

Read the following:—

No. 1,217.

Note by the Chief Engineer for Irrigation.

No. 440.

The report of the Executive Engineer in charge, Kistna District, on the floating plant belonging to the Delta and on its requirements shows that, as was the case elsewhere, this plant has been greatly neglected and needs to be put into proper repair as soon as possible. The provision in the Budget under Navigation repairs is altogether only Rupees 5,100, and the report shows that Rupees 20,700 are needed for the current year, leaving Rupees 15,600 unprovided for. It must be noticed that as attention was specially called to the subject in G. O., No. 236, of the 3rd February 1874, sanction should have been obtained to the estimates, for at any rate a considerable portion of this plant, in time to admit of adequate provision being made in the current year's Budget. As it is, the only money which can be made available is the following:—

Letter No. 73, para. 4.

		Rs.	
Surrender under Capital, Ordinary, being the provision for a boiler	...	4,700	...
Part of the sum of Rupees 7,020 at the disposal of Government under Capital, Ordinary	...	2,700	...
Part of the sum of Rupees 4,800 at the disposal of Government under Repairs	...	3,030	...
Total	...	10,430	...

And the most should be made of this amount, for there does not appear to be any probability of any funds under Repairs being surrendered from other districts. Local officers must not expect, if they fail to make their wants known at the proper time, that large sums of money will be found for these during the year.

2. The special repairs required are as follow:—

		Value of Plant,	
		Original.	Present.
		RS.	RS.
5 Dredges	...	25,000	1,13,022
25 Iron Punts, Nos. 1 to 4 and 6 to 26	...	12,435	59,235
Total	...	37,435	49,723

N.B.—There are 32 iron punts altogether.

The balance not provided for this year should be included in the Budget of 1876-77.

3. The ordinary maintenance of the plant is estimated to cost as follows:—

		Rs.	
1 Steamer Pioneer	...	600	...
5 Dredges	...	1,550	...
32 Iron Punts	...	3,260	...
11 Wooden Punts and Boats	...	340	...
6 Range Boats	...	300	...
Total	...	6,050	...

It must be noticed that it is very doubtful whether the Dredges can be maintained for the sum stated, as the wear and tear on the machinery must be very considerable, and that wooden boats cannot, it is thought, be kept serviceable for so small an amount.

4. Detailed estimates have been prepared for all the plant, and with regard to these the only remark required is that some of the rates seem to be unnecessarily high, and that information as to the cost of similar work at Dowlaishwaram should be obtained.

5. Much of the deterioration of the floating plant is probably due to the workshops at Bezwadah having been closed for several years, and it is manifestly quite impracticable to keep plant in order without efficient shops, in which timely repairs can be executed, being available.

OOTACAMUND,
5th October 1875.

(Signed)

JOHN MULLINS, Lt.-Col., R.E.,
Chief Engineer for Irrigation.

Proceedings of the Madras Government,

KISTNA

Statement of the Floating Plant in Kistna District showing the Nature of Employment, the

Registered No.	DETAILS OF PLANT.			MEASUREMENT OF PLANT.						MACHINERY, ETC.					
	Description.	Name of Boat.	Date of construction.	Hull over all.			Extra width for Paddle box.	When loaded.		Engines.		Boilers.		Propellers.	
				Length.	Breadth.	Depth.		Draft.	Tons carried.	No. of Horse Power.	Description.	lbs. Pressure.	Description.	Description.	Revolution.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Steamer	Pioneer.	1872-73, transferred from Godavery.	FT. IN. 89 9	FT. IN. 9 6	FT. IN. 4 4	FT. IN. 0 6	FT. IN. 2 6	About 20 tons.	8	High pressure oscillating.	60	Tabular.	Paddle.	30 per minute.
1	Dredge	...	1858-59	50	8 0	3 10	...	2 4	...	6	High pressure horizontal.	50	Do.	...	...
2	Do.	...	1858-59	50	10	3 10	...	2 0	...	6	Do.	50	Do.	...	...
3	Do.	...	1859-60	90	14 6	3 10	...	1 9	...	8	High pressure oscillating.	50	Do.	...	...
4	Do.	...	1866-67, transferred from Godavery.	90	14 6	3 10	...	1 11	...	8	Do.	50	Do.	...	...
5	Do.	...	1872-73, transferred from Godavery.	90	14 6	3 10	...	1 9	...	8	Do.	50	Do.	...	...
6	Workshop machinery.	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1	Iron Pant	...	1859-60	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
2	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
3	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
4	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
5	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
6	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
7	Do.	...	1861-62	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
8	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
9	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
10	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
11	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
12	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
13	Do.	...	1867-68	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
14	Do.	...	1861-63	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
15	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
16	Do.	...	Do.	60	10 0	2 10	...	2 6	16 10	...	...	...	...	...	...
17	Do.	...	1862-63	41	12 0	3 9	...	2 6	16 10	...	...	...	...	...	...
18	Do.	...	1864-65	41	12 0	3 9	...	2 6	16 10	...	...	...	...	...	...
19	Do.	...	Do.	41	12 0	3 9	...	2 6	16 10	...	...	...	...	...	...
20	Do.	...	1871-72	62	10 0	2 10	...	2 0	16 10	...	...	...	...	...	...
21	Do.	...	1870-71	40 6	7 6	2 2	...	1 11	8 10	...	...	...	...	...	...
22	Do.	...	1871-73	49 6	7 6	2 2	...	1 11	8 10	...	...	...	...	...	...
23	Do.	...	1873-74	40 6	7 6	2 2	...	1 11	8 10	...	...	...	...	...	...
24	Do.	...	1874-75	40 6	7 6	2 2	...	1 11	8 10	...	...	...	...	...	...
25	Do.	...	Do.	40 6	7 6	2 2	...	1 11	8 10	...	...	...	...	...	...
26	Do.	...	Do.	40 6	7 6	2 2	...	1 11	8 10	...	...	...	...	...	...
27	Do.	...	Do.	40 6	7 6	2 2	...	1 11	8 10	...	...	...	...	...	...
28	Do.	...	In 1873-74, received from Godavery.	39 9	11 3	2 10	...	1 7	16 0	...	...	...	...	...	...

Public Works Department, 28th October 1875.

DISTRICT.

Cost of Upkeep, and the Fund or Estimate from which to be maintained during 1875-76.

Average speed in Miles per Hour.	VALUE OF PLANT.			Cost of annual upkeep as per details appended.	EMPLOYMENT DURING 1875-76.				Special Repairs.	Remarks. Present condition, and how to be disposed of if irreparable.																													
	Original.	Present book value, vide paragraph 2 of N. B. at foot.			District.	Locality.	Work.	Fund.																															
		Rs.	A. P.																																				
17	18	19	20	21	22	23	24	25	26																														
2 1/2	16,988 3 6	16,635 5 8	600	Kistna.	River.	Towing punts with materials.	Imperial Irrigation.	...	Hull in fair order; engine very shaky and requires constant repairs.																														
...	15,614 4 6	12,534 11 0	250	Do.	Edlora, Masulipatam, Nizampatam Main Canals and locks.	Dredging.		8,170	Hull bottom plates much worn; requires renewal. Machinery in fair order.																														
...	15,614 4 7	11,001 8 7	250	Kistna District.				Imperial Irrigation.	1,550	Hull bottom plates worn; requires renewal; requires new boiler and considerable repairs to machinery. This is not included in the estimate.																													
...	28,853 11 10	20,556 14 4	350						Total as per G. O. No. 1,093, of 13th April 1873.	Employed in conveying materials for different works.	9,560	Hull and deck very much decayed; requires entire renewal; engine and machine are in fair order.																											
...	30,437 0 11	25,727 7 9	350								Imperial and Local.	7,970	Hull bottoms very much decayed; requires entire renewal. Boiler requires new tubes and other repair; machinery requires renewal of some heavy castings and considerable repairs.																										
...	23,000 0 0	22,344 9 7	350									2,750	Hull requires some repairs; machinery generally in fair order; but bucket chain, &c., require considerable repairs.																										
...	...	...	2,150									25,000	The bottoms of all these punts are more or less decayed and many of them to a large extent. They require considerable repairs, kept up hitherto out of Government Fund, which it is now proposed to abolish, and funds from Tools and Plant are now required, vide G. O. No. 236, of 2nd February 1874.																										
3.	2,185 9 7	1,659 12 6	200									1,330		Eastern and Western Delta Canals.	Kistna District.	Imperial and Local.	Now in good order. Under construction.																						
Down 1 Up.	2,185 9 7	1,659 12 6	110									Imperial and Local.						Kistna District.	Imperial and Local.	Now in good order. Under construction.																			
Do.	2,185 9 7	1,659 12 6	110																		Imperial and Local.	Kistna District.	Imperial and Local.	Now in good order. Under construction.															
Do.	2,185 9 7	1,659 12 6	110				Imperial and Local.																		Kistna District.	Imperial and Local.	Now in good order. Under construction.												
Do.	2,185 9 7	1,659 12 6	110		Imperial and Local.	Kistna District.																						Imperial and Local.	Now in good order. Under construction.										
Do.	2,185 9 7	1,659 12 6	110	Imperial and Local.				Kistna District.																						Imperial and Local.	Now in good order. Under construction.								
Do.	2,185 9 7	1,659 12 6	110						Imperial and Local.	Kistna District.																						Imperial and Local.	Now in good order. Under construction.						
Do.	2,172 0 7	1,734 11 0	110								Imperial and Local.																							Kistna District.	Imperial and Local.	Now in good order. Under construction.			
Do.	2,172 0 7	1,734 11 0	110																																		Imperial and Local.	Kistna District.	Imperial and Local.
Do.	2,172 0 7	1,734 11 0	110										Imperial and Local.																										
Do.	2,172 0 7	1,734 11 0	110											Imperial and Local.	Kistna District.	Imperial and Local.	Now in good order. Under construction.																						
Do.	2,172 0 7	1,734 11 0	110									Imperial and Local.						Kistna District.	Imperial and Local.	Now in good order. Under construction.																			
Do.	2,172 0 7	1,734 11 0	110																		Imperial and Local.	Kistna District.	Imperial and Local.	Now in good order. Under construction.															
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Do.	2,172 0 7	1,734 11 0	110		Imperial and Local.	Kistna District.																						Imperial and Local.	Now in good order. Under construction.										
Do.	2,172 0 7	1,734 11 0	110	Imperial and Local.				Kistna District.																						Imperial and Local.	Now in good order. Under construction.								
Do.	2,172 0 7	1,734 11 0	110						Imperial and Local.	Kistna District.																						Imperial and Local.	Now in good order. Under construction.						
Do.	2,172 0 7	1,734 11 0	110								Imperial and Local.																							Kistna District.	Imperial and Local.	Now in good order. Under construction.			
Do.	2,172 0 7	1,734 11 0	110																																		Imperial and Local.	Kistna District.	Imperial and Local.
Do.	2,172 0 7	1,734 11 0	110										Imperial and Local.																										
Do.	2,172 0 7	1,734 11 0	110											Imperial and Local.	Kistna District.	Imperial and Local.	Now in good order. Under construction.																						
Do.	2,172 0 7	1,734 11 0	110									Imperial and Local.						Kistna District.	Imperial and Local.	Now in good order. Under construction.																			
Do.	2,172 0 7	1,734 11 0	110																		Imperial and Local.	Kistna District.	Imperial and Local.	Now in good order. Under construction.															
Do.	2,172 0 7	1,734 11 0	110				Imperial and Local.																		Kistna District.	Imperial and Local.	Now in good order. Under construction.												
Do.	2,172 0 7	1,734 11 0	110		Imperial and Local.	Kistna District.																						Imperial and Local.	Now in good order. Under construction.										
Do.	2,172 0 7	1,734 11 0	110	Imperial and Local.				Kistna District.																						Imperial and Local.	Now in good order. Under construction.								
Do.	2,172 0 7	1,734 11 0	110						Imperial and Local.	Kistna District.																						Imperial and Local.	Now in good order. Under construction.						
Do.	2,172 0 7	1,734 11 0	110								Imperial and Local.																							Kistna District.	Imperial and Local.	Now in good order. Under construction.			
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Do.	2,172 0 7	1,734 11 0	110										Imperial and Local.																										
Do.	2,172 0 7	1,734 11 0	110											Imperial and Local.	Kistna District.	Imperial and Local.	Now in good order. Under construction.																						
Do.	2,172 0 7	1,734 11 0	110									Imperial and Local.						Kistna District.	Imperial and Local.	Now in good order. Under construction.																			
Do.	2,172 0 7	1,734 11 0	110																		Imperial and Local.	Kistna District.	Imperial and Local.	Now in good order. Under construction.															
Do.	2,172 0 7	1,734 11 0	110				Imperial and Local.																		Kistna District.	Imperial and Local.	Now in good order. Under construction.												
Do.	2,172 0 7	1,734 11 0	110		Imperial and Local.	Kistna District.																						Imperial and Local.	Now in good order. Under construction.										
Do.	2,172 0 7	1,734 11 0	110	Imperial and Local.				Kistna District.																						Imperial and Local.	Now in good order. Under construction.								
Do.	2,172 0 7	1,734 11 0	110						Imperial and Local.	Kistna District.																						Imperial and Local.	Now in good order. Under construction.						
Do.	2,172 0 7	1,734 11 0	110								Imperial and Local.																							Kistna District.	Imperial and Local.	Now in good order. Under construction.			

Proceedings of the Madras Government.

Statement of the Floating Plant in Kistna District showing the Nature of Employment, the Cost

Registered No.				DETAILS OF PLANT.				MEASUREMENT OF PLANT.				MACHINERY, &c.							
Description.				Name of Boat.	Date of construction.	Hull over all.			for Extra width Paddle box.	When loaded.		Eng. Mch.		Boilers.		Propellers.			
						Length.	Breadth.	Depth.		Draft.	Tons carried.	No. of Horses power.	Horsepower.	Pressure.	Description.	Description.	Revolutions.		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
80	Iron Pant	...	In 1872-73 received from God- avery.	39 9	11 8	2 19	...	1 7	16 0	...	...	...	...	...	...				
81	Do.	...	Do.	35 0	8 3	2 11	...	1 11	14 0	...	...	...	...	...	...				
82	Do.	...	Do.	39 6	12 0	3 0	...	1 6	16 0	...	...	...	...	...	...				
In 2nd Range	Large wood- en punt.	...	Unknown.	19 0	10 0	3 0	...	2 0	3 0	...	...	...	...	...	...				
	Do.	...	Do.	19 0	10 0	3 0	...	2 0	3 0	...	...	...	...	...	...				
	Do.	...	Do.	19 0	10 0	3 0	...	2 0	3 0	...	...	...	...	...	...				
	Small do.	...	Do.	15 9	4 2	1 9	...	1 0	1 5	...	...	...	...	...	...				
	Do.	...	Do.	13 3	4 6	2 0	...	1 5	1 5	...	...	...	...	...	...				
	Pinnace Racer.	...	Do.	21 0	4 6	1 9	...	...	Unknown.	...	...	...	...	...	...				
1	District Engi- neer's Boat.	...	1867-68	52 0	7 0	3 0	...	...	...	...	...	...	...	...	...				
2	Range Officer's Boat.	...	1868-69	33 6	6 0	2 3	...	...	...	...	...	...	...	...	...				
2	1st do.	...	1873-74	43 0	8 2	7 5	...	...	...	...	...	...	...	...	...				
3	7th do.	...	In 1872-73 transfer- red from Godavery.	30 0	6 0	2 4	...	...	...	...	...	...	...	...	...				
4	Range Officer's boat.	...	Do.	25 3	6 0	2 6	...	...	...	...	...	...	...	...	...				
5	6th Range do.	...	Unkn wn.	40 0	5 6	2 3	...	...	...	...	...	...	...	...	...				
6	Anticut Paddle Boat.	...	Do.	41 0	5 9	1 11	3 0	...	...	...	...	...	...	...	...				
7	2nd Range do.	...	Do.	24 3	4 4	2 6	...	...	...	...	...	...	...	...	...				
...	Anticut Paddle Boat.	...	Do.	40 0	5 6	2 3	3 0	...	...	...	...	...	...	...	...				
1	Wooden Ballacut	...	1869-70	30 0	11 0	3 0	...	2 0	8 0	...	...	...	...	...	...				
2	Do.	...	Do.	29 6	11 0	3 0	...	2 0	8 0	...	...	...	...	...	...				
3	Do.	...	Unknown.	30 0	10 4	3 5	...	2 0	9 0	...	...	...	...	...	...				
4	Do.	...	Do.	29 6	10 9	3 4	...	2 0	9 0	...	...	...	...	...	...				
5	Do.	...	Do.	29 6	10 6	3 0	...	2 0	8 0	...	...	...	...	...	...				

- N. B. 1. Present book value is not filled in when either or both the entries in columns 4 and 15 are unknown.
2. The book value is made by adding the cost of subsequent improvements to and sub-
tracting the amounts of deterioration at 2 per cent. per annum from the original cost of the plant.
3. The amount entered in column 20 against Steamer and Dredges are those sanctioned.
4. There is no harbour plant in the district.

MASULIPATAM,
20th September 1875.

Public Works Department, 23th October 1875.

Flotilla, and the Fund or Estimate from which to be maintained during 1875-76. — (Concluded.)

and the Find or Estimate from which to be made.										EMPLOYMENT DURING 1875-76.		Special Repairs.	Remarks. Present condition and how to be disposed of if irreparable.
VALUE OF PLANT.				Cost of annual upkeeping as per details appended.	District.	Locality.	Work.	Fund.					
Original.	Present book value vide paragraph 2 of N. B. at foot.												
17	18	19			20	21	23	24	25	26			
5 Down 1 Up.	400 0 0	884 0 0			100	Kistna.	Chebrole.	Conveying materials for different works.	Imperial.	...			
Do.	250 0 0	240 0 0			100					...			
Do.	400 0 0	884 0 0			100					...			
...	...	...			1,500					...			
...	...	...			40					...			
...	...	...			40					...			
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...	...	...			3,400					...			
...	1,260 0 0	1,032 0 0			100					...			
...	...	...			...					...			
...	647 6 9	638 9 9			70					...			
...	694 0 0	860 0 8			50					...			
...	768 0 0	752 10 3			40	...							
...	217 0 0	300 0 0			40	...							
...	...	50 0 0			...	...							
...	...	...			300 as per Budget sanction.	...							
...	...	...			...	...							
...	...	...			...	...							
...	...	...			...	...							
...	675 0 0	621 0 0			40	...							
...	675 0 0	621 0 0			40	...							
...	350 0 0	150 0 0			40	...							
...	350 0 0	150 0 0			40	...							
...	350 0 0	75 0 0			40	...							
...	...	...			200	...							
...	...	...			6,250	...							
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are unknown.
tracting the amounts of deterioration at 2 per cent. per annum from the original cost of the plant.
in G. O., No. 1,096, of 18th April 1873.

(Signed) D. N. CAMPBELL, Lieutenant, R.E.,
Executive Engineer in charge, Kistna District.

Proceedings of the Madras Government, Public Works Department,
28th October 1875.

Nos. 441 & 442.

ORDER THEREON, 28th October 1875, No. 3,036.

IRRIGATION, No. 42-A.

* Rupees 15,600 additional.

Kistna Delta. Proper provision should have been made in the current year's Budget after estimates for such of the plant as it was intended to repair had been sanctioned.

2. The estimates for special repairs to five Dredges and twenty-five Iron Puntas, amounting together to Rupees 37,435, are sanctioned, and the following amount will be placed at the disposal of the District Engineer, the first two items being made available subject to the approval of the Government of India, to whom a copy of these Proceedings will be forwarded:—

	Rs.
The provision for a boiler under Capital, Ordinary	4,700
Part of the sum under Capital, Ordinary at the disposal of Govern- ment	2,700
Part of the sum under Repairs at disposal of Government	3,030
Total	10,430

3. The estimates for annual maintenance of the plant, amounting to Rupees 6,050, are approved, subject to the revision hereafter of the amounts for Dredges and Wooden Boats if found necessary.

4. The District Engineer will revise Part VI. of his Budget Estimates in accordance with these orders.

(True Extract.)

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

No. 443.

(DOCKET No. 3,037, dated 28th October 1875.)

Copy of the above forwarded to the Government of India.

(True Extract.)

Major-General, R.E.,
Secretary to Government.

Exd. E. C. Shunker.

Spare Copies

Specimen 36.

Note by the Chief Engineer for Irrigation

The report of the Executive Engineer in charge, Kistna District on the floating plant belonging to the Delta and on its requirements shows that as was the case elsewhere this plant has been greatly neglected and needs to be put into proper repair as soon as possible. The provision in the Budget under Navigation Repairs is altogether only Rupees 5,100 and the report shows that Rupees 20,400 are needed for the current year leaving Rupees 15,300 unprovided for. It must be noticed that attention was especially called to the subject in L.O. No. 26 of the 3rd February 1874, sanction should have been obtained to the extent of at any rate a considerable portion of this plant in time to admit of adequate provision being made in the current year's Budget. As it is the only money which can be made available is the following

following

Surrender under Capital
 Ordinary repairs to the plant
 for a boiler - 14,788

Part of the sum of Rs. 7020 at the disposal of Government under Capital
 Ordinary - 2700

Part of the sum of Rs. 4800 at the disposal of Government under repairs - 3030

and the rest should be under of this amount for there does not appear to be any probability of any funds under repairs being surrendered from other districts. Local officers must not in defect if they fail to make their wants known at the proper time that large sums of money will be raised for them during the year.

Letter 173
 para 4

2. The special repairs required are as follows

5 Bridges	Rs. 25,000	11,3022	Value of Original
25 Iron Puntas 1 to 4 and 6 to 26		12,435	59,235
As there are 32 Iron Puntas altogether			37,435

The balance not provided for this year should be included in the Budget of 1876-77

3. The ordinary maintenance of the plant is estimated to cost as follows

1 Steamer - "Pioneer"	Rs. 600
5 Bridges	" 1550
32 Iron Puntas	" 3260
11 Wooden Puntas & Boats	" 340
6 Range Boats	" 300
	<u>6,050</u>

It must be noticed that it is very doubtful whether the Bridges can be maintained for the sum stated, as the wear and tear on the machinery must be very considerable and that wooden boats cannot be kept serviceable for so small an amount.

4. Detailed estimates have been prepared for all the plant, and with regard to these the only remark required is that some of the rates seem to be unnecessarily high, and that information as to the cost of similar work at Dowlaichwaram should be obtained.

5. Much of the deterioration of the floating

floating plant is probably due to the
works being closed for several years, and it is
manifestly quite impracticable to
keep plant in order without efficient
shops, in which timely repairs can be
executed being available.

Costa Rica
8th October 1878 }
"Chief Engineer for Irrigation"
\$1000

The Secretary of Commerce
U.S. Post Office Department

PC 17

[Handwritten signature]

34-210-1

77-100-0000

7th Nov

11. 11. 1941

Q 16-2/12/13. 216-217.
" 22 Feb/74 " 4-7
" 17 Aug - " 335-228.

P. W. 1895 Sept.
No: 6752

From (12)

The Chief Engr.
for Irrigation

Dated 8 Oct 75
Recd. 21 Nov 1895.

C. 36. No: 1247.

Note on Statement of
the floating plant in
the Krishna Dist. and
on its requirements.

No 440

Oct 22-10-75

G. O. No 336-37. 28 10.75

No 3036

Proceedings of the Madras Government
under date the 28 Oct 75

Read the following:-

From

The Chief Engineer
for Irrigation

(H. R. No 1217 of 8 Oct 75)

* Requires 15,600 additional

M

The Honorable the
Governor in Council observes
that it is now impracticable
to provide the amount
required in the current
year on account of the
floating plant of the
Krishna Delta. Proper
provision
should have been made
in the current year's
Budget after estimates
for such of the plant
as it was intended to
repair had been sanctioned.

2. The estimates for
special

of special repairs to 5 dredges
 and 25 Iron Pumps amounting
 together to Rupees 37,435
 are sanctioned, and the
 following amount will
 be placed at the disposal
 of the District Engineer,
 the first two items being
 made available subject
 to the approval of the
 Government of India,
 to whom a copy of these
 Proceedings will be for-
 forwarded.

The provision for a boiler under Capital aiduary	4700
Part of the sum under do - at the disposal of Govt.	2700
Part of the sum under Repairs at disposal of Govt.	3030
<u>Total Rupees -</u>	<u>10,430</u>

3. The estimates for
 annual maintenance
 of the plant amounting to

to Rupees 6050 are
 approved, subject to the
 revision hereafter of the
 amounts for dredges
 and wooden boats, if
 found necessary

4. The District Engineer
 will revise part of
 his Budget estimates
 in accordance with
 these orders

Chief Engr. Durg. 5 with
 Contables with 34 Estimates
 of Kolna — 6

Durg - 16-11-75

My. 20/10

Docket No 3037 JES app.
 Copy of the above
 forwarded to the Govt.
 of India.

25 sc raised
 copy Durg -
 16-11-75

[Faint, mostly illegible handwritten text at the top left of the page.]

(12)

[Handwritten notes in the middle section, including the phrase "at the time of the..."]

[Small handwritten word, possibly "Appl".]

[Faint handwritten notes or markings in the lower middle section.]

[Handwritten date "1942" in the bottom right corner.]

K-440/41

Proceedings of the Madras Government, Public Works Department,
28th October 1875.

for the clock tower; but as the arrangement I have proposed affords access to the clock at all times without travelling over half the immense roof each time the clock has to be attended to, and makes the whole structure perfectly secure, I determined to adopt the course for which a revised design has been submitted.

No. 438-E. From the same Officer, dated Madura, 6th October 1875, No. 2,795.

With reference to your Memorandum, No. 568, under date the 25th ultimo, suggesting certain alterations in the spiral staircase proposed to be constructed to the north turret in Tiroomala Naick's Palace, Madura, I have the honor to submit the accompanying copy of a report from the Executive Engineer, Madura Range, No. 1,020, of the 5th instant, and to request that, under the circumstances therein mentioned, the Government will be pleased to sanction the revised estimate for the turret as submitted by me to Government as soon as possible.

From L. W. PAYNTER, Esq., Executive Engineer, Madura Range, to Lieutenant-Colonel J. F. FISCHER, R.E., District Engineer, Madura, dated Madura, 5th October 1875, No. 1,020.

In returning the accompanying memorandum from the Under Secretary to Government, bearing your office endorsement, No. 2,655, dated 2nd October 1875 (received yesterday), I have the honor to report that it is quite

possible to turn a segmental arch, supported on the side walls of the palace, capable of bearing the weight of the new brickwork of the turret, but I should not consider it advisable. The difference of cost between constructing the arch and of steps from the palace floor would be extremely small, while I think no one can question the far greater convenience of the steps from the floor to the steps only commencing from the palace roof. In the one case the turret will be easy of access, while in the other case a long walk over the whole length of the roof must be undertaken in order to visit the turret.

No. 439. ORDER THEREON, 28th October 1875, No. 3,035.

CIVIL WORKS, No. 30.

THE Government are of opinion that the Consulting Architect's arrangement should be adhered to as far as practicable, and that a new arch should be constructed to carry the clock tower in lieu of the one reported unsound. The necessary excess on the original estimate will be sanctioned when reported.

(True Extract.)

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

To the Consulting Architect.
" District Engineer, Madura.
" Controller of Public Works Accounts.

Exd. W. J. Lewis.
Spare Copies

No. 149

ARCHITECT'S OFFICE,
Chennai, 6th August 1875.

From

THE CONSULTING ARCHITECT TO GOVERNMENT,

To

THE Secretary to
Government Public Works Dept.

SIR,

Enclosures.

1 Letter
1 Estimate
1 Plan

At the request of the District Engineer,
Madura, I have the honor to forward a
Revised Estimate, Plan, and Comparative
Statement, for improving and restoring
the north Turret of Tiroomala Naick's Palace.

I have the honor to be

Sir

Your most Obedt Servt

W. J. Lewis
Captain R.E.
Offg. Cons. Archt. to Govt.

74
 No 1722 District Engineer's Office
 Madras 2 August 1875
 No 376
 Memo

The Offg. Comdg. Archt. Madras
 to Govt is requested to be good
 enough to submit the
 "comparative statement"
 referred to in his letter No
 149 of 6th Aug^r 75 which
 has not come to hand

108.
 J. H. H. Major
 Offg. Ch. Eng^r
 Madras
 11th Aug^r 75

9.
 The Offg. Comdg. Archt. to
 Govt
 The copy now applied for is the present
 on the original sanction.
 2 This has arisen from the
 circumstance of the arch (marked A)
 in the accompanying plan) not having
 been examined at the time the

1875
 23 Aug 75
 572-573
 1149
 5106

1875
 1149
 5106
 Govt

to the Secretary to
 Govt
 Ch. Secy No 376
 dated 6 August 1875
 Received

Estimate & Comparative
 Statement for the Clerk
 Lower Divisional Branch
 Palace

40. No 3035. 28.10.75
 438
 1302
 10-10-75
 10-10-75

6 AUG 75

No 1722 District Engineers Office
Madurai 3 August 1875

From
Lieut Colonel J Fischer M.E.
District Engineer, Madurai

To
Colonel G W Walker M.E.
Secretary to Government

Enclosures 2

- 1 Estimate of Rs 2670
- 1 Plan.

I have the honor to submit for the consideration and orders of the Government a revised estimate amounting to Rs 2670 in lieu of the estimate sanctioned by G.O. of the 22nd August 1874, No 2386, and amounting to Rupees 2340: the excess now applied for is 14 per cent on the original sanction.

2 This has arisen from the circumstance of the arch (marked A) in the accompanying plan) not having been examined at the time the

Statement for the Clerk

Lower Government Works

Palace

G.O. No 6035. 28.10.75

No 438

Recd 15th Aug 75

C. 10. 10. 35. 28. 10. 75.
No. 10. 10. 35. 28. 10. 75.

estimate was prepared: on going
through this with Mr. Carpenter, we
found it was of very rotten construction
like all those in the Palace, and
that it would be utterly unsafe
to build the heavy stair-case of the
proposed tower on it, and I then
directed the estimate to be revised
and the stair-case to be built
up from the floor of the Palace
resting on a proper bed of concrete.

3 The sum now applied is
only Rupees 330 and will form a
very small percentage of the total
outlay required for the Palace, under
these circumstances I have requested
Mr. Carpenter to go on with the work ^{*Collecting materials.}
and trust the Government will
be pleased to approve of these
proceedings, as funds are available
from the Rupees 10,000 provided in
this year's Budget for the Palace works.

9/1
I have the honor to be
Sir
Your Most Obedt Servant
W. T. Tucker Esq. M. E. S.
District Engineer,

Can 10-10-75
 Re 10-10-75 9-8-75

40. No 18035. 28-10-75

forwards for
 Section removed
 estimate for
 work done
 11.5.106/75
 90-28 Oct 75
 with 435

of
 the District Engineer
 Madras
 to
 the District Engineer
 Madras
 dated 3 Aug 75
 Received

6A
 Detailed Estimate No of 1875-76
 District Madras Taluk Madras
 Improving & Restoring the North Turret of the
 Primal Nark's Palace Madras.

Particulars of Work	Measurement in feet			
	Length	Breadth	Height	Contents
<u>Dismantling</u>				
Floor of the Turret	9'-6"	9'-6"	1'-0"	90 1/4
Cross or Support walls of Turret Floor	6	9'-6"	9'-5"	213 3/4
Roof below	9'-0"	10'-0"	1'-0"	90
Total cubic feet of dismantling old brick in chunam				394
Being equal to Cys				14 1/2
Excavating Foundation	9'-9"	9'-0"	7'-6"	658 3/8
Being equal to Cys				24 3/8
Filling in with river sand	9'-9"	9'-0"	6'-0"	43 7/8
Being equal to Cys				1 5/8
Filling in with dry concrete	9'-0"	9'-0"	3'-6"	283 1/2
Being equal to Cys				10 1/2
Filling in with wet concrete	8'-6"	8'-6"	3'-0"	216 3/4
Being equal to Cys				8
Brick in chunam over concrete	8'-0"	8'-0"	6'-0"	32
Being equal to Cys				1 1/2
<u>Superstructure Brick in chunam</u>				
inter wall of the spiral	area		59	138
inter wall of the spiral	area		22	59
3 steps for the spiral	89		2	178
Wall below Dome	38		11	418
Rectangular piece at bottom of Dome	1		22	2
Projections at sides of Dome	1		2	6

Top portion of the Dome	15 1/2
Semispherical portion of Dome	16 1/2
Rebuilding an old parapet near top of spiral	500' 8' 2' 5' 120
Pillars for square part	8' 7' 5' 21

Total cubic feet of Brick in ch. 2509

Deduct	
for the Doorway at bottom	2' 11' 5' 7 1/2
Do Windows	2' 1' 3' 2' 3 1/2
Do Space for clock	2' 1' 3' 17 1/2
Do portion in Dome	43 1/2

Total Deductions cft 72 1/2

Remaining cft of Brick in ch 2437

Being equal to cft 90 1/3

Plastering Old wall

Center wall of spiral inside	3 1/4	59	185 1/2
Do outside	6 1/4	59	371
Outer wall of the ring inside	14'	59	1121
Do outside	25'	59	1475

Steps 11 1/2 2' 11' 6" 35 1/2

Under Steps 15 2' 11' 21 1/2

Codungay or Cornice of lower portion 85 2' 6" 220

Pillars for square part 8 2' 3' 126

Do center 64 1' 6" 96

Do base 66 3' 1' 231

Do inside lower portion 38 9' 1' 323

Old Parapet 2 1' 6" 120

Dome inside 51

Do Outside 165

Total Plastering cft 5054 1/2

Being equal to sqrs 50 1/2

Plaster Cornice below Dome 33' 2' 76

Shower Center portion 60' 1' 6" 90

Do parapet 52' 2' 104

Do pillasters 8 2' 1' 6" 24

Shower opening	8' 8' 0" 1 3/4"	48
Sides of Dome	4' 4' 6" 2' 0"	36
Total Ornamental Cornice		378

Plain Cornice to have 38' 0" 1' 0" 88

Do at bottom of Codungay 34' 0" 1' 0" 84

Do center portion 45' 0" 1' 0" 145

Do below parapet 44' 0" 1' 0" 144

Total sqft of Plain Cornice 261

Wood work

Frames for largest opening in tower portion 4x2 22' 0" 3' 2" 7 1/3

Do small 2x8 17' 0" 3' 2" 11 1/3

Do larger to center portion 2x4 18' 0" 3' 2" 6

Large to upper portion 2x4 11' 0" 3' 2" 3 1/2

Small 2x8 8' 0" 3' 2" 5 2/3

Small to center portion 2x8 14' 0" 3' 2" 9 2/3

Do for windows at bottom of Dome 4 11' 0" 4" 5' 6 1/3

Cornice piece first floor 3 5' 0" 6" 1' 2 3/4

Do 2nd 2 5' 0" 6" 4 1/2 1 1/8

Do 2 5' 0" 3" 3' 5 1/8

Do 3rd 4 3' 0" 4" 3' 1

Do 4 12' 0" 4" 3' 4 1/6

Do 4 3' 0" 4" 3' 1

Support for 4 9' 0" 4" 3' 3

Similar for the cornice to the 4" 4 5' 0" 3" 3' 1 1/8

Do 3 1/2 4' 7' 0" 4" 3' 2 1/2

Do 2 1/2 4' 11' 0" 2" 3' 1 1/2

Do joists 16 1' 6" 3" 4" 2

Do pieces 8 2' 0" 3" 2" 5 1/6

Do 8 3' 0" 4" 2" 1 1/9

Do for the cornice to the first floor 4 13' 0" 4" 3' 4 1/2

Do joists 15 1' 6" 3" 4" 1 1/2

Do 8 3' 0" 4" 3" 2

Do a piece in the wall 2 2' 0" 3" 3" 3 1/2

Total cft of Oak wood 92

Planking to fix ventilator large at lower portion	30 2' 0" 3' 0"	346 1/2
Do small	50 2' 0" 3' 0"	660
Do outer large	36 2' 0" 2' 0"	180
Do small	15 2' 0" 2' 0"	256
Do large upper story	24 1' 0" 1' 0"	54
Do small	40 1' 0" 1' 0"	90

Total sq ft of Planking 1556 1/2

Doors and windows		
Do Outer portion	2 3' 0" 3' 0"	21
Windows	2 3' 0" 3' 0"	14

Total for Doors & windows 35

Lightning Conductor	1	1
Pillars in corner	3	3

Painting

Frames for large openings in lower portion	2 2' 0" 1' 0"	132
Do small	2 1' 0" 1' 0"	204
Do large to centre	2 1' 0" 1' 0"	108
Do small	2 1' 0" 1' 0"	174
Do large upper portion	2 1' 0" 1' 0"	69
Do small	2 1' 0" 1' 0"	112
Do for windows at bottom of dome	2 1' 0" 1' 0"	33

Planking to fix ventilation large at lower portion	30 2' 0" 3' 0"	66
Do small	50 2' 0" 3' 0"	128 1/2
Do large outer	36 2' 0" 2' 0"	36
Do small	15 2' 0" 2' 0"	53 1/4
Do large portion	24 1' 0" 1' 0"	12
Do small	40 1' 0" 1' 0"	20
Doors	2 3' 0" 3' 0"	142
Windows	4 2' 0" 3' 0"	28

Total sq ft 1207 2/3
Being 3 sqs

Abstract Estimate No of 1875/76
Madurai District - Taluk - Madurai
Work - Improving & Restoring North Porch of the Primal
Naik's Palace Madurai

Quantity	Description of Work	Rate	Amount	Total
14 1/2	Cyds of Dismantling	50	7 1/2	
24 3/4	" of Excavating foundations	10	2 1/4	
1 1/2	" filling in with river sand	5	8 1/2	
10 1/2	Do dry concrete	1 1/2	13 1/2	
5	Do concrete in chunam	2 3/4	20	
10 1/2	" brick in chunam in found	1 3/4	5 5/4	
127	Do Superstructure	1 1/4	364 9/4	
9 1/2	" of Plastering with chunam	3 8	176 12	
50 1/2	3 coats	3 8	176 12	
378	Ornamental Cornices	5	189	
261	Plain Cornices	4	65 1/4	
82	sq ft of Teak wood wrought & put up	3	246	
1556 1/2	sq ft of Planking	6	594 15	
35	" Doors & windows	1 8	52 8	
12	sqrs of Painting wood oil	3 3	12	
1	Lightning Conductor	300	300	
3	Pillars including Capital	5	15	
	Summary repairs		150	
	Contingencies		47 7 1/2	
	Superintendence		101	

Grand Total of Estimate Rupees 2,670

W. T. ... District Engineer of Madurai
L. S. ... Executive Engineer
Madurai Range

10.10.75
10.10.75

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10.10.75

No 1795
From,

District Engineer's office
Madras 6 October 1975

Lieut. Col. J. H. Fischer Esq.
District Engineer of
Madras

To,
Major General G. M. Walker Esq.
Secretary to Government
P. W. D.

Sir, Madras.

With reference to your Memo-
randum No. 588 under date the 25th
Ultimo suggesting certain alterations in the
Spiral Stair-case proposed to be constructed
to the North Tower in Tirumala Naidu's
Palace Madras, I have the honor to sub-
mit the accompanying copy of a report
from the Executive Engineer Madras Range
No 1020 of the 5th District and to request
that under the circumstances therein
mentioned the Government will be
pleased to sanction the Revised esti-
mate for the Tower as sub-
mitted by me to Government

Encls: 2.
1. Plan of the
Tower.
1. copy of a letter
from the Executive
Engineer to
the S.D. No 1020
of 5th District.

as soon as possible.

I have the honor to be
Sir
Your most obedient
Wth servant
Wm. M. W.
District Engineer, Indiana

Madura Range office.

Madura, 5th October 195.

Mr A
at
Hesperia
the 20
A-1
He has
every
has a
-stands
y/his

Enclars. No. 2 ret'd. to D. Engo:
with Memo.

P. W. 1895 Sept.
No: 6410
From
The District Engineer
Madura
To
The Secretary
to Government P. Ws.

Maguire
1st Range.

ingineiro
Raduza.

N^o 2795

Date L 6th } (October 1895) to accompany
 Recd 9' } Barn to Crook

Encls: 2

1 No: 2655

Forwards copy of a letter from the Executive Engineer, Madras Range, and requests for the sanction the Revised Estimate as submitted by him for the ~~work~~ ^{work} ~~at~~ ^{at} Surret in Tirumala Naick's Palace, Madras.

G.O. no 3035-28-10-75 I should

is it advisable. The difference
in constructing the arch,
from the Palace floor, would
be small, while I think no
question the far greater conse-

M-438

Cin 221-10-75
 Temp 100 at 9-10-75.

as soon as possible.

I have to

on

Madura No.
568
25-9-75

24 Dtr. Engr. Madura
with plan of arch

Madura Range office

No: 1020.

Madura 5th October 1875.

From.

The Executive Engineer

Madura Range.

To.

The District Engineer

Madura.

Sir,

In returning the accompany

Enclo: 2.

memo

Plan

ring memo from the Under Secretary to Govt
bearing your office endorsement No: 2655
dated 2nd October 1875 (received yesterday)
I have the honor to report that it is quite
possible to turn a segmental arch, sup-
ported on the side walls of the Palace,
capable of bearing the weight of the new
brickwork of the tower, but I should
not consider it advisable. The difference
of cost between constructing the arch,
and of steps from the Palace floor, would
be extremely small, while I think no
one can question the far greater conse-

[Faint handwritten notes at the bottom of the page]

(Signed). L. W. Poynter Ex: Surgt.

(True copy)

Charles L. Smith
District Engineer,

No. 160

ARCHITECT'S OFFICE,

Chennai
Royapettah, 13th August 1876.

From

Offc
THE CONSULTING ARCHITECT TO GOVERNMENT,

W. L.

Memo:

*but, I
must that
as to
comparative
chick to,
a paper
it is believed
you with
my letter
stant.*

our to be

your agent the client document

J. P. P. P.
Capt. R. E.

Offc. Consulting Architect

Ind

*Enclosure in a letter
from the District Engineer
Madras to the
Secretary to Government
D. P. D. N. 22995, dated
6th October 1875.*

M. S. 410/95.

No. 160

ARCHITECT'S OFFICE,
Chennai
Royapettah, 13th August 1876.

From *Offr*
THE CONSULTING ARCHITECT TO GOVERNMENT,

To
THE *Offr* Secretary to Government
C. N. H.

SIR,

Adverting to your Memo:
N^o 376 of the 11th Instant, I
have the honor to request that
you will be so good as to
ascertain whether the "Comparative
Statement" is not attached to,
or written in the same paper
as the Estimate; as it is believed
it was forwarded to you with
the other enclosures of my letter
of the 6th Instant.

I have the honor to be
Yours most obedient servant

P. R. E.
Capt. R. E.

Offr. Consulting Architect

Encl

N^o 271
Memorandum.

The undersigned has
the honor to inform the
Offr. Consr. Archt with
reference to his letter No
152 of 13th Aug^r 75 that
his Comparative Statement
is attached to it written in
the same paper as the
Estimate.

Adl. Secy. Major R.
Under Secy to Govt.
P. R. E.

Memorandum
27th Aug^r 75

Offr. Consr. Archt to
Govt.

211

Royapettah, 11 Sept 1875.

THE CONSULTING ARCHITECT TO GOVERNMENT,

THE Secretary to
Government P. H. D.

Referring to your Memos No. 367 & 417²
dated 11th and 20th August 1875 respectively
I have the honor to forward the Comparative
Statement therein asked for.

Your most Obedt. servant.

W. H. Thompson Capt. R. C.
Offg. Cong. Archt. to Govt.

Dr. Wm. 1895
No. 1608
No. 5288
y
m

Mr. Wm. Russell Smith
to Son:

to the left: denting
bottom: D. W. A.
Ch. B. A. M. 1847

with reference to the
comparative statement
for the business
block down. Estimate.

13th August 1875 }
Received 18th August }

Ms 438.05

Q. 103035-28. 10-75

62-210-75
Adams

Madura

Madura

Mr

Comparative
Showing the
between
to Revised
for improve
the North
Linn
at Ma

Comparative Sta
Improving & Re

Particulars of Work

- Cyds of Bricklin chun
- Do in four
- Sqrs of Plastering in chun and
- sft of Ornamental Co
- Plain Cornice to
- sft of Teak wood
- sft of Planking
- of Doors & windows
- Sqrs of Painting with wood
- Pillars in corner with caps
- Lightening conductor
- Wooden ladder
- Cyds of Dismantling
- of excavating found
- Filling in pined bam

C. W. 1875 Sept

From
No. 5893

The Office of the
to Government

of

The Secretary to
Government

3-1 V

dated 11 September 1875
Received 13

Advocate's Certificate

the lowest for Madras

Black Paper

No. 438C

P.O. No 3035 28 10 75

2024-10-25
Revised 15-9-75

1873/75.
District
Calcutta
Statement
of difference
to Original
Estimate
and Repair
Cost of the
Fairs Palace
Dur.

District Engineer's Office
No. 2662. Silkharpully 2 October 1895.
Sonoma.

Genl. Coll: J. F. Fischer R.E.
District Engineer Madras
to Major General G. M. Walker R.E.
Secretary to Govt. P. M.D.

Sir,

In reply to your memo of
the 25th September 1895, No: 518 I have the
honour to inform you that I do not consider
it would be more advisable to construct
a brick arch as therein proposed and I had
thought of this when revising the estimate
for the clock-tower, but as the arrangement
I have proposed affords access to the clock
at all times without travelling over half
the roof each time the clock has to be
attended to and makes the whole structure
perfectly secure I determined to adopt
the course for which a revised design

has been submitted.

I have the honor to be

Sir,

Your most obedt. servt.

Wm. L. Smith Esq.

District Attorney, Montreal

has been submitted.

Shaved the honor to be

Sir,

P. M. 1895 Sept.
From No: 6255

The District Engineer

Madras

To The Secretary to Govt.

P.W.D.

Madras.

Dated 2 October 1895 }
Recd: 6 ~ ~ ~ }

No 2662

Encls: none.

Informing that
for the reasons assigned
it will not be advisable
to construct brick work
for the class of work.

G.O. No 3035: 28-10-95

N-438D

28-10-95
Recd 6 Oct 6-10-95

State of Derivations

On rates in Comparative Statement concerning
repairs to the North tower of Trimbak Palace.

Madras

The following rates
differ from the rates
in the District Schedule
for the current year -

Brick in Churnam. In excep
Painting with wood oil
also in excep -

Teakwood

Doors & windows

Excavating foundations.

The above three
items are less than
the rates in District
Schedule -

C.M.P.
15
19
75

Comparative Statement showing differences of Rates between the Revised Estimate, submitted by the District Engineer and the District Schedule - for Improving & Repairing the North Tunnel of the Trimmul Nairs Palace at Madras -

Description of Work.	Rates as per Revised Estimate submitted by the District Engineer.		Difference.	Remarks.
	Revised Estimate	District Schedule		
Brick in Chumam ——— Crd.	64.	54.	10.	
do in Foundation ——— do.	48.	38.	10.	
Plastering with Chumam ——— Sqr.	38.	28.	10.	
Ornamental Cornice ——— Sqr.	8.	—	8.	
Plain Cornice to base ——— do.	4.	—	4.	
Teakwood ——— Cft.	3.	—	3.	
Plau King ——— Sqr.	6.	—	6.	
Doors & Windows ——— do.	18.	10.	8.	
Painting with Wood Oil ——— Sqr.	38.	26.	12.	
Pillars in Corner with Capital ——— Sqr.	5.	—	5.	
Dis mantling Roof ——— Crd.	8.	—	8.	
Excavating Foundation ——— do.	16.	—	16.	
Filling in River Sand ——— do.	5.	—	5.	
Dry Concrete ——— do.	14.	—	14.	
Concrete in Chumam ——— do.	28.	—	28.	

Govt. Ltho. Department
 Fort St. George.
 Madras. 15th Sept^r 1875.

[Signature]

No 3035 Public Works Dept.
431

Proceedings of the Madras Government
Under date the 28th Oct. 1875
Read the following

From

The Offg. Consgr. Archt. } (Off. No 149 of 6th Aug 75)
to Government

do do (a-a 160 - 13th - " - ")

do do (a-a 201 - 11th Sept - ")

" Dist. Engr. Madura (a-a 2662 - 2nd Oct - ")

" do do (a-a 2795 - 6th - " - ")

The Government
are of opinion that the
Consulting Architects
arrangement should
be adhered to as far
as practicable, and
that a new arch-
should be constructed

to carry the clock
Tower in lieu of the
one reported unsound.
The necessary extra
on the original estimate
will be sanctioned
when reported.

Adm. S.

PUBLIC WORKS.

Cong: Archt.

11/11/75

11/11/75

11/11/75

28/10/75 235

Nos. 438-439

*Arch. Smt. at Vicarage
Church, Palace, Madras*

*Contracted to carry the
in lieu of the one reported
unsound.*

*Cong: Architect
Adm. Smt.
Controller of Public Works*

11/11/75

11/11/75
Adm. S.

Sept. 10-11-75

*Proceedings of the Madras Government, Public Works Department,
28th October 1875.*

No. 441. Read the following letter from W. C. FURNIVALL, Esq., Under Secretary to the Government of India, Public Works Department, (Railway,) to Major-General G. W. WALKER, R.E., Secretary to the Government of Madras, Public Works Department, (Railway,) dated Simla, 2nd October 1875, No. 2,462 R.:—
I AM directed to forward, for information, copies of a memorandum by the Consulting Engineer to the Government of India for State Railways, on iron and steel.

STATE RAILWAYS.

Memorandum by the Consulting Engineer to the Government of India for State Railways on Iron and Steel.

THE Board of Trade rule fixing the working stress on wrought-iron at 5 tons per square inch, was adopted after very careful investigation by a Royal Commission.

It is a very good rule, the only objection that can be taken to it is that it makes no allowance for the character of the iron used, and there has been nothing in the manufacture of iron since the time when that rule was adopted to render its alteration necessary; the common rule usually adopted by English Engineers of 5 tons in tension and 4 tons in compression is simply a modification of the Board of Trade rule.

But since the adoption of that rule, a new phase has arisen owing to the application of steel to engineering and structural purposes, and steel is not recognized or provided for by the rules of the Board of Trade.

The term "steel" is very vague, and may mean almost anything, as there is no defined line of demarcation between steel and iron.

The strength and properties of wrought-iron manufactured in different districts, such as Lancashire, Longmoor, Staffordshire, &c., are now well understood, and the strength of iron in the same class does not vary very much.

Steel, however, unless obtained from certain well-known makers, may vary very much in strength.

Tests during construction are not always satisfactory as has been shown in the case of the Thelam girders, and there is a want of confidence in the reliability of steel which has prevented its use except in some special cases. There are other reasons to which I shall advert presently.

Speaking generally, steel as produced by the best makers has a tensile strength about double that of wrought-iron. Its ultimate tensile strength in tons per square inch varying from 30 to 50 tons, whilst that of wrought-iron varies from 18 to 25.

The limit of its elasticity is greater than that of iron, whilst its modulus of elasticity is nearly the same. The same steel girders require a greater depth than iron if the stress on both bears the same proportion to the ultimate strength.

Barlow gives as the safe working stress on iron and steel in tons per square inch the following:—

	Tension.	Compression.	Shearing.
Cast-iron	1½	9	3
Wrought-iron	5	3½	4
Steel	9	9	5

Kirkaldy's experiments give as the ultimate tensile strength of wrought-iron and steel the following:—

	Tons per square inch.
Wrought-iron	20 to 25
Cast-steel bars	59
Bessemer tool steels	49
Cast steel for rivets	47
Krupp's steel for bolts	41
Mercy puddle steel-bars	37
Cast-steel plates	33 to 42
Puddled steel-plates	32 to 41

Proceedings of the Madras Government, Public Works Department,
28th October 1875.

American experiments give the following ultimate strain for steel and iron in tons per square inch:—

	Compressed.	Tension.
Cast-iron	25 to 30	7
Wrought-iron	15 to 17	25
Cast-steel for tools	130	...
Shear and blister steel	67	41
Bessemer tool steel	...	30
" steel-plate	...	25
" steel rolled and hammered	...	44
Puddled steel rolled and hammered	...	...

Barlow gives as the ultimate strength of iron and steel in tons per square inch:—

	Tension.	Compressed.	Strain.
Cast-iron	7 1/2	48	14
Wrought-iron	23	17	20
Steel	45	70	30

There are some anomalies in the use of steel. Captain Eads in his experiments on steel for the Mississippi bridge found that forged steel-bolts of 5 1/2 inches diameter broke with very much lower relative strain than 2 bolts cut out from the larger bolts.

Experiments have also shown that by heating steel to a "cherry" red, and plunging it into oil of about 800 Fahr., there is an increase in strength of from 10 to 30 per cent.

The strength of steel varies with the amount of carbon, which should not be less than 0.5 per cent, or more than 1.2 per cent, in steel intended for girder work. In steel-rails the amount of carbon should be between 0.3 and 0.5 per cent. The relative strength of steel with different proportions of carbon is as follows:—

	Ultimate tensile strength per square inch.
0.3 per cent.	30 tons.
0.4 "	33 "
0.5 "	40 "
0.6 "	43 "
0.7 "	45 "
0.8 "	53 "
1.0 "	60 "
1.2 "	66 "

The steel with too much carbon is not calculated to resist sudden strains. A Committee in England, consisting of Messrs. Barlow, Fowler, and Stirling, and Captain Galton, experimented on steel, and found that—

- 1st.—The tensile strength of steel varied from 25 to 45 tons per square inch.
- 2nd.—That the relation subsisting between the resistance of tension, compression and transverse strain is practically the same as in wrought-iron.
- 3rd.—That the limit of elasticity is (as in iron) rather more than half its ultimate resistance.
- 4th.—That the modulus of elasticity of steel may be taken at 30,000,000.
- 5th.—That the rules which apply to the rivetting of iron apply equally to that of steel.

The results of Kirkaldy's experiments seem to be at variance with the conclusions 2 and 5.

Mr. Kirkaldy finds that steel rivets fully larger than those used in rivetting iron have been found too small for rivetting steel plates, and that the shearing strain of steel rivets is found to be one-fourth less than their tensile strain.

With the light loads on our metre gauge bridges it is difficult to adopt the most economical depth owing to the want of rigidity of the small section of the top boom, and this difficulty would

be increased by the use of steel as the depth of steel girders should on the grounds of elasticity be greater than that of iron girders.

If Mr. Kirkaldy's conclusions be correct with respect to rivetting, and they appear to be borne out by the results of experiments, the apparent economy in iron bridges from the use of steel will be lessened by the increase of material consequent on the diminution of strength caused by large rivets.

With steel girders it will therefore be probably necessary to use pinned, and not rivetted, joints in tension in order to economize in weight.

If steel can be used under the most advantageous circumstances of load, it will probably reduce the weight of main girders of large span very considerably, but hitherto I have not seen any way to its introduction on the State Railways, except in the chains and stiffening girders of the Indus bridge, where the long span renders it necessary to economize in weight.

The great obstacle to the use of steel in bridges has been the difficulty of obtaining a material that can be trusted.

Many of the steel rails we have had from England have broken in the road under ordinary traffic in a very dangerous manner.

The life of steel rails has been variously estimated; on the London and North-Western Railway at Camden Town a steel rail wore out 16 sets of iron rails, and was not worn out itself.

In Philadelphia some steel rails wore out 17 sets of iron rails and were still in good condition; 4, 8 and 10 times the life of iron rails has been assigned to steel rails by different authorities, and there is no doubt that if the wear be heavy and brake power be used much, whether in shunting or on inclines, the adoption of steel rails is very desirable, provided that a good material can be ensured. When however the life of iron rails is long, the climatic influences are severe and the loads light, the rails will probably be destroyed by other influences than those of direct wear, and this is somewhat the case with our metre gauge. State Railways, on which the gradients are, as a rule, good, the traffic small, the wheel loads light, and the necessity for using brake power infrequent. On the Holkar line, where the gradients are severe, I recommended the use of steel rails, and I also recommended a trial of steel rails on some other portions with a view of gaining experience on the subject.

Under impact the strength of steel rails, if made by good manufacturers, is very marked when compared with that of iron rails, but the weight of steel rails consequent on their superior strength cannot be reduced more than from 12 to 20 per cent.

With iron rails it is found that a weight of 800 lbs. falling 15 feet on the centre of a 2-foot bearing of 75 or 80 lbs. will break them.

In Germany (test of an iron rail under impact is about 1,000 lbs., falling 10 1/2 feet.

In America 1,500 lbs., falling 10 1/2 feet.

For steel the test in Austria is 2,000 lbs. falling 13 1/2 feet.

In England 2,240 lbs. falling 15 to 17 feet.

In America 2,000 lbs. falling 20 feet. There has however of late been a tendency to reduce the amount of weight in this test.

In the experiments made for the Chemin de Fer du Nord in France, the limits of elasticity of iron and steel rails were in the proportion of 1 to 1 1/2.

The ultimate tensile strength of the rails in tons per square inch was—

18 to 22 for iron.
41 to 44 for steel.

I have alluded above to the condition of wear of rails on our metre gauge railways. On a portion of the Lancashire and Yorkshire Railway, where the line is level and the speed low, the life of iron rails was found to be 38,800,000 tons, but on the Lancashire and Yorkshire Railway the wheel loads of the engines are very heavy, and heavy wheel loads are a great source of

*Proceedings of the Madras Government, Public Works Department,
23rd October 1875.*

destruction of rails. It is probable therefore that, as far as simple wear is concerned, provided that the iron in both cases is equally good, the life of rails on the Indian State Railways should be longer than that of the rails of the Lancashire and Yorkshire Railway in point of tonnage. If we assume the traffic on a State Railway as twelve trains of 300 tons per day (and this will probably be above the average on our State Railways), the life of rails at the Lancashire and Yorkshire Railway rate) would be about 30 years. It is not probable that steel rails with climatic influences could last anything like the time that could be proportional to its life if wear alone were taken into account.

In the improbable event of steel lasting 150, 200 or 1,000 years, the following would be the result in a financial point of view:—

Let x = the cost at which the adoption of steel rails will be justified.

y = cost of iron rails.

L = life of steel rails in years.

l = life of iron rails in years.

i = rate of interest per annum in decimals of 100 = i.e., 4 per cent. = .04, 5 per cent. = .05, &c.

$$\text{Then } x = y \frac{(1 + i)^L - 1}{(1 + i) - (1 + i)^L}$$

Assuming the cost of iron rails laid on any Railway in India at £1,000 per mile, and the life of iron rails at 30 years, of steel rails at 150 years, and money at 4 per cent., the cost of steel rails should not exceed £1,400 per mile. Again, supposing the life of iron rails to be 40 years and that of steel 200 years, the cost of steel should not exceed £1,260 per mile against £1,000 for iron. Again, supposing the life of iron to be 40 years and steel 1,000 years, the cost of steel rails should not exceed £1,263 per mile as against £1,000 for iron. The comparative cost of steel and iron rails for the metre gauge, taking steel at £12 per ton and iron at £8, would be as follows:—

	Iron.	Steel.
	£	£
First cost in England	8	10.5
Freight and landing	2.2	1.92
Transport 500 miles railway	2.5	2.18
Total	12.7	14.6

or a saving of 15 to 115

There is so much uncertainty in the results that I do not think we are justified in the expenditure of much money on steel rails at all events until we are assured that we can obtain material that can be relied upon. On heavy inclines or other places where the wear of iron rails would be great, the case is different. Our first experience of steel rails in India has not been satisfactory, though it is possible that the rails which have been used may be faulty specimens which do not represent the majority of the rails. A chemical as well as a mechanical test for steel is much needed.

The strength of steel is seriously affected by a small variation in the percentage of carbon, and the presence of as small a proportion as 0.1 per cent. of phosphorus renders steel brittle and untrustworthy.

With regard to the use of steel in bridges, except in special cases, the time has not arrived for its general adoption.

GUILFORD L. MOLESWORTH.

The 30th July 1875.

*Proceedings of the Madras Government, Public Works Department,
23rd October 1875.*

No. 445.

ORDER THEREON, 23rd October 1875, No. 3,038.

RAILWAY, No. 40-A.

COMMUNICATED to the Consulting Engineer for Railways and to District Engineers for information.

(True Extract.)

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

To the Consulting Engineer for Railways.
„ Superintending and District Engineers.
„ Executive Engineer, Wynnad.
„ Chief Engineer for Irrigation.

Encl. S. T. Austin.
Spare Copies

No. 2462 R.

All communications
should be addressed to
the Secretary.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

Railway.

The Secretary to the Govt. of Madras,
Public Works Department (Railway).

Santa, 10th October 1875.

Sir,

I am directed to forward for information,
copies of a memorandum by the Consulting
Engineer to the Government of India for
State Railways, on iron and steel.

I have the honor to be,
Sir,

Your most obedient servant,

M. M. M.
Under Secretary.

Sm

Recd - 10 - 11 - 1