WESTERN PROVINCES

No. 1290, dated 16th August, 1864.

*Extract from a letter from—G SIBLEY, Esq, Chief Engineer,
To—Deputy Agent, E. I. Railway Company, N. W. Provinces.*

I am of opinion that the gauge of the Indian Railway presents, on a balance of advantages and disadvantages, a marked superiority over the English narrow gauge, the steadiness of travel which is not surpassed by any even of the older lines at home excepting, perhaps, the Great Western, is doubtless most largely due to its greater base, to the lowness of angle between the extremity of the base and the centre of gravity.

The additional first cost due to extra 9½ inches of gauge is infinitesimally small, between 80 and 90 per cent of the whole expenditure remaining unaffected, and of the remainder no part is affected on the full ratio of the increased width of gauges. All stations, all permanent way, excepting cross sleepers, all large bridges, are wholly unaffected, the only remaining item affected being cross sleepers, ballast, earth-work (central portion only, slopes remaining the same), and masonry of small bridges,—these are affected in ratio varying from 1 in 12 to 1 in 40 or 60.

As regards the weight of our waggons, I would point out that they are built of generally heavier wood than is used at home, if another six inches were added to the gauge, the weight would not, assuming the same overhang, increase in the same ratio as the carrying capacity.

The 5 feet 6 inches gauge was probably as favourable a compromise as could be obtained at the time, considering how completely some of the Engineers interested were committed to the 4 feet 8½ inches gauge, but I think that if the work were to be begun anew it would be decidedly advantageous to add another 6 inches and make the gauge 6 feet.

No. 4127, dated 30th August, 1864

*Extract from a letter from—P. D. NICOLL, Esq, Locomotive Superintendent,
To—Agent, E. I. Railway Company, Calcutta*

I would give as my opinion that the 5 feet 6 inches gauge of our Indian lines is on the whole by far the best, as compared with any other that I know of.

By its adoption there is ample room for the convenient arrangement of the machinery for a powerful locomotive, a great desideratum, the want of which is so felt in the narrow gauge, and the stock runs much smoother at high speeds than on the narrow gauge.

No. 3278, dated 11th July, 1864

*From—C. CLEWORTH, Esq, Offg Locomotive Superintendent,
To—Deputy Agent, E. I. Railway, N. W. Provinces.*

I think there can be no doubt that the Indian gauge of 5 feet 6 inches is far preferable to the English 4 feet 8½ inches as rolling-stock will run much steadier on the former, and the liability to get off the road will be considerably less.

I consider the 5 feet 6 inches to be about the best gauge that has ever been adopted, and preferable to either the Great Western, 7 feet, or the Spanish 6 feet, as I think both those gauges unnecessarily wide, and the English universal gauge 4 feet 8½ inches too narrow to be safe for anything like high speed, unless the road is kept in perfect order.

PUNJAB

No. 262, dated 20th July, 1864

*From—Chief Engineer, Punjab Railway,
To—Agent, Punjab Railway Company.*

With reference to your Memorandum No. 719 of the 12th instant, with enclosures, relative to the advantages and disadvantages of the Indian gauge as compared with the English narrow gauge, the former has the advantage of allowing a greater space for the working machinery of the locomotive and for the production of steam, also a greater width of carriages or trucks which do not overhang the rail to such an extent as upon the narrow gauge, and therefore not subject to the same oscillation. The disadvantages are an increased cost of works and rolling-stock.

2. On the whole, I consider the Indian gauge preferable, the working expenses, so far as I have been able to ascertain, being the same as in the narrow gauge.

Dated 4th August, 1864

*From—Locomotive Superintendent, Punjab Railway,
To—Agent, Punjab Railway Company.*

In reply to your Memorandum No. 720 of 12th July, requesting information on the relative advantages of broad and narrow gauges, I beg to state that I consider the broad (i.e., Indian 5 feet 6 inches) gauge to be decidedly the best, although its increased cost of works and rolling-stock are disadvantageous.

2. Its advantages are, more room for the locomotive machinery and boiler space (a very great advantage when heavy engines are repaired), roomier carriages, and a decreased amount of carriage and waggon stock. The fact of being able to travel at a higher rate of speed with less oscillation (the centre of gravity being comparatively lower in the broad than in the narrow gauge), consequently there must be less wear and tear in rolling-stock, and less maintenance of way.

2610

*EXTRACTS from Reports of the Head Officials
of the various Indian Railway Companies,
on the relative advantages of the Indian gauge
as compared with the English narrow gauge
for Railways.*

1. taken from

17th / 65
at No. 1230

GENERAL No of
letter replied to.

Date of Despatch

No. 012R
for July
MEMO.

Public Works Department.

RAILWAY.

702610
Fort William,
The 30th June 1865.
Recd. 1st July "

To
The Secretary to the Govt
of Madras, P. W. Dept.

With one Encl.
The undersigned is directed
to forward for information
six copies of Reports on the
Indian Railway Gauge
as compared with the
gauges adopted in Great
Britain and Ireland.

W. P. R. S.
Asst Secy to the Govt
of India

MS. 60
Enclosed find 3 Copies.

The Report be furnished to the
Financial & Railway Department.

For the Secy
17 June 1865