

*(1) Recd at Koly
14 Sept 81
No 159
N. 159*

ADMINISTRATION REPORT

OF THE

PUBLIC WORKS DEPARTMENT,

GENERAL AND BUILDINGS AND ROADS BRANCH,

IN THE

MADRAS PRESIDENCY,

FOR THE YEAR

1880-81.



MADRAS:
PRINTED BY E. KEYS, AT THE GOVERNMENT PRESS.

1881.

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செப்பனெயர் பெயர்
1993
செப்பனெயர் வதற்காக எடுத்த
கொள்ளப்பட்ட நாள்
1993
செப்பனெயர் முடிந்த நாள்
சாபார்க்கும் ஜார்யச்சி
மு.பா.எ. உதவியுடன்
கையொப்பம் கையொப்பம்

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ADMINISTRATION REPORT OF THE PUBLIC WORKS DEPARTMENT,
GENERAL AND BUILDINGS AND ROADS BRANCH.

STATEMENT showing Outlay compared with Grant under Departmental Heads—cont.

Heads of Service.	PROVINCIAL.						LOCAL.					
	General.			Navigation.			Incorporated.			Excluded.		
	Original Budget	As modified after the issue of the Budget	Expenditure compared with modifications.	Original Budget	As modified after the issue of the Budget	Expenditure compared with modifications.	Original Budget	As modified after the issue of the Budget	Expenditure compared with modifications.	Original Budget	As modified after the issue of the Budget	Expenditure compared with modifications.
Original Works ..	Rs. 7,07,599	Rs. 8,45,366	Rs. 44,100	Rs. 1,20,000	Rs. 1,19,976	Rs. 1,19,976	Rs. 1,18,550	Rs. 2,00,533	Rs. 99,463	Rs. 29,058	Rs. 28,136	Rs. 15,287
Repairs ..	67,103	1,38,158	7,731	64,550	1,26,750	1,26,750	1,77,910	2,11,445	1,43,525	3,450	13,512	10,490
Establishment ..	3,02,919	3,45,712	2,04,842	..	..	..	66,100	93,904	56,249	7,877	13,112	6,440
Tools and Plant ..	26,540	534	19,371	..	..	..	7,240	9,938	5,498	787	1,306	643
Profit and Loss ..	..	..	3,332	..	..	..	..	..	..	..	..	..
<i>Suspense Balances.</i>												
Stock ..	..	..	..	..	..	..	..	..	..	..	..	..
Stock purchases and sales ..	..	..	..	..	..	..	..	..	..	..	..	..
Miscellaneous Advances ..	22,839	16,839	29,282	..	..	..	..	..	..	..	..	..
London Invoices ..	..	..	..	..	..	..	..	..	..	..	..	..
London Stores ..	..	..	..	..	..	..	..	..	..	..	..	..
Grand Total ..	11,27,000	1,346,609	2,38,056	1,84,550	2,46,726	2,46,726	3,69,800	5,15,820	3,04,735	40,172	56,066	32,860
Less Expenditure in England ..	..	..	..	..	..	..	..	..	..	..	..	..
Net Excess ..	..	..	1,66,854	..	..	..	..	..	..	..	..	..
Net Saving ..	..	..	..	..	..	..	..	..	..	..	..	..

No. II.

STATEMENT showing Outlay under Funds, Departmental and Service Heads.

Fund.	Class, Departmental and Service Heads.	Outlay.	Total.
		RS.	RS.
Imperial.	Military—		
	Original works ..	1,39,576	
	Repairs ..	2,77,447	
	Establishment ..	99,255	
	Tools and Plant ..	9,925	
	Less Expenditure in England ..	..	
	Other Services—		5,26,203
	Civil Buildings—		
	Original works ..	1,19,010	
	Repairs ..	2,618	
Provincial.	Communications—		
	Original works ..	..	
	Repairs ..	..	
	Miscellaneous Public Improvements—		
	Original works ..	121	
	Repairs ..	695	
	Establishment ..	28,362	
	Tools and Plant ..	3,040	
	Less Expenditure in England ..	..	
	Madras Harbour Works—		1,53,846
Provincial.	Productive Public Works—		
	Works ..	6,68,622	
	Establishment ..	27,513	
	Tools and Plant ..	3,865	
	Other Public Works—		
	Works ..	7,15,542	
	Establishment ..	41,119	
	Tools and Plant ..	4,914	
	Suspense Balance—		
	Stock ..	— 4,365	
Provincial.	Stock purchases and sales ..	29,671	
	Miscellaneous advances ..	— 14,285	
	London invoices ..	— 54,363	
	Do. stores ..	— 37,646	
	General—		13,80,587
	Civil Buildings—		
	Original works ..	4,84,652	
	Repairs ..	88,905	
	Communications—		
	Original works ..	2,05,919	
	Repairs ..	33,184	
Provincial.	Miscellaneous Public Improvements—		
	Original works ..	1,10,695	
	Repairs ..	8,338	
	Establishment ..	5,50,554	
	Tools and Plant ..	— 18,837	
	Profit and Loss ..	3,332	
	Suspense Balance—		
	Stock ..	— 59,601	
	Stock purchases and sales ..	— 665	
	Miscellaneous advances ..	1,15,565	
	London invoices ..	— 1,349	
	Do. stores ..	— 7,229	
			15,13,463

Statement showing Outlay under Funds, Departmental Service Heads—cont.

Fund.	Class, Departmental and Service Heads.	Outlay.	Total.
		RS.	RS.
Local.	Incorporated—		
	Civil Buildings—		
	Original works	3,243	
	Repairs	454	
	Communications—		
	Original works	96,077	
	Repairs	1,37,252	
	Miscellaneous Public Improvements—		
	Original works	143	
	Repairs	5,819	
	Establishment	56,249	
	Tools and Plant	5,498	
			3,04,735
	Excluded—		
	Civil Buildings—		
	Original works	10,167	
	Repairs	3,665	
	Communications—		
	Original works		
	Repairs		
	Miscellaneous Public Improvements—		
	Original works	5,120	
	Repairs	6,825	
	Establishment	6,440	
	Tools and Plant	643	
			32,860

NOTE.—The head Provincial Navigation has been omitted as the Outlay on the Buckingham Canal is charged in the Irrigation Accounts.

No. III.

STATEMENT showing Outlay compared with Grant under Departmental and Service Heads.

Sub-heads.	IMPERIAL.									
	MILITARY.					OTHER SERVICES.				
	MADRAS HARBOUR.					Other Public Works.				
	Original Grant.	Modified Grant.	Outlay.	More.	Less.	Original Grant.	Modified Grant.	Outlay.	More.	Less.
	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.
Military	74,610	1,60,575	1,39,576	..	20,999	59,920	1,33,121	1,19,010	..	14,111
Civil Buildings	..	..	..	..	..	..	..	..	..	..
Communications	..	..	..	..	..	..	..	..	..	..
Miscellaneous Public Improvements	..	..	..	..	..	2,500	470	121	..	349
Total ..	74,610	1,60,575	1,39,576	..	20,999	62,420	1,33,591	1,19,131	..	14,460
Military	2,50,000	2,90,367	2,77,447	..	12,920	13,970	3,436	2,618	..	818
Civil Buildings	..	..	..	..	..	..	..	..	..	..
Communications	..	..	..	..	..	2,000	1,747	695	..	1,052
Miscellaneous Public Improvements	..	..	..	..	..	15,970	5,183	3,813	..	1,870
Total ..	2,50,000	2,90,367	2,77,447	..	12,920	19,968	34,071	28,362	..	5,709
Establishment	81,152	1,07,735	99,255	..	8,480	19,598	34,071	28,362	..	5,709
Tools and Plant	8,115	10,774	9,925	..	849	1,958	3,405	3,040	..	365
Profit and Loss	..	..	..	..	..	..	..	..	..	..
Add net increase of Suspense Balances.	..	..	..	..	..	..	..	..	..	..
Grand Total ..	4,13,877	5,69,451	5,26,203	..	43,348	99,946	1,76,250	1,58,846	..	22,404
Less expenditure in England	..	..	..	..	..	..	..	..	..	..
Net Total ..	4,13,877	5,69,451	5,26,203	..	43,348	99,946	1,76,250	1,58,846	..	22,404
Net Excess ..	..	..	..	..	..	..	..	..	..	..
Net Saving ..	..	..	..	..	..	..	..	..	..	..

ADMINISTRATION REPORT OF THE PUBLIC WORKS DEPARTMENT,

Sub-heads.	PROVINCIAL.						LOCAL.					
	GENERAL.			NAVIGATION.			INCORPORATED.			EXCLUDED.		
	Original Grant.	Modified Grant.	Outlay.	Original Grant.	Modified Grant.	Outlay.	Original Grant.	Modified Grant.	Outlay.	Original Grant.	Modified Grant.	Outlay.
Military	Rs. 5,51,399	Rs. 5,28,796	Rs. 4,84,662	Rs. 44,144	Rs. 44,144	Rs. 44,144	Rs. 44,144	Rs. 44,144	Rs. 44,144	Rs. 44,144	Rs. 44,144	Rs. 44,144
Civil Buildings	56,200	2,07,433	2,05,919	1,514	1,20,000	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976
Communications	1,00,000	1,09,137	1,10,695	1,558	1,20,000	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976
Miscellaneous Public Improvements.	7,07,399	8,45,366	8,01,266	1,558	1,20,000	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976
Total ..	31,050	94,318	88,905	5,413	1,20,000	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976	1,19,976
Military	34,053	35,455	33,184	2,381	64,550	1,26,750	1,26,750	1,26,750	1,26,750	1,26,750	1,26,750	1,26,750
Civil Buildings	2,000	8,375	8,338	37	37	37	37	37	37	37	37	37
Communications	67,103	1,38,158	1,30,427	7,731	64,550	1,26,750	1,26,750	1,26,750	1,26,750	1,26,750	1,26,750	1,26,750
Miscellaneous Public Improvements.	3,02,919	3,45,712	5,50,554	2,04,842	37	37	37	37	37	37	37	37
Total ..	26,540	534	18,837	19,371	3,332	3,332	3,332	3,332	3,332	3,332	3,332	3,332
Establishment	22,839	16,839	46,721	29,882	29,882	29,882	29,882	29,882	29,882	29,882	29,882	29,882
Tools and Plant	11,27,000	13,46,609	15,13,463	2,39,614	72,760	1,84,550	2,46,726	2,46,726	2,46,726	2,46,726	2,46,726	2,46,726
Profit and Loss	11,27,000	13,46,609	15,13,463	2,39,614	72,760	1,84,550	2,46,726	2,46,726	2,46,726	2,46,726	2,46,726	2,46,726
Add net increase of	..	..	..	..	..	..	..	..	..	..	..	..
Suspense Balances.	..	..	..	..	..	..	..	..	..	..	..	..
Grand Total..	11,27,000	13,46,609	15,13,463	2,39,614	72,760	1,84,550	2,46,726	2,46,726	2,46,726	2,46,726	2,46,726	2,46,726
Less expenditure in England	..	..	..	..	..	..	..	..	..	..	..	..
Net Total ..	11,27,000	13,46,609	15,13,463	2,39,614	72,760	1,84,550	2,46,726	2,46,726	2,46,726	2,46,726	2,46,726	2,46,726
Net Excess ..	..	..	..	..	..	..	..	..	..	..	..	..
Net Saving ..	..	..	..	..	..	..	..	..	..	..	..	..

STATEMENT showing Outlay on Works under each Fund distributed by Divisions with the total Outlay on Establishment against each Division.

Circle.	Divisions.	IMPERIAL.						PROVINCIAL.						LOCAL.				IRRIGATION.				Grand Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		MILITARY.			OTHER PUBLIC WORKS.			PRODUCTIVE PUBLIC WORKS.			OTHER PUBLIC WORKS.			INCORPORATED.			EXCLUDED.		Original Works.		Repairs.		Total.	Establishment.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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1st Circle	Cuddapah ..	4,107	23,435	300	17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	

* The head Provincial Navigation has been omitted, as the outlay on the Buckingham Canal has been charged in the Irrigation Accounts.
† Represent Rs. 6,200 outlay by Civil Officers, and Rs. 87,078 from grants-in-aid for Minor Irrigation Works.

STATEMENT of Grant and Outlay appertaining to all works other than Budget Works.

Fund.	Departmental and Service Heads.	RESERVE.		INCOMPLETE WORKS.		NEW WORKS.		Total Outlay Columns 6 and 8.
		Budget.	Final.	No.	Outlay.	No.	Outlay.	
1	2	3	4	5	6	7	8	9
Imperial	Military Original Works ..	Rs. 41,000	Rs. 1,45,882	Rs. 15	Rs. 27,851	Rs. 123	Rs. 98,819	Rs. 1,26,670
	Do. Repairs ..	2,50,000	2,90,367	..	..	462	2,77,447	2,77,447
	Civil Buildings, Postal--	..	..	..	..	..	..	..
	Original Works ..	11,980	56,192	1	1,167	12	11,636	12,803
	Repairs ..	5,000	2,264	..	..	14	1,469	1,469
	Do. Telegraph--	..	..	..	..	..	..	..
	Original Works ..	5,000	39,396	1	63,788	3	14,821	78,609
	Repairs ..	5,000	72	..	..	2	55	55
	Do. Salt--	..	..	..	..	..	..	..
	Original Works ..	10,450	17,473	4	10,006	1	5,274	15,280
Provincial	Repairs ..	3,970	1,100	..	..	1	1,094	1,094
	Miscellaneous Public Improve-	..	..	..	..	..	..	..
	ments--	..	..	..	..	..	..	..
	Original Works ..	2,500	470	..	..	1	121	121
	Repairs ..	2,000	1,747	..	..	4	695	695
	Civil Buildings, Original Works ..	2,12,259	2,83,250	23	28,372	174	2,18,295	2,44,667
	Repairs ..	31,050	94,318	..	..	270	88,905	88,905
	Communication, Original Work ..	..	1,68,545	3	1,990	8	1,87,083	1,89,073
	Repairs ..	98,603	1,02,215	..	..	56	33,184	33,184
	Miscellaneous Public Improve-	..	..	..	..	..	..	..
	ments, Original Work ..	..	9,137	..	..	3	10,695	10,695
	Repairs ..	2,000	8,375	..	..	3	8,338	8,338

IMPERIAL—MILITARY—VIZAGAPATAM.—Temporary thatched lines for the 29th Regiment, N.I., were constructed at a cost of Rs. 7,177.

BELLARY.—A cook-house for the Royal Artillery was completed.

PRESIDENCY.—The following were the principal works in progress and completed within the year:—

Rs. 5,608 was spent on the work of converting the old Infantry Hospital at Bangalore into a Garrison Hospital. A road from Trinity Church to and around the Agram Barracks at Bangalore was completed.

The barracks occupied by the bandsmen of the Madras Volunteer Guards were repaired.

Washhouses for the Military Prison and the Provost Sergeants' quarters were completed.

Thirty-four minor new works at the Presidency and twenty-seven at Bangalore were carried out during the year.

The most extensive repair works carried out were the thorough reroofing of the Native Regimental Lines at Perambur, and the reroofing of the Cavalry stables at Bangalore.

The former work, for which Rs. 20,349 was specially allotted for the year by the Government of India, was completed on the 20th December 1880 at a total cost of Rs. 22,538 including expenditure of previous years. The reroofing of the Cavalry stables at Bangalore, which was commenced in the year 1877-78, was completed at a total cost of Rs. 26,814.

A number of lightning conductors on Military buildings at Madras and Bangalore were examined and put into good order, and those at Madras were tested by the Telegraph Department with satisfactory results.

Rs. 10,773 was spent on the maintenance of the roads in the Cantonment of Bangalore and in Fort St. George, and Rs. 6,000 was paid to the Madras Municipality for the maintenance of the esplanade roads and those along the sea face of the Fort.

CHINGLEPUT.—Three family quarters at Poonamallee, out of a sanctioned number of thirty, were completed and handed over to the Military authorities.

A sum of Rs. 15,064 was spent on the work of demolishing the east and west blocks and renewing the north and south blocks of the old European barracks at Poonamallee. The roof of the whole of the south block was renewed.

A portion of the additions and alterations to the new and old hospitals at the same station was completed.

NORTH-ARCOT.—The roof of the barracks of 25th Regiment, N.I., was improved by altering the tiled roof of the verandah into a Bengal terrace at a cost of Rs. 1,309.

SALEM.—The east and south sides of the sick horse stables at the Remount Depot, Hosur, were completed and handed over for use.

The work of altering forty horse stables at the Depot was completed at a cost of Rs. 2,499.

Colonel Drury's house at Mathigiri was purchased by Government for Rs. 20,000 for a residence and office for the Remount Agent.

TRICHINOPOLY.—The most important Military works undertaken was that of renewing the roofs of the lines of the 21st Regiment, N.I., at a cost of Rs. 3,950.

IMPERIAL OTHER SERVICES—GODAVARI.—A new Post Office at Tuni was completed, and the Bhadrachalam Post Office was repaired.

KISTNA.—The stone flooring to the Post Office at Bezvada was completed. Total expenditure Rs. 236.

PRESIDENCY.—An outlay of Rs. 63,788 was incurred on the new combined Post and Telegraph Offices. The Telegraph Office was brought up to the level of the first floor and a large quantity of materials were prepared for the further prosecution of the work. The site of the Post Office block having been encumbered with the old Commissariat Mule sheds the foundations could not be laid till a new set of lines was constructed on the strand. The cost (Rs. 14,644) of the latter was charged against the estimate for the Post and Telegraph Offices.

NORTH ARCOT.—Improvements and additions to the Post Office at Chittoor were completed.

WEST COAST.—A new Post Office at Kottagiri was in progress; another at Cherambadi was completed at a cost of Rs. 2,569.

TINNEVELLY.—A new Post Office at Tenkasi was completed.

PROVINCIAL PRODUCTIVE PUBLIC WORKS—MADRAS HARBOUR WORKS.—During the year 1880-81 the progress on the Madras Harbour Works was on the whole better than in any previous twelve months. At the north pier 2,215 concrete blocks were set in position, and the pier was brought to within 25 feet of its termination. The length built during the year was 1,100 feet, making the total length of the concrete blockwork from the shore end 3,845 feet. The progress was steady throughout the whole year, and in August and September together a length of 395 feet was constructed. The curved portion of the work (568 feet radius) was accurately and satisfactorily completed on 7th June 1880.

The rubble foundation was very nearly completed by the end of March 1881, the amount deposited during the year having been 94,638 tons. This was chiefly laterite deposited by the two steam hopper barges. The total amount which was deposited in the north pier base from the shore end was 485,775 tons, an amount slightly in excess of Mr. Parkes's original estimate.

At the south pier the progress was very satisfactory. 2,592 blocks were set, and the pier was advanced by a length of 1,489 lineal feet. The whole of the curved portion of the work was built in the current year between June 26th and November 10th.

In the rubble base of the south pier 176,401 tons of stone were deposited, and the foundation was kept fairly well in advance of the blockwork. The best months for work were August and September and during these 408 lineal feet of the pier were built. On March 31st, 1881, each pier terminated in water 8 fathoms below mean sea level, and the distance between the two terminations was 890 feet, or 340 feet more than the proposed ultimate width of the entrance to the harbour.

The total amount of stone quarried and sent to the works during the year was 354,706 tons, being in excess of the outturn in 1879-80. Of this quantity 172,720 tons was granite from Pallavaram. At the latter quarry the use of dynamite as a blasting agent was introduced with good results.

The total quantity of rubble base deposited in the two piers was 271,039 tons, and the total number of concrete blocks set was 4,807. The total number of blocks made was 4,863.

The shelter afforded by the two breakwaters by the end of the official year under review was very considerable, and nearly all large steam vessels visiting Madras anchored in the harbour. On two occasions the sailing transport "Ozarewitch" lay within the harbour, and frequently as many as twenty native sailing vessels were moored inside the north pier. The proper moorings had not arrived by March 31st, but were expected. They have since then come to hand and are being laid down.

All the sewage from the town of Madras which formerly flowed into the harbour area is now intercepted by a barrel drain two feet in diameter discharging to the north of the north pier. This drain was completed in September 1880, and difficulties had to be overcome in constructing the lower end, owing to the heavy influx of water which necessitated the constant use of steam pumps. The drain terminates in 30 feet of water with two feet diameter cast iron-pipe, the end of which is below mean sea level.

The Protective Works to the northward, constructed with the object of maintaining the coast line, have proved fairly successful hitherto, and the sea ceases to encroach where formerly it threatened to carry away much valuable property, though some erosion has again lately shown itself beyond the end of the revetment. 11,033 tons of stone were used in these Protective Works during the past year.

The Harbour Works' staff suffered severely from sickness, Mr. Beardmore (Assistant Superintendent) having been compelled to go to England for eight months on medical certificate. Mr. Lowe, the Chief Foreman, and Mr. Gunther, the Foreman Mechanic, were both incapacitated for work; Mr. Bhemaya Saenna, the Sub-Engineer, was also seriously ill for some months. In addition to these difficulties a serious accident occurred on November 21st during a somewhat heavy storm, whereby eleven persons connected with the works were washed off the south pier of the harbour and seven of them drowned. Amongst the latter were Messrs. Duffy and Patching, two highly deserving and energetic members of the European staff. The Government awarded a gratuity of six months' pay to the relatives of the deceased.

This storm of November 21st washed away a considerable portion of the railway lines from both piers, and also displaced the end block in the north pier by disturbing the rubble base at its foot. The disturbance was confined to the end row of blocks, and was undoubtedly caused by the local eddy of the water round the abrupt termination. The finished end wall, it is proposed, be so constructed as to render a repetition of such action, it may be hoped, impossible.

The expenditure during the year 1880-81 was Rs. 14,57,793, and the total expenditure from the commencement Rs. 51,93,096. There still appears to be a possibility of completing the work within the estimate.

Mr. W. Parkes, the Engineer-in-Chief, arrived in Madras on January 6th, and returned to England on March 14th.

PROVINCIAL CIVIL BUILDINGS—GODAVARI.—The Divisional Officer's quarters at Chettiput was in progress.

VIZAGAPATAM.—The alterations and additions to the Hill Jail at Párvatipur were in good progress. The office, two blocks of wards and the bathing cisterns were completed all but the plastering. A tiled-roof was put on the entrance guard-room. The superstructure of the hospital was completed and the walls plastered. The female ward was roofed, the cook-house and the walls of the solitary cells were built and the cut-stone drains were about half finished. The well was carried down to a depth of ten feet, and a quantity of wood was cut up for palisading.

CUDDAPAH.—The main buildings of Taluk Cutcheries at Madanapalle and Kadiri were completed and the outhouses were in progress. The reroofing of the Taluk Cutcherry at Anantapur was completed.

NELLORE.—A second-class Taluk Cutcherry at Venkatagiri, a first-class Taluk Cutcherry at Kanigiri, a Sub-Jail of four wards at Kandukúr, and additions and improvements to the Police Office at Nellore were completed.

ONGOLE.—The work of converting the old barracks into a dwelling-house for the Sub-Collector on an estimate of Rs. 7,365 was in progress.

KISTNA.—Alterations and improvements to the Taluk Cutcherry at Gudiváda were completed with the exception of asphaltting.

A double range office at Bezvada was completed.

MASULIPATAM.—The ex-nawab's house was purchased for Rs. 25,000 and the necessary alterations for converting it into a District Court House were commenced.

GUNTUR.—Improvements to the Jail were in progress.

PRESIDENCY.—The following works were completed:—

A new storeroom at the north-east corner of the Small Cause Court.

Barracks and school-room, &c., in the compound of the Police Commissioner's Office.

Contagious diseases ward, &c., at the General Hospital.

Coach-houses, stables, tiffin-rooms and compound wall to the Public Works Offices at Chepauk.

Boundary wall and gates to the Chepauk Park (terracotta work and lamps for the gate posts not finished).

A system of surface drainage in the Penitentiary.

An upper-storey to the Superintendent's house, Lunatic Asylum.

The new Lying-in-hospital was finished and occupied on the 20th March. The buildings which are constructed to accommodate 64 patients are planned on the pavilion system, each pavilion (double storeyed) communicating with the central block by raised and covered corridors with lifts and other special arrangements for the patients of the most elaborate and thoughtful designs. There are special wards for contagious diseases, residences for the Surgeon and Apothecary, quarters for nurses, a laundry and all necessary out-buildings. In one corner of the compound a building commenced by private individuals as a church was converted into an outdoor dispensary. This group of buildings, which is probably quite the finest of its kind in India, has been finished at an outlay of Rs. 1,61,863, and reflects the highest credit on Mr. R. F. Chisholm its designer and constructor.

Twenty-eight minor new works were also completed.

BANGALORE.—A portion of St. Patrick's Church was reconstructed.

NORTH ARCOT.—Alterations and improvements to the Taluk Cutcherry at Palmanér were in progress and nearly completed.

Improvements to the Taluk Cutcherry and an extension of the English record-room of the Collector's Cutcherry at Chittoor were completed.

SALEM.—Alterations and improvements to the Taluk Cutcherry at Krishnagiri were in progress and about three-fourths completed.

Two additional rooms to the same building for a Sub-Registrar's Office were completed.

The property known as Fischer's bungalow at Salem was purchased for Rs. 5,500 and an additional sum of Rs. 1,985 was paid to the Collector for carrying out the necessary alterations to adapt it for a Taluk Cutcherry.

COIMBATORE.—A Sub-Collector's Cutcherry at Erode was in good progress.

Additions and improvements to the District Munsif's Court at Collegal were completed with the exception of tiling and whitewashing.

WEST COAST.—The building of the upper floor on the south wing of Government House at Ootacamund was commenced in November. The design was slightly altered and improved at the request of the late Governor. The walls of the upper-storey, south wing, were built, and about half the roofing completed.

A Head Assistant Collector's Cutcherry at Cundapur and a District Munsif's Court at Udipi were in fair progress.

A Sub-Registrar's Office at Badagara was completed.

The building known as Colonel Lavies' bungalow at Malliapooram was adapted for a residence for the Special Assistant Collector.

SOUTH ARCOT.—A Sayer Cutcherry and toll gate at Valdavur, a fourth-class Police Station at Mettathur, and police huts for a Head Constable and three Constables at Pemalur were completed.

Repairs to the Government house at Munjakuppam, occupied by the Collector, which were commenced in the preceding year on an estimate of Rs. 5,750 were completed with the exception of providing rattan mats and paper for screen doors.

NEGAPATAM.—The following works were completed :—

Second-class Police huts at Meenbesil.

Protecting wall to the Sea Custom house at Nagore.

Reconstruction of the District Munsif's Court at Manargudi.

Additional accommodation to the Sub-Collector's Cutcherry at Negapatam.

The reroofing of St. Peter's church at Negapatam with corrugated iron was in progress.

TANJORE.—A Sub-Registrar's Office at Kumbakonam was in progress.

The Court-house at Tranquebar was repaired at a cost of Rs. 4,572.

The greater part of the more urgent repairs in twenty-five sets of apartments of the Tanjore Palace were carried out and some of these were handed over for occupation. The estimate for this work amounts to Rs. 32,848 and the expenditure during the year was Rs. 16,322.

MADURA AND TRICHINOPOLY. } Work in connection with the restoration of Tirumala Naick's Palace at Madura was carried out. For particulars see remarks under "Restoration and preservation of ancient buildings" page 17.

The Taluq Cutcherry at Periyakulam was completed.

TINNEVELLY.—Rs. 37,404 were spent on the new jail at Palamcottah. The compound wall and the quarters for the jail establishment were completed, and, with the exception of wards for male convicts, all the buildings within the jail compound were nearly completed.

PROVINCIAL COMMUNICATIONS—GODAVARI.—The navigation works at Dumagudiem were maintained to the extent of Rs. 6,846.

VIZAGAPATAM.—The expenditure on the new Pottinghi Ghât amounted to Rs. 35,823. The work was inspected in July by the Chief Engineer, who suggested a modification of the trace chiefly from the Sunki clearing upwards for about three miles.

Dynamite was used to facilitate rock removal, and Conductor Milne, who had already carried out experiments with this explosive on the Nilgiri Hills, was for a time specially deputed to the work. Labor did not come freely to the work until September, when about 700 coolies from the plains were employed and some 300 from the hill tracts. Funds were surrendered upon consideration of the progress made in the first-half of the year, but as the work in the second-half got on much more rapidly the money left was exhausted by January. The workmen were dispersed and could not be brought together again at once when further funds were available, and the result was an unspent balance of Rs. 2,200.

The canal from Chilka lake to Ganjam port was completed.

PROVINCIAL IRRIGATION AND NAVIGATION—BUCKINGHAM CANAL.—The net Provincial grant for this work for the year and the total outlay is shown below :—

	Grant. RS.	Expenditure. RS.
Original Works	1,20,776	1,17,627
Revenue, Maintenance and Repairs	1,26,750	1,22,930
Tools and Plant	8,737	8,207
Total	2,56,263	2,48,764

The work carried out in the different sections of the canal was as follows :—

Extension from the Palar to Merkanum.—The portion between the Palar and Madahar Cooppum (12 miles) was completed and opened for traffic. On the Pangoor Section 3½ furlongs were excavated to a depth of 4½ feet, 2 furlongs to a depth of 7½ feet, 3 furlongs to a depth of 12 feet, 6 furlongs to a depth of 15 feet, 5 furlongs to a depth of 10 feet, 3 furlongs to a depth of 3 feet, 6 furlongs to a depth of 8 feet, and 3 furlongs to a depth of 5 feet; 2 furlongs were completed, the remaining 4 miles and 2 furlongs run through the back water which required to be cleared for only 4 furlongs in length; the depth of excavation remaining to be done was 3 miles 7 furlongs in length and from 3 to 9 feet in depth, but only a short length of the latter.

Locks for the Adyar River.—Estimates amounting to Rs. 55,570 for a lock at the head of the Sadras canal on the right bank of the Adyar and another (a double lock) at the head of the Junction canal on the left bank of the same river were sanctioned. The expenditure during the year amounted to Rs. 7,500 and was incurred on the lock gates and roofing timber received from the Public Works Workshop.

Junction Canal from Adyar to the Cooum River.—The expenditure during the year was Rs. 8,967 and was incurred in the adjustment of land compensation.

Portion of Canal from Kistnapatam to the Pennér.—The expenditure on this section too, amounting to Rs. 656, was incurred in the adjustment of land compensation.

Portion of Canal from the Pennér to the Kistna frontier.—The expenditure during the year was Rs. 6,952, and was incurred in the adjustment of land compensation and of liabilities for work done but not paid for at the time.

The registry of tides was maintained throughout the year at several river and mid stations and proved a valuable record for basing all designs for canal improvements.

A first-class inspection bungalow at Ramapatam was in progress.

The construction of a bund across the north bank of the Pennér river, a work of much importance in training the stream (which is here deltaic) to one débouchure and thus securing the future improvement of the crossing, was nearly completed.

The survey of the canal was almost completed.

The traffic receipts, consisting of license fees and tolls collected during the year, amounted to Rs. 1,09,810, showing an increase of Rs. 62,119 over the receipts of the previous year. The tonnage of boats plying on the canal was registered at 10,278 tons.

The canal has been greatly injured by silt brought in both by the action of floods in the numerous streams crossed by the canal and by the direct action of surface drainage in eroding the banks.

Neither of these causes will be removed until the completion of the necessary masonry works for which provision is being made in the completion estimates.

These works and others such as training banks of rivers, alteration of direction of crossings, and flattening of side slopes of the canal, which are being carried out as funds permit, will do much towards mitigating the injury and interruption to traffic now caused by every cyclone or severe storm.

PROVINCIAL MISCELLANEOUS PUBLIC IMPROVEMENT—PRESIDENCY.—An outlay of Rs. 8,338 was incurred on the conservancy of the Cooum river, the opening and closing of the Cooum bar and closing the Adyar bar.

SPECIAL CIVIL BUILDINGS—VIZAGAPATAM.—A school-house at Ellamanchelly was completed.

BELLARY.—A range of solitary cells at the district jail was finished.

CUDDAPOH.—A zillah school at Kurnool was completed and a middle school-house at Madanapalle was in progress.

NELLORE.—An anglo-vernacular school at Ongole was completed.

PRESIDENCY.—Repairs to the marine yards and store godowns of the Master Attendant's Office were carried out on an estimate of Rs. 5,300.

CHINGLEPUT.—The basement of the agricultural school at Saidápet was finished, and the veterinary and contagious diseases wards were completed and handed over for use.

SALEM.—The school-house at Krishnagiri was completed.

An anglo-vernacular school at Tirupatūr was completed.

WEST COAST.—A school at Chowghat was finished, and the rebuilding of the outer wall of the District Jail at Mangalore was nearly completed.

SPECIAL COMMUNICATIONS.—GODAVARI.—The expenditure on the Cevūr Munjair junction canal amounted to Rs. 19,885. The earthwork was almost completed for four out of nine miles, and the first masonry work, an aqueduct, was commenced and nearly finished.

SPECIAL, MISCELLANEOUS PUBLIC IMPROVEMENT.—KISTNA.—A quay wall in the salt creek below the tidal lock at Masulipatam was in progress.

GODAVARI QUARRIES.—The quantity of stone despatched from the Godāvāri quarries during 1880-81 and the two previous years was as follows:—

Years.	Quantity in Cubic Yards.
1878-79	27,220
1879-80	20,904
1880-81	22,881

Including building, dressed, cyclopean, groyne and concrete stone.

BEZVADA WORKSHOPS.—The condition of these workshops improved during the year. A large quantity of expensive but useless stock was removed, and it is expected that work will be better and more economically executed in future. There was still a want of machinery and the buildings require remodelling.

DOWLAISHWERAM WORKSHOPS.—The total expenditure during the year was Rs. 79,304-0-10, of which Rs. 28,479-4-6 was for New Works, Rs. 36,766-10-7 for Repairs, Rs. 4,346-3-8 the value of work done for private parties, and 9,712-9-1 the amount spent on workshop stores and sundries. The charge for establishment was 9,730-9-8 or 13-9 per cent. on the value of work turned out, not including stores and purchases. The recoveries by bills amounted to Rs. 68,470-13-9.

PRESIDENCY PUBLIC WORKS STORES AND WORKSHOPS.—The opening balance of serviceable stock in store on the 1st April 1880 was valued at Rs. 4,00,315, and the receipts from all sources amounted to Rs. 40,589, making a total of Rs. 4,40,904. The remains on the 31st March 1881 amounted to Rs. 3,92,590 or Rs. 7,725 less than the opening balance. The closing balance did not include the value of repairable and unserviceable instruments received into store during the year. These are usually borne on the books numerically, and when repaired are brought on the stock accounts at their full value, while the unserviceable articles are sold. The receipts were obtained from the following sources:—

	RS.	A.	P.
From London	11,175	14	2
„ Civil Departments	6,340	10	3
„ Military Department	786	0	1
„ Public Works Divisions	7,599	1	6
„ Presidency Public Works Workshops	8,956	15	2
„ Railways	621	8	0
„ Local market	2,917	14	1
„ Bombay and Calcutta	2,190	13	11
Total ...	40,588	13	2

and the issues were as under—

	RS.	A.	P.
To Public Works Divisions	17,579	2	4
„ Presidency Public Works Workshops	13,031	6	1
„ Dowlaishweram do.	414	8	11
„ Civil Departments	1,445	8	2
„ Military Department	1,571	10	9
„ Native States	1,867	9	1
„ Railways	621	3	3
„ Local Fund Boards	9,894	9	8
„ Private parties	2,088	10	7
Total ...	48,314	5	7

A number of instruments were sent to England for repair and of these 15 theodolites, 12 levelling instruments, 8 mountain barometers, 4 aneroid barometers, and 4 large sextants were returned and brought on the books at full value. The mountain barometers however arrived in an unserviceable condition, although they had apparently been well and carefully packed. On the whole, however, the experiment of sending instruments to England for repair may be considered as successful.

The amount received from Government for the operations of the workshops was Rs. 1,38,996 in cash and Rs. 17,347 in stores, making a total of Rs. 1,56,343, against which credits were afforded by cash Rs. 50,920, and by book adjustments Rs. 1,45,026, or a total of 1,95,946. The advances made by Government were therefore more than repaid by Rs. 39,603.

PLANS AND PUBLICATIONS.—The following is a brief summary of the work turned out by the Government Lithographic Branch of the Chief Engineer's Office from April 1880 to March 1881:—

Different Departments.	Amount.			Remarks.
	RS.	A.	P.	
General Branch, Public Works Department ...	4,046	3	4	
Irrigation Branch, do. do. ...	1,162	11	1	
Examiner, Public Works Accounts	60	0	0	
Consulting Engineer for Railways	42	0	0	
Inspector-General of Jails	18	3	1	
Superintendent, Government Central Museum ...	357	8	0	
Examiner of Assistants	12	0	0	
Public Works Stores	39	0	0	
Government Consulting Architect	3	0	0	
Civil Engineering College	143	13	4	
Military Department... ..	410	10	8	
Through Gazette } Public do.	*4,322	15	6	Rs. 3,740-1-0 charge of seven Pagodas plans is included in this * amount.
Press. } Revenue do.	518	8	9	
Board of Revenue	15	0	0	
Sanitary Commissioner	520	12	4	
Principal Medical Storekeeper	24	6	0	
Private sources	+285	8	11	† This amount received in cash has been paid to the Superintendent of Works, Presidency.
Grand Total, value of work turned out ...	11,982	5	0	
Deduct working expense ...	11,100	0	0	
Balance in favor of Lithographic Department ...	882	5	0	

RESTORATION AND PRESERVATION OF ANCIENT BUILDINGS.—The work commenced in 1870-71, in the Governorship of Lord Napier, of restoring Teroomal Naick's Palace at Madura and adapting it for use as public offices, still continues.

Including the allotment of Rs. 30,000 for last year the expenditure to date is about Rs. 1,28,000, and it is expected that all the needful work of restoring this splendid structure (which was on the point of falling to pieces when taken in hand by Mr. Chisholm) will be completed for an additional outlay of Rs. 32,000.

A very large quantity of work has been executed. Iron ties and bands now secure the whole structure from further movement. The large wagon vault, at the end of the court-yard, has been restored, as also the south-west octagonal room and nearly the whole of the cloisters.

The stone plinth round the court-yard has been completed, and low screen walls added to confine the offices within their respective limits.

Numerous ruined portions have, moreover, been dealt with, and one of the most interesting and imposing chambers, destined as the future Judge's Court, is being restored.

The old temple in the Vellore fort (not now used for worship), in which are found some of the most beautiful specimens of stone carving in the Dravidian style, has been very successfully dealt with during the past year.

The work was first commenced tentatively, but complete restoration was subsequently decided on under the instructions of His Grace the Duke of Buckingham.

The whole of the fort offices, constructed by making cross-screens between the columns, the Commissariat stables, which found place in a fine carved stone colonnade on the north side, and the filth concealed by mud walls, have all been removed, and we have now a temple architecturally complete which can be examined in all its parts.

The expense has been trifling. Room has been found for the fort offices elsewhere, and the building is completely protected from wanton injury in future.

In the previous year's report mention was made of the plans and sections executed in the lithographic branch of the Chief Engineer's office of the monolithic raths at Mavalipuram, better known as the Seven Pagodas.

No great amount of work has been done or was indeed necessary in dealing with these ancient and most interesting monuments. An estimate was, however, sanctioned for replacing the fallen Naga Rajah's head, which originally occupied a central position in the great rock tableau known as Arjuna's penance; for preventing the rain water from flowing over and disfiguring certain of the carvings, and for clearing away the drift sand which had accumulated round the southern group of raths; conservation will, in future, be alone either necessary or desirable.

As regards the ruins of Hampi, which were inspected and noted on by His Grace the Duke of Buckingham, the Collector of Bellary was directed, by G.O. of 6th September 1880, No. 1,344, Public, to submit estimates for giving effect to His Grace's suggestions in communication with the Public Works Department. Messrs. R. Chisholm, R. Sewell, and the Collector submitted their recommendations after a joint inspection, but it was found impossible to spare a sufficiently qualified officer or subordinate of the Public Works Department for the execution of the needful work. Operations here, therefore, have been confined to the extraction of injurious vegetation and to general conservancy.

But little work has been done in the past year regarding the old fort and temples at Gingee, on which some small outlay had previously been incurred in clearing vegetation and making the place accessible.

On a proposal of Mr. Chisholm a correct survey and report is to be made, but it is unlikely that much outlay will be needed for the purposes of restoration.

Excellent drawings and plans of the ancient palace of Chendragiri have been turned out by the head draughtsman (Mr. Lewis) of the Consulting Architect's office, and estimates are awaited for adapting the fine building for the use of public offices. As there is but little stone carving, the proposed adaptation can, no doubt, be effected legitimately and at a moderate outlay.

Saving in the case of the Seven Pagodas, before adverted to, little has as yet been attempted towards securing plans, sections and elevations of many of the noble Dravidian structures in Southern India, though valuable photographs are in the possession of Government.

It is hoped that ere long this desideratum will be provided for.

BHADRACHALAM COAL-FIELD.—Setting aside the Singareni and Bedadrol fields, which are both in the Nizam's territory and over the working of which this Government can only exercise an indirect influence, the coal-field near the small village Tiperpenti on the left bank of the Godavari river, and now called the *Bhadrachalam* field (the spot being about 12 miles below that better known place), is the only one holding out a prospect of favorable results, and this Government have had till lately a small party of Sappers and Miners engaged on the spot since last July endeavouring to sink a six feet diameter shaft.

Owing to the rains the works were delayed, and it is only lately that the shaft has got down to 70 feet below the surface. The borings previously made have shown that probably as great a depth again will have to be sunk in order to get fully through the several seams of coal, which, as far as shown by the auger, are believed to aggregate some 16 feet in thickness.

At the depth, however, which has already been reached a very permeable stratum has been cut into, and the access of water proving far in excess of the power of the machinery on the spot to subdue, and as, moreover, it is clear that no new machinery of sufficient power can be supplied for some months, it has appeared desirable to this Government to close the works temporarily.

The extent of the field is very limited and the quality of the coal, judging from the specimen brought up originally by the auger, so poor and full of ash that the results, particularly under the difficulties, which as above shown have lately arisen, will probably be anything but satisfactory.

The discovery of a workable seam of coal close to water carriage is however of such vital importance to the Presidency that the Government are disinclined to yield without obtaining some definite results, and accordingly Her Majesty's Secretary of State has been addressed on the subject of despatching adequate pumping machinery, &c., with the least practicable delay.

DYNAMITE EXPERIMENTS.—Reference was made in the Administration Report of 1879-80 to certain experiments with dynamite conducted on the Nilgiris, the details of which were stated to be embodied in a separate paper then in the press. These details have since been published and communicated for the use of the Madras Public Works Department and other Indian Governments. The results of the experiments were considered to have demonstrated the superiority of dynamite as an explosive agent, well adapted for most of the operations to which gunpowder has hitherto been employed in the execution of public works.

The question of employing dynamite as a part of the future equipment of Sapper and Miner Companies and Engineer Field and Siege Parks was remitted for consideration in the Military Department. The Military authorities are however averse to its introduction at present owing principally to the high temperature at which the material freezes, and the slowness with which it thaws, and to its being generally of a more deleterious nature than gunpowder and more injurious to handle.

An endeavour was also made to obtain for dynamite the same facilities of carriage by steamers and railways as are allowed in the case of gunpowder, the danger of explosion being less with the former material under proper conditions of packing.

The Madras and South Indian Railways offer no objection to the conveyance of dynamite which they accept on the same terms as gunpowder and other combustibles, but the Great Indian Peninsula Railway refuse to convey dynamite on any terms. The matter was referred for consideration to the Government of Bombay, who seem to be in correspondence with the Government of India on the subject.

As regards carriage by steamers, the prejudice against dynamite seems at present to be too strong to allow of any advance in this direction being made.

The application of dynamite to the blasting of rock below water without divers has been successful in the Tees, where, under Colonel Beaumont's method, the dredger had no difficulty in lifting some 1,200 to 1,500 tons of rock per day after it had been blasted by dynamite. But valuable as this method seems to be when applied in rivers and quiet waters, where the essential requirements of a smooth surface and a level bottom exist, it seems to be inapplicable for removing a rock like the Santopilly in the open ocean. Useful results may however be expected from dynamite in connection with irrigation and navigation works.

BOOK OF STANDARD SPECIFICATIONS.—This much needed document ordered to be maintained by the Code for general reference in the department, and which was for some time in compilation, was issued at the close of the year in its present preliminary form. With periodical revisions and improvement it will in time become a complete standard of reference for all executive agents and contractors.

MILITARY HISTORY OF THE CORPS OF MADRAS ENGINEERS.—Major H. M. Vibart solicited the aid of Government towards bringing out a work upon which he had some time been engaged, comprising the services of the Madras Engineers, Pioneers, and Sappers from their origin, and was informed that the Government would subscribe for fifty copies.

The compilation, which has been made from letters and reports of Engineers themselves, will show the gradual development of the Corps with the campaign on which they have been engaged, and will prove interesting as a record of a body of officers which will so soon disappear from the Army List after a brief, but not, it is believed, inglorious career.

INTRODUCTION OF THE USE OF THE TELEPHONE.—On inquiries made by the Government of India regarding the introduction of telephones, it was replied that their introduction would very much facilitate the progress of public business between Government offices at large stations, and that the Chamber of Commerce considered they would be used to a fair extent under a moderate tariff.

On the whole, however, it is not thought that the general public in Madras would make much use of this mode of communication.

Major A. T. Fraser has lately suggested experiments being made over the telegraph wire between Madras and Ootacamund, in view to ascertain the results over distances hitherto considered impracticable, and it is hoped that arrangements may yet prove feasible for making the desired trial.

SUPERFLUOUS STOCK OF THE DEPARTMENT.—In October a Committee, composed of Majors Trail and Pennycuik, presided over by Colonel H. Prendergast, was appointed to report on this troublesome subject, and they concluded their labors in a very satisfactory manner before the close of the year under review.

The report dealt with a large amount of over-manufactured stock of the Godáviri, Kistna, and Presidency Workshops, with much useless plant originally transferred from the Upper Godáviri Works on their transfer from the Central Provinces, with useless floating plant of the Godáviri System, &c., and fixed in all cases the amount of reserve stock for each executive division.

In nearly all respects the Committee's decision received the approval of Government, and although the disposal of so much material will require time for cautious sale and adjustment in the accounts, there can be no question as to great utility of the measure in itself, which cannot fail on completion to place the departmental stock on a satisfactory footing.

PRACTICAL TRAINING OF SUBORDINATES FOR THE DEPARTMENT.—A commencement was made in the year by posting "Apprentice Overseers" on first appointment from the college to divisions, where, as contemplated by the Departmental Code, they would receive a year's training in their practical duties before being placed in independent or semi-independent charges.

This, which is intended to be the ordinary routine with all fresh appointments to the Upper Subordinate grades in future, will, it is hoped, be ere long supplemented by (1) an extension of the college course, (2) by arrangements within that course which will ensure a portion at least being devoted to instruction on the practical side of the profession.

In September the Director of Public Instruction submitted a scheme with these objects, based on a plan followed by His Honor the Lieutenant-Governor of Bengal for remodelling the Civil Engineering Branch of the Presidency College, Calcutta, and this on review by the Chief Engineer has been submitted to the following Committee:—

Colonel J. H. M. Shaw-Stewart, R.E., *President*.

Lieut. H. D. Love, R.E., Principal, C.E. College,

F. S. Evans, Esq.,

W. H. Wilson, Esq.,

} *Members.*

with power to add to their number.

The Report of this Committee has, it is understood, been submitted now for some time, and early orders are looked for. It is needless to say that the results cannot fail to be beneficial to the department, as hitherto green youths direct from the college have had to be placed in semi-independent charges to pick up their practical training through mistakes and failures, and to sink or swim as they could, a plan which, to say the least, was decidedly expensive to the tax-payer, and often entailed the ruin of a career which under suitable arrangements would have been very different.

CRICKET GROUND, MADRAS.—The cricket ground for which the Government undertook to find the requisite means, in compensation for the old grounds destroyed in cutting the junction canal, was finished in the course of the year at a total outlay of Rs. 3,872.

GATEWAYS, &c., CHEPAUK PARK, MADRAS.—Handsome cut-stone gate-posts, lamps, and a compound wall were added on the west side of the Chepauk grounds, at an expense of Rs. 9,873. By these and other much needed improvements these grounds, in which are placed the most important of the Government buildings and offices, may eventually be redeemed from their present unsightly surroundings and be converted into a public park worthy of Madras. The position is admirable and with taste and well directed attention this desirable object, it is hoped, may eventually be attained.

NEW EDITION OF THE PUBLIC WORKS CODE AND FORMS.—In the course of the year Volume I of the new Code, down to, and including, Chapter XIII, was issued to the Department, and the text of Volume II, decided on so far as concerned

Chapter XIV, *Duties of the Examiner's Office*, and
Chapter XV, *Budget Rules and Annual Reports*.

The text of the Government of India Code was necessarily adhered to, but with reference to Chapter XVI, *Military Works*, modifications were introduced (1) to accommodate the rules to the regulations of the Madras Army, and (2) to suit local practice, there being no Inspector-General of Military Works in this Presidency, and the Barrack Department being here directly under the Quartermaster-General and having no connection with the Public Works Department.

The final Chapter XVII, *Irrigation Works*, though also based on the Government of India Code, was modified to meet the requirements of the tank systems, &c., in this Presidency.

The arrangement and text of most of the Appendices to the Code were also decided on, and the volume is now far advanced towards completion.

The forms of Account which to a great extent had been decided on and issued by Major D. H. Trail, R.E., are now being supplemented by all miscellaneous forms, by the present Examiner, Mr. D. C. Gordon.

It will thus be observed that little remains to complete this work so essential to the proper administration of the department. When quite finished the matter will be thrown into more logical form, and the whole (brought up to date) issued as follows:—

Volume I.—Code complete down to Chapter XVII.

Volume II.—Appendices.

Forms, Part I.—All forms required by Sub-Divisional, Divisional, and Superintending Engineer Offices.

Forms, Part II.—All forms for Examiner's office, Chief Engineer, and Secretariat, Public Works Department.

TOURS OF INSPECTION BY THE CHIEF ENGINEER.—From the 29th June to the 28th July 1880, the Chief Engineer was engaged in visiting the ports of Masulipatam, Cocanada, and Vizagapatam, the Potinghi Ghât and other works in Vizagapatam District, the Ganjam-Chilka lake canal and the Aska river embankments in the Ganjam Division, also the Bhadrâchalam coal-field in the Godáviri.

From the 27th January to the 12th February 1881, he visited Mangalore, Cannanore, Calicut, Beypore, Cochin, Quilon, Trevandrum and Muttum at Cape Comorin, in company with the Master Attendant; and again from 2nd to 14th April 1881, visited with the same officer Tuticorin, Colombo, Paumben, Negapatam, and Cuddalore.

HARBOURS ON THE EAST AND WEST COASTS.—Urgent demands having reached the Government regarding the desirability of constructing first-class harbours at Vizagapatam and Cochin, and the Government of India being, apparently, not indisposed to afford aid from Imperial resources on the production of adequate proof that harbours of refuge could with certainty be established at one or two selected points on both coasts, the Chief Engineer and Master Attendant were directed to submit joint reports on the subject.

With these objects the officers named made personal inspections of all the ports of the Presidency, but were compelled to arrive at conclusions unfavorable to any schemes of the character named. Generally speaking they found, with the exception of Cocanada, that the only action which Government could take in the interests of the existing trade would be in the form of minor improvements to assist the cargo boats serving the shipping in the offing, and that much of the inconvenience, now experienced, was solely due to the unsuitable character of the boats employed.

An examination of the various schemes put forward for turning Vizagapatam into a first-class harbour showed that not only were one and all of these quite chimerical, but that most of them, if attempted, would be productive of most serious injury to the port.

At Cocanada, where alone they found it desirable to recommend works of any magnitude, an estimate was sanctioned for carrying out, in a tentative measure, a groyne leading north towards the present anchorage (six miles from the port) which, if successful in maintaining a sufficiently deep channel for the cargo boats, may be eventually extended.

At Masulipatam, a jetty and landing-stage was the only feasible improvement.

At Negapatam and Cuddalore minor works for maintaining the sand-spits and fixing the mouth of the rivers at these places were, with a boat basin at Negapatam, all the operations considered desirable.

At Paumben, the feasibility of the projected ship canal frequently put forward with the object of saving the voyage round Ceylon to all steamers, &c., outward or homeward bound, was considered, and an opinion arrived at, that the cost of any such undertaking would far outweigh the advantages proposed, and that if carried out, it would certainly kill the last remnants of the native coasting trade already nearly destroyed, at all other places, by the coasting steamers.

No work further than the lengthening of a jetty was found necessary at Tuticorin.

The proposed first-class harbour at Cochin, so urgently pressed on the attention of Government by the mercantile community, was found to be infeasible excepting at an altogether prohibitory cost.

The Harbour Engineer, Mr. Parkes, whose advice was subsequently sought, considered that it could not be carried out under 80 lakhs of rupees.

At Beypore, the terminus of the Madras Railway, no hope could be held out as regarded the construction of a harbour or the removal of the bar. Some trifling groyne work being alone considered necessary to maintain the connection established between the shore and laterite island south-west of the port.

At Calicut, the only question deserving consideration was one connected with the repairs of the iron pile pier.

At Mangalore, a question of some difficulty, though involving trifling outlay, called for solution owing to the peculiar action of the two rivers (the Gurpur north and Netravati south) on which, the position and maintenance of the *debouchure*, common to both, depends. Preparations were made for taking advantage of any heavy flood coming down the southern river to cut a new *debouchure*; but till quite lately, owing to the lightness of the monsoon, there has been no sensible effect further than a slight change in the form of the present mouth. Information has, however, now been received that a heavy flood coming down recently has opened a new mouth for the rivers at the point intended, and which if it establishes itself will prove of marked benefit to the port. There can be no thought of forming a first-class harbour here.

It will thus be seen that no portion of the East or West Coast could be accepted as likely to fulfil the conditions needed for a first-class harbour, and that once the Madras work has been completed, the harbours of refuge, if any be needed, must in all probability be looked for in Ceylon, viz., at Trincomallee and Columbo.

NORMAL STRENGTH OF THE DEPARTMENTAL ESTABLISHMENT.—Throughout the year the subject of increasing the establishment, with a view to meeting the immediate requirements of works in progress and of framing projects of a "Productive" character, and those classed as "Protective" for meeting the exigencies of famine, received continued consideration.

2. It became early clear to Government that, notwithstanding the relief afforded to the department by its withdrawal from the execution of work for Local Funds, and from the petty repairs of buildings in charge of other than Imperial Departments, the reductions made at the demand of the Government of India in 1879 to meet the financial embarrassments due to the Afghan war had been pushed unduly particularly in this Presidency, where far from there having been, as in other provinces, superfluous Public Works Officers, there were too few to meet current demands, e.g., one executive officer alone was left for Malabar, Canara and Nilgiris, one for all Ganjam and Vizagapatam, and one for Cuddapah, Kurnool and Bellary, &c.

From late correspondence with the Government of India it seems not improbable that the strength of the establishment will ere long be raised to—

6 Superintending Engineers,
36 Executive "
47 Assistant "
185 Upper Subordinates,

which should admit of the works in hand, Imperial and Provincial, being properly supervised, and provide for the formation of four Project Divisions for the completion of projects for Protective and Productive Works to be executed from the special Imperial Funds under each head.

In last year's Report the absolute necessity of providing well in advance for projects suitable for famine, if financial failure were to be avoided, was clearly pointed out, and as the efforts now being made are in the direction indicated, it appears desirable to note here briefly the programme now before the department which has been submitted for the orders and approval of the Government of India.

Name of Project.	Division and Circle.	When the Project can be prepared.	Probable amount of Estimate.	Forecast provision for current and following years.		
				1881-82.	1882-83	1883-84.
(a.) Ganjam. Gopálpúr tidal canal.	A. Project Division, First Circle.	In six or eight months.	LAKHS. 2.10	LAKHS. ...	LAKHS. ...	LAKHS. 1.00
(b.) Road from Sálúr in the Vizagapatam Division, <i>via</i> Pottinghy Ghát to Koraput and Jugdulpore in Bustar.	Do. ...	In a year ...	10.50	0.75	1.00	2.00
(c.) Buckingham Canal.	At present Buckingham Canal Division, First Circle.	In six months ...	56.00	...	5.00	5.00
(d.) Buckingham Canal, south of Mercanum.	...	In time for the budget of 1884-85.	30.00	...	...	...
(e.) Baroor Tank ...	B. Project Division, Second Circle.	Revised estimates will probably be submitted by the end of the official year (1881-82).	3.10	...	1.00	2.00
(f.) Marandahully ...	Do. ...	Estimates nearly ready.	3.90	...	1.50	2.00
(g.) Vaniar ...	Do. ...	By the end of the official year (1881-82).	8.50	...	...	...
(h.) Hindupur ...	C. Project Division, Third Circle.	Do. ...	2.00	...	1.50	0.50
(i.) Roddam ...	Do. ...	Do. ...	1.40	...	...	1.00
(j.) Complete revised project for the Godáviri Delta works.	D. Do. ...	In five or six months.	60.00	...	5.00	5.00
(k.) Complete revised project for the Kistna Delta works.	Do. ...	By the end of the year or a little later.	140.00	...	5.00	5.00
(l.) Perryaur ...	Do. ...	By the end of the year.	70.00	...	1.00	5.00
(m.) Poogalur Channel...	Do. ...	Do. ...	3.70	...	1.00	2.00
(n.) Rushikulya ...	Do. ...	Shortly ...	26.00	...	2.00	2.50
(o.) Pálár Anicut ...	Unassigned as yet.	Plans and estimates have been prepared. Will be submitted on receipt of certain revenue information expected.	2.50	...	...	...
(p.) Atúr Anicut ...	Do. ...	In three or four months.	0.54	...	...	...
(q.) Lower Coleroon Anicut.	Do. ...	Within a year ...	6.50	...	...	...
(r.) Bhaváni reservoir ...	Do. ...	Preliminary investigations have been made.	40.00	...	...	...
Total ...			425.84	0.75	25.00	35.00

OFFICERS AND SUBORDINATES RETIRED UNDER THE REDUCTION SCHEME.—In addition to five officers of Royal Engineers who were granted special furlough of two years, fifteen officers and seventy-nine subordinates were retired under the Resolution of the Government of India, No. 2,079 of 31st July 1879.

Forty of these executive officers and subordinates took service under the several Local Fund Boards, but there are as yet no sufficient facts to adduce as to the success of the measure.

So far as regards the individual interests of the officers and subordinates concerned there was an unfortunate misapprehension, involving discussion with the Government of India and Home Government, on the subject of their pensions and gratuities, but it is hoped that a satisfactory solution of the difficulty will ere long be arrived at.

26/88

APPENDIX.
List of Imperial Major Works referred to in the Report.

Division.	Work.	3	4	5	6	7	8	9	10
		Hain Head.	Estimate.	Outlay to end of previous year.	Outlay during the year reviewed.	Total of Columns 5 and 6.	Allotment during year reviewed.	More than Allotment.	Less than Allotment.
1	2	3	4	5	6	7	8	9	10
Presidency	Barracks occupied by the bandmen of the Madras Volunteer Guards	..	Rs. 3,290	..	Rs. 3,290	Rs. 3,290	..	..	..
West Coast	Cook rooms, bath room, store room and water room for military prison; cook rooms, latrine and bath for Provost Sergeant's quarters	..	..	..	..	..	..	..	..
Chingleput	Painting doors and windows of barracks, Cannanore	..	4,872	..	3,252	3,252	3,240	12	..
	Improvements to the latrines of the European Regiment, Cannanore	..	2,780	..	4,107	4,107	4,400	..	323
	Additions to the hospital room for prisoners at Wellington	..	4,590	1,852	2,904	4,056	2,730	..	526
	Completing the third block of married quarters at	..	3,720	317	1,993	2,310	2,400	..	407
	New double-storied barracks for 200 men with outhouses at Poonamallee	..	1,66,885	9,282	-1,201	8,081	3,856	..	1,026
	New quarters for thirty families with outhouses at Poonamallee	..	82,300	5,317	4,031	9,348	..	..	..
	Constructing new cook house with Duff's range to new hospital at Poonamallee	..	3,630	3,650	55	3,705	55	..	..
	Alterations and additions to new hospital at Poonamallee	..	1,02,000	98,151	421	98,572	420	1	..
	Demolishing the old hospital, converting Nos. 1 and 2 wards into Assistant Apothecary's quarters at Poonamallee	..	5,380	..	4,184	4,184	3,500	684	..
	Demolishing east and west blocks and renewing the roof of north and south blocks of the European barracks at Poonamallee	..	4,010	74	851	925	2,500	..	1,649
Cuddapah	Constructing a cook house for the use of the Royal Artillery at Bellary	..	25,105	..	14,934	14,934	16,144	..	1,210
Vizagapatam	Constructing huts for the accommodation of 489 Sepoys of the 29th Madras Native Infantry	..	2,750	..	2,587	2,587	2,750	..	163
Presidency	Constructing second storey to the quarters occupied by Commissary of Ordnance	..	6,690	..	7,177	7,177	7,177	..	..
West Coast	Asphalting verandah and boarding floors of Officers' quarters, West Hill, at Calicut	..	9,220	2,465	-726	1,739	..	..	726
Presidency	Improvements to barracking room at the Gun Powder Factory	..	2,700	2,145	440	2,555	555	115	..
	Do. to the Gun Powder Factory	..	1,830	2,424	200	2,624	200	..	..
	Converting the old European Hospital into a Garrison Hospital, Bangalore	..	1,85,013	1,63,355	6,416	1,69,771	6,665	..	249
West Coast	Lawrence Asylum buildings, Nilgiris	..	12,600	..	5,609	5,609	7,500	..	1,891
Salem	Constructing sick horse stables at the Remount Depot, Hosur	..	11,38,310	8,60,914	-288	8,60,626	..	..	288
Presidency	Purchase of a residence for the Remount Agent at	..	23,000	373	14,518	14,921	14,620	..	72
	Read from Trinity Church to Agaram barracks, Bangalore	..	20,000	..	20,000	20,000	20,000	..	..
West Coast	Additions to Ulsoor Works, Bangalore	..	9,200	834	4,965	5,739	4,966	..	1
Presidency	Enlarging the pure water cistern and of re-arranging the supply pipes of the division, Ooty	..	12,600	10,016	120	10,136	300	..	180
	Garrison Gymnasium, Bangalore	..	2,400	1,985	535	2,520	535	..	..
	Drainage of Native Infantry Lines, Bangalore	..	44,600	1,738	-139	1,649	..	..	139
		..	14,400	-11,922	38	11,960	..	..	62

Vizagapatam	Stone drainage for carrying off surface drainage of Regimental lines	Do.	6,420	..	5,962	5,962	6,400	..	438
Chingleput	Constructing a drain for sewage parallel to old and new Royal Artillery Barracks, St. Thomas Mount	Do.	3,376	366	415	781	823	..	408
Buckingham	Opening Ennore Bar including groynes	Other Services	18,300	386	9,137	9,523	9,155	..	18
	Making a second opening and constructing a second groyne at Covelong	..	..	..	..	..	..	..	..
Nagarpatam	Opening bar and constructing temporary groyne at Covelong	Do.	5,700	..	5,274	5,274	5,297	..	23
	Huts for two Head Constables and 19 Constables at Vedaraniem	Do.	4,200	3,710	490	4,200	490	..	..
	Huts for one Head Constable and 9 do. at Kattunavady	Do.	5,670	500	1,566	2,066	2,000	..	434
	Do. do. and 14 do. in two blocks for the Salt Police at Adirampatnam	Do.	5,640	1,497	2,178	4,675	3,500	..	322
South Arcot	Head sluice to the Mercanam brine supply channel	Do.	7,950	7,802	356	8,158	100	..	..
Nellore	Salt road from the Great Northern road near Bodilingampad to the platform	Do.	2,660	..	168	168	1,060	256	892
West Coast	Constructing Post Office at Charambady	Do.	5,940	3,884	23	3,907	126	..	103
	Do. do. at Kottagiri	Do.	2,566	1,402	1,167	2,569	1,164	3	..
Architect	Telegraph Office at Ootacamund	Do.	3,500	..	2,392	2,392	3,500	..	1,108
	Do. at Madras	Do.	21,000	..	5,014	5,014	10,000	..	4,986
	Erecting mules' stables on the strand south of the south groyne of the Harbour Works	Do.	2,57,192	22,070	63,788	86,758	39,216	..	..
		Do.	13,880	..	14,644	14,644	..	..	..

APPENDIX TO REPORT OF THE PUBLIC WORKS DEPARTMENT,

District.	Work.	Main Head.	Estimate.	Outlay to end of previous year.	Outlay during year reviewed.	Total of the Columns 5 and 6.	Allotment during year reviewed.	More than Allotment.	Less than Allotment.
1	2	3	4	5	6	7	8	9	10
Chingleput	Government house furniture charges at Guindy Room for Assistant or Deputy Collector over the treasury at Homes' Garden.	Civil Buildings.	Rs. 12,550	Rs. 12,557	Rs. 2,000	Rs. 2,000	Rs. 2,840	Rs. 2,000	Rs. 1,126
Coinbatore	Sub-Collector's Cutcherry at Erode	Do.	31,870	32,600	312	31,845	6,000	..	10
Godavari Eastern.	New Press and Treasury buildings for the Collector's Cutcherry at Coenada.	Do.	34,222	32,950	1,466	34,066	1,660	..	312
Nellore	Do. a second-class do. at Venkatagiri	Do.	7,365	12,231	83	12,314	520	..	194
North Arcot	Sub-Collector's Cutcherry at Ongole	Do.	4,180	..	3,008	3,008	3,500	..	437
Negapatam	Altering and improving the Taluk Cutcherry at Palmaner	Do.	11,556	16,781	2,809	2,809	2,800	9	492
	Constructing Deputy Tahsildar's Cutcherry and Sub-jail with outhouses at Vedaraniem.	Do.	2,580	2,556	-67	15,565	..	..	216
	Alterations to the Taluk Cutcherry at Tiruturaiyandi	Do.	32,476	30,056	2,911	2,489	3,420	..	67
Trichinopoly	Constructing Taluk Cutcherry at Periyakulam	Do.	25,180	25,296	290	25,586	..	..	469
	Constructing Taluk Cutcherry at Pulur	Do.	8,355	..	5,000	5,000	3,355	..	..
Presidency	Constructing Sub-Collector's bungalow at Dindigul	Do.	2,980	..	2,694	2,694	3,000	..	3,355
	Government house furniture charges	Do.	17,700	..	1,171	1,171	1,175	..	406
	Constructing tiled sheds for storage of stationery in the Stamp Office.	Do.	1,367	..	1,367	1,367	1,380	..	13
Vizagapatam	Constructing latrine and bath room at Government Work house	Do.	1,907	..	1,907	1,907	2,000	..	93
West Coast	Senior Assistant Collector's Cutcherry at Parvatipur	Do.	2,76,000	2,62,352	45,990	3,08,342	50,000	..	4,010
	Constructing Government house at Norwood	Do.	3,433	1,891	1,387	3,188	1,388	..	1
	Restoring Colonel Leves' bungalow into a residence for the Special Assistant Collector at Malapuram.	Do.	8,685	..	4,710	4,710	4,600	110	..
	Constructing a Cutcherry with outhouses for Head Assistant Collector at Koodanur.	Do.	3,600	2,988	28	3,016	27	1	..
Cuddapah	Constructing a wrought iron strong room for treasury at Calicut.	Do.	32,218	29,350	869	30,219	868	1	..
	Taluk Cutcherry at Madanapalle	Do.	7,795	7,699	370	8,069	370	..	..
	Do. at Kadiri	Do.	33,070	22,819	251	33,070	251	..	..
Salem	Purchase money for Fischer's bungalow	Do.	5,800	..	5,500	5,500	5,600	..	..
Kistna Eastern	Additions and improvements to Taluk Cutcherry at Krishnagiri.	Do.	4,880	73	3,140	3,213	3,880	..	740
	Amount paid to the Nawab of Masulipatam on account of interest, &c., on the purchase money paid him for his house.	Do.	..	..	2,649	2,649	..	2,640	..
	Purchase of a building for the Collector's residence	Do.	..	..	20,000	20,000	20,000	..	..
West Coast	District Munsif's Court at Udipi	Do.	9,100	..	6,237	6,237	6,830	..	593
	Additions and improvements to the Munsif's Court at Mangalore.	Do.	3,200	..	1,211	1,211	2,000	..	789
Presidency	Constructing Store-room at north-eastern corner of Small Cause Court, North Beach.	Do.	2,540	..	2,537	2,537	2,540	..	3
Kistna Eastern	Purchase of Masulipatam Nawab's house and for adapting it as the District Court, Kistna.	Do.	..	..	25,458	25,458	25,500	..	42
Cuddapah	Enlarging accommodation in building used as Garrison Church at Bellary.	Do.	..	..	2,045	2,045	2,045	..	..

GENERAL AND BUILDINGS AND ROADS BRANCH.

Presidency	Reconstructing portions of St. Patrick's Church, Bangalore	Civil Buildings.	7,750	4,914	3,022	7,936	3,070	..	48
	Constructing a wall along the northern boundary of St. Andrew's Kirk, Bangalore.	Do.	4,996	..	4,110	4,110	4,006	104	..
Negapatam	Roof of St. Peter's Church at Negapatam	Do.	6,000	9,844	3,496	3,496	3,500	..	4
Nellore	Sub-jail at Kandakur of four wards with out-buildings	Do.	10,000	..	359	10,203	420	..	61
South Arcot	Do. with out-buildings at Mannargudi	Do.	4,450	..	128	128	1,700	..	1,572
Tinnevely	Constructing a new jail at Palenecottah	Do.	1,60,000	47,432	37,404	84,836	27,000	404	..
Trichinopoly	Additions and alterations to the Central Jail	Do.	6,420	12,040	660	12,700	660	..	..
Cuddapah	Solitary cells in the jail at Bellary	Do.	6,372	..	6,372	6,372	6,372	..	187
	Jail Hospital, Cuddapah	Do.	5,760	..	5,563	5,563	5,750	..	..
Vizagapatam	Additions and alterations to Hill Jail at Parvatipur	Do.	17,540	8,781	7,791	13,572	7,759	32	..
	Do. do. to Zillah Jail	Do.	23,306	10,172	9,910	16,082	6,000	..	90
Kistna, Western.	Improvements to the Jail at Guntur	Do.	37,313	24,882	9,549	34,431	10,000	..	451
Presidency	Penitentiary works, constructing a system of surface drainage	Do.	2,850	..	2,557	2,557	2,565	..	8
West Coast	Reconstructing District Jail at Mangalore	Do.	4,400	..	2,869	2,869	2,869	..	..
Godavari, Eastern.	Recoiling with corrugated iron the Police Station houses at Chodavaram and Kola.	Do.	4,455	4,444	-843	3,601	..	2,869	843
Nellore	Additions and improvements in the Police office, Nellore	Do.	3,300	1,478	1,903	3,381	1,823	80	..
Presidency	Constructing Barracks and School room, &c., in the compound of the Police Commissioner's office, Madras.	Do.	8,548	..	8,532	8,532	8,359	173	..
Chingleput	Construction of the Agricultural College at Saidapet	Do.	32,190	..	7,093	7,093	20,300	..	13,207
Presidency	Constructing contagious diseases, &c., wards at the General Hospital.	Do.	20,100	16,202	3,239	19,441	3,898	..	659
	Constructing Nurses' quarters at the General Hospital	Do.	5,170	4,821	349	5,170	349	..	..
	Constructing an upper storey to the Superintendent's quarters, Lunatic Asylum.	Do.	11,180	..	11,179	11,179	11,180	..	1
Architect	Lying-in Hospital	Do.	4,76,782	99,995	61,887	1,61,822	61,502	385	..
West Coast	Erecting a Medical School near Monigar's Choultry	Do.	15,672	..	6,288	6,288	5,245	42	..
Kistna, Eastern.	Additions and improvements to the Lunatic Asylum, Calicut	Do.	8,865	..	338	338	700	..	362
Tanjore	Constructing double range office, Bezavada	Do.	7,350	..	350	350	354	..	4
Presidency	Sub-Registrar's Office, Kumbakonam	Do.	4,580	..	2,833	2,833	2,280	553	..
	Constructing boundary wall and gate, Chempauk	Do.	10,270	2,906	6,967	9,873	6,963	4	..
	Constructing Chempauk Public Works Stores buildings into offices for the Public Works Department	Do.	1,26,200	1,26,903	500	1,26,403	500	..	..
	Alterations to gateway and roads, Marine Villa	Do.	2,815	2,621	124	2,745	124	..	..
	Constructing coach houses and stables, tiffin rooms, compound wall and gates for Public Works offices.	Do.	13,110	..	13,110	13,110	13,110	..	..
West Coast	Alterations for the Pavilion in the Cricket ground, Chempauk	Do.	4,100	..	3,872	3,872	3,872	..	..
Trichinopoly	Chinchona buildings, Neddivattam	Do.	..	..	4,109	4,109	4,100	..	..
	Preservation of Tirumal Naick's Palace and digging out the courtyard at Tirumal Naick's Palace garden, part of Item 9.	Do.	1,56,085	97,878	185	1,56,085	300	..	115
Godavari, Eastern.	District Engineer's Office at Dowlishwaram	Do.	8,700	9,045	29,149	1,27,027	30,000	..	851
Architect	Putting up a main staircase at the south end of Amir Mahal	Do.	3,702	..	3,730	3,730	3,564	166	70
Godavari, Western.	Constructing quarters and dwelling house for Divisional Officer at Chettipet	Do.	13,594	..	5,594	5,594	7,044	..	1,450
Vizagapatam	New Pongthy ghant	Do.	1,30,400	71,851	35,823	1,07,674	37,865	..	2,042
Salem	Opening out the new trace of the ghant between Yercaud and Salem as a bridle-path.	Do.	6,200	..	1,023	1,023	1,023	..	..
Coimbatore	Road from Mettupalayam to Kalliar	Do.	1,19,500	19,397	600	19,997	1,231	..	631
West Coast	Experiments with dynamite on the new Kotagiri ghaut	Do.	2,600	1,555	1,112	2,667	..	1,112	..
Vizagapatam	Road from Chilla lake to Ganjam port	Do.	1,41,370	1,40,910	278	1,41,188	460	..	182
Trichinopoly	Road from Cumbam to Gadalar ghaut	Do.	..	..	973	973	1,000	..	28
Cuddapah	Compensation for lands taken up in the Cuddapah District	Do.	..	..	10,626	10,626	10,626	..	..
Godavari, Eastern.	Light-house at Coranada	Do.	3,847	..	3,847	3,847	3,847	..	..
	Bhadrachalam coal-field operations	Do.	5,000	..	6,558	6,558	5,000	1,558	..

List of Major Works under Incorporated and Excluded Local Funds referred to in the Report.

Division.	Works.	Main Head.	Estimate.	Outlay to end of previous year.	Outlay during year reviewed.	Total of Columns 5 and 6.	Allotment during year reviewed.	More than Allotment.	Less than Allotment.
1	2	3	4	5	6	7	8	9	10
Godavari, East-ern.	Kovur junction canal from Kovur lock to Manjer lock ..	Communications.	1,89,450	5,045	19,886	24,932	20,000	..	RS. 114
Nagapatam ..	Reconstructing road No. 63 from Panany to Kallimodoo ..	Do.	8,900	321	7,323	7,649	7,927	..	599
Trichinopoly ..	Making a canal cut in the bed of Adapur in Thathagadi limits ..	Do.	6,780	2,097	2,386	4,453	2,036	..	..
Godavari, West-ern.	Constructing Chutrum at Togumali ..	Civil Buildings.	3,500	1,345	1,631	2,976	..	1,631	..
Nallore ..	Taluk School at Veravasarum ..	Do.	4,055	2,343	30	2,378	286	..	256
Cuddapah ..	Completion of the Anglo-Vernacular School, Ongole ..	Do.	9,200	9,014	421	9,435	503	..	82
Vizagapatam ..	Do. of the Kurnool High School ..	Do.	8,985	8,668	244	8,910	407	..	163
Do.	Constructing a School house at Ellamanchilli ..	Do.	3,725	2,534	1,110	3,644	1,191	..	81
West Coast ..	Do. at Tickapalli ..	Do.	3,530	..	43	43	3,530	..	3,487
Salem ..	Do. at Chowghat ..	Do.	3,966	..	623	623	..	623	..
Cuddapah ..	Do. latrine at Krishnagiri ..	Do.	4,940	2,593	1,487	4,900	1,437	50	2,850
Godavari, East-ern.	Middle School house at Madanapalle ..	Do.	4,935	..	1,020	1,020	3,870	..	111
Do.	Purchase of a house for the Master Attendant at Cocanada ..	Miscellaneous Public Improve-ments.	8,100	741	-111	630	..	..	67
Do.	Constructing Superintendent's quarters attached to the light-house, Vakalapudi.	Do.	3,735	3,803	-67	3,735	..	..	872
Kistna, Eastern.	Quay in the Fort below tidal lock ..	Do.	..	..	-872	-872	3,500	..	98
Do.	Do.	Do.	12,525	..	3,402	3,402	..	..	..

NOTE.—Works under Local Funds under Act IV of 1871 have been omitted.