(1) Number of pages 70

(2) Date of repair 18.6.87

(3) Initials of the Referencer bvs

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

Public WORKS — DEPARTMENT

G.O. No. / ~~B.P. No:~~	946 W 18 28 946 W	Press. / ~~Mis.~~
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946/1

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Buildings and Roads.
Civil Works.

No. 183.

READ—the following paper :—

Despatch from the Right Honorable the Secretary of State for India, to His Excellency the Right Honorable the Governor in Council, Fort St. George, dated India Office, London, 22nd February 1883, No. 7 (Public Works).

The Administration Report of your Public Works Department, General and Buildings and Roads Branch, for 1881-82, has been before me in Council, and I desire to draw your Excellency's attention to one or two points which seem to deserve notice.

2. The large appropriations from the Provincial Public Works grant of money to "Civil Buildings," as compared with the grants made for "Communications," has frequently been the subject of communication between my predecessors and the Government of India, and I observe that in the review of the Regular and Budget Estimates of "Other Public Works" for 1880-81 and 1881-82, dated 21st March 1881, Nos. 150—62 A.C., the Government of India noticed the disproportion of the provision for Communications to that for Civil Buildings in the budgets submitted by your Excellency's Government, and expressed a hope that the matter would be considered.

3. From the figures given in the present Report it would appear that the same disproportion continues, for, while Rs. 7,19,372 has been appropriated to Civil Buildings, official residences, &c., under all heads, only Rs. 3,16,746 is devoted to Communications. I again, therefore, draw the attention of your Government to the subject, in view to your taking such steps as you may deem fit for securing a different distribution in future, or offering some explanation of the circumstances which may satisfy your Excellency that this large outlay on buildings is essential.

4. With regard to the paragraphs in the Report relative to the curriculum of the Civil Engineering College at Madras, I shall be glad to be informed what steps have been taken to provide for the practical training of the students in the manner suggested by my predecessor in paragraph 2 of his Public Works Despatch, No. 18, of the 19th October 1882.

5. I also request information as to the rules under which official residences are provided in the Madras Presidency.

No. 184.

ORDER—dated 28th March 1883, No. 946 W., Public Works.

Ordered that the following reply be sent.

(True Extract.)

(Signed) R. H SANKEY, Colonel, R.E.,
Secretary to Govt., P.W.D.

Exd. A. F. Goodall.
Spare Copies

BUILDINGS AND ROADS.
CIVIL WORKS.

Govt. of {1883} Madras.

PUBLIC WORKS.

Dated March, 28th.

Recd. *Encl.*

G.O., 28th March 1883, No. 946 W.

MARCH.

Nos. 183-184.

Administration Report

Ordering that a reply be sent to the Secretary of State's remarks on the — of the General and Buildings and Roads Branch for 1881-82.

946
2

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

11th March 1880, No. 591 W.

General.
Account.

Read the following paper :—

No. 59. From R. H. HOLLINGBERY, Esq., Assistant Secretary to the Government of India, Department of Finance and Commerce, to the Secretary to the Government of Madras, Public Works Department, dated Simla, 11th July 1879, No. 1,649.

In reply to your letter No.——, dated 24th June 1879, I am desired to forward a copy of my letter No. 666, dated 24th May 1878, and of its enclosures, relating to expenditure for altering or adding to buildings occupied by the Heads of Local Governments.

FINANCIAL DEPARTMENT PROCEEDINGS, MAY, 1878.

Administration.

Cost on account of new furniture for the State reception rooms at the residence of the Lieutenant-Governor of Bengal.

Extent to which expenditure is to be incurred on account of buildings occupied by Heads of Local Governments and Administrations without the previous sanction of the Government of India.

From A. MACKENZIE, Esq., Secretary to the Government of Bengal, Financial Department, to the Secretary to the Government of India, Financial Department, dated 21st March 1878, No. 1,079.

I HAVE the honor, by direction of the Lieutenant-Governor, to request the permission of the Government to his making a grant of Rs. 8,000 for the purpose of replacing the furniture of the State reception rooms at Belvedere.

2. The furniture in these rooms is quite worn-out, and the Lieutenant-Governor is advised that it is not worth repairing. It has been in the house exposed to a great deal of usage ever since 1852.

3. The allowance of Rs. 3000 given for maintaining the equipment of the house is not even adequate to the ordinary repair and maintenance of the regular house furniture, such as the renewal of curtains and carpets, cleaning chandeliers, &c., and nothing whatever has been spent from that fund in the public rooms except for curtains and carpets; and indeed it is impossible that it should be. There are rooms in the house which have never yet been furnished.

4. Society in Calcutta has become very large, and the reception rooms, which are also used for durbars and native reception, are entirely public rooms, and should certainly be properly furnished. Furniture can hardly be expected to remain efficient for a longer period than 26 years, exposed to such usage as that of Belvedere is, and in such a climate.

5. Under these circumstances the Lieutenant-Governor trusts that His Excellency in Council will not consider it improper to expend the sum named in entirely refurnishing the large room with good modern furniture, which should last certainly for 25 years more without addition.

6. The charge would be a provincial charge, but the Lieutenant-Governor has not thought it proper to sanction expenditure for such a purpose, involving as it does, to some extent, his personal interests without ascertaining that he has the concurrence of the Government of India in his so doing.

7. I am to take this opportunity of suggesting that no outlay in altering or adding to buildings occupied by the Heads of Local Governments should be incurred in excess of Rs. 15,000 without the previous sanction of the Governor-General of India. The Lieutenant-Governor is led to make this proposal as he thinks that it is calculated to obviate misunderstanding in future.

From R. H. HOLLINGBERY, Esq., Assistant Secretary to the Government of India, Financial Department, to the Secretary to the Government of Bengal, dated 30th March 1878, No. 2,176.

IN reply to your letter No. 1,079, dated 21st March 1878, I am desired to state that the Governor-General in Council is pleased to authorize the Honorable the Lieutenant-Governor of Bengal to spend, from Provincial Funds, a sum of Rs. 8,000 for replacing the furniture of the State reception rooms at Belvédere, the old furniture being quite worn-out.

Orders will be issued hereafter on paragraph 7 of your letter under acknowledgment.

COPY of paragraph 1 forwarded to the Accountant-General, Bengal.

From W. WATERFIELD, Esq., Officiating Comptroller-General, to the Secretary to the Government of India, Financial Department, dated 3rd April 1878, No. 17.

I HAVE the honor to forward, for the information of Government, copy of a letter* from the Accountant-General, Public Works Department, reporting that the Governments of Madras and Bombay have purchased, out of their respective Provincial Funds, the Sunnydale property at the Nilgiris and the house and grounds known as "Bella Vista" at Mohableshwar for Rs. 5,500 and Rs. 32,000 respectively, and inquiring whether such purchases and outlay are permissible; the object of the first purchase being to provide accommodation for the bachelor clerks who proceed with the Government offices to the Nilgiris, and of the second to secure a residence for His Excellency the Governor.

* No. 174 G., dated 23rd March 1878.

2. As the Government of India, in closing the Finance and Revenue Accounts of 1876-77, had to raise the Provincial Funds of Madras and Bombay to equilibrium, these additional items of expenditure may ultimately fall upon the resources of the Imperial Government, and I have accordingly thought it necessary to submit the matter for the consideration of Government.

From Colonel J. J. McLEOD INNES, Accountant-General, Public Works Department, to the Comptroller-General, dated 23rd March 1878, No. 174 G.

I HAVE the honor to report the two following cases.

2. The Madras Government has sanctioned the purchase of the Sunnydale property for Rs. 5,500, to provide accommodation for the bachelor clerks who proceed with the Government offices to the Nilgiris.

3. The Bombay Government has purchased, at Mohableshwar, for a residence for His Excellency the Governor, a house and grounds known as "Bella Vista" for Rs. 32,000.

4. The purchases have been made from the respective Provincial Funds. I beg the favor of your opinion as to whether such purchases and outlay are permissible, and if not, what notice I should take of them, and what advice I should give the Public Works Department respecting them.

From E. J. SINKINSON, Esq., Officiating Under Secretary to the Government of India, Financial Department, to all Local Governments and Administrations, dated 24th May 1878, No. 666.

I AM desired to forward to you, for the information of copy of a letter to the Government of India from the Lieutenant-Governor of Bengal, No. 1,079, dated 21st March, and to call your attention in particular to its seventh paragraph.

2. In that paragraph, with reference to his request for sanction to an expenditure of Rs. 8,000 in replacing the furniture of Belvedere, His Honor the Lieutenant-Governor suggests that, in future, no outlay for altering or adding to buildings occupied by the Heads of Local Governments shall be incurred in excess of Rs. 15,000 without the previous sanction of the Government of India.

3. The Governor-General in Council believes that the motives of delicacy which have induced the Lieutenant-Governor of Bengal to make this recommendation, will be shared by the Heads of all other Local Governments and Administrations, and he has no doubt that they will welcome the adoption of a rule apparently well calculated to prevent misunderstanding of a nature which, since the extension of their financial powers and responsibilities, are especially likely to arise in regard to expenditure of the nature referred to.

4. The Governor-General in Council is, therefore, pleased to decide that no outlay for altering or adding to the buildings occupied by the Heads of Local Governments and Administrations, or for the purchase or construction of new buildings intended to be so occupied, shall be incurred in excess of Rs. 15,000 without the previous sanction of the Government of India.

COPY forwarded to the Public Works Department, and to the Comptroller-General.

No. 60. ORDER THEREON, 11th March 1880, No. 591 W.

RECORDED in continuation of G.O., No. 1,697 W., dated 26th June 1879.

(True Extract.)

(Signed) R. H. SANKEY, Colonel, R.E.,
Secretary to Govt., P.W.D.

To the Examiner of Public Works Accounts.
" Financial Department.

Exd. S. T. Austin.
Spare Copies

GENERAL
ACCOUNT.

Gobt. of (1880) Madras.

PUBLIC WORKS.

To

THE EXAMINER OF PUBLIC WORKS
ACCOUNTS,

&c., &c., &c.

Dated March, 11*th*.

Rcvd. *Encl.*

G. O., 11*th March* 1880, No. 591 W.

MARCH.
Nos. 59-60.

Buildings occupied by Heads of Local Governments.—Correspondence from the Government of India relating to expenditure on —, recorded.

S.A.W.

ADMINISTRATION REPORT 946/4

OF THE

PUBLIC WORKS DEPARTMENT,

GENERAL AND BUILDINGS AND ROADS BRANCH,

IN THE

MADRAS PRESIDENCY,

FOR THE YEAR

1881-82.

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

1882.

ADMINISTRATION REPORT

OF THE

PUBLIC WORKS DEPARTMENT,

GENERAL AND BUILDINGS AND ROADS BRANCH,

IN THE

MADRAS PRESIDENCY,

FOR THE YEAR

1881-82.

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

1882.

966/6

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The general results of the year's working may be gathered from the following tables supplied by the Examiner of Public Works Accounts.

No. I.

Statement showing Outlay compared with Grant under Departmental Heads.

Heads of Service.	IMPERIAL.								MADRAS HARBOUR.								PRODUCTIVE PUBLIC WORKS.							
	OTHER SERVICES.																							
	Original Budget Grant.	As modified after the issue of the Budget Orders.	Expenditure	Expenditure compared with modification.			Original Budget Grant.	As modified after the issue of the Budget Orders.	Expenditure	Expenditure compared with modification.			Original Budget Grant.	As modified after the issue of the Budget Orders.	Expenditure	Expenditure compared with modification.			Original Budget Grant.	As modified after the issue of the Budget Orders.	Expenditure	Expenditure compared with modification.		
				More.	Less.					More.	Less.					More.	Less.					More.	Less.	
	Rs.	Rs.	Rs.	Rs.	Rs.		Rs.	Rs.	Rs.	Rs.	Rs.		Rs.	Rs.	Rs.	Rs.	Rs.		Rs.	Rs.	Rs.	Rs.	Rs.	
Original Works	1,10,538	1,10,648	1,00,582		10,066										6,62,358				2,45,100	2,06,508	2,60,192	53,592		
Repairs	2,50,909	2,66,314	5,672	2,672											71,084	71,084			16,000	7,442		7,442		
Establishment	92,157	90,490	64,311	12,351											54,817	54,817			66,275	52,050		14,225		
Tools and Plant	9,615	9,648	6,627	1,422															6,627	5,305		1,322		
Profit and Loss																								
Suspense Balance.																								
Stock																								
Stock Purchases and Sales																								
Miscellaneous Advances																								
London Invoices																								
Do. Stores																								
Grand Total	4,70,000	4,87,000	4,90,435	4,609											-95,477				3,38,000	2,79,165	2,60,192	77,973		
Less Expenditure in England.															739									
Net Excess				3,435											-4,976									
Net Saving															15,668									
															-16,663				37,009		6,89,060		37,009	

Heads of Service.	MILITARY.					
	Original Budget Grant.	As modified after the issue of the Budget Orders.	Expenditure	Expenditure compared with modification.		
				More.	Less.	
	Rs.	Rs.	Rs.	Rs.	Rs.	
Original Works	1,10,538	1,10,648	1,05,574		5,074	
Repairs	2,50,909	2,66,314	2,69,097	3,783		
Establishment	92,157	90,490	96,161	671		
Tools and Plant	9,615	9,648	9,603	55		
Profit and Loss						
Suspense Balance.						
Stock						
Stock Purchases and Sales						
Miscellaneous Advances						
London Invoices						
Do. Stores						
Grand Total	4,70,000	4,87,000	4,90,435	4,609		
Less Expenditure in England.				3,435		
Net Excess						
Net Saving						

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

Heads of Service.	Incorporated.						Excluded.					
	Original Budget Grant.	As modified after the issue of Budget Orders.	Expenditure.	Expenditure compared with modification.		Original Budget Grant.	As modified after the issue of Budget Orders.	Expenditure.	Expenditure compared with modification.		
				More.	Less.				More.	Less.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
PROVINCIAL.										
General.										
Original Works	5,40,879	6,85,042	4,74,295	..	2,10,747	..	..	..	..	..
Repairs	98,223	1,67,694	1,47,922	..	19,772	..	..	..	..	..
Establishment	6,46,669	6,64,953	7,05,784	40,831	..	..	..	..	..	..
Tools and Plant	27,802	1,29,407	— 31,802	..	1,52,206	..	..	..	..	..
Profit and Loss	..	..	11,788	11,788	..	..	..	..	..	..
Suspense Balances.										
Stock	..	..	21,567	21,567	..	..	..	..	..	..
Stock Purchases and Sales	..	..	22,274	22,274	..	..	..	..	..	..
Miscellaneous Advances	..	..	— 1,13,802	..	1,13,802	..	..	..	..	..
London Invoices	..	..	— 84	..	84	..	..	..	..	..
Do. Stores	..	..	11,269	11,269	..	..	..	..	..	..
Grand Total	13,10,668	16,27,496	12,49,211	1,07,729	..	4,86,014	46,569	42,402	146	4,312
Less Expenditure in England	..	..	..	..	..	..	..	..	..	..
Net Excess + Net Saving −	..	..	3,78,285	..	..	4,167	..	..	..	4,167

946/8

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	1,15,574	
	Repairs	2,69,097	
	Establishment	96,161	
	Tools and Plant	9,603	
	Less Expenditure in England	...	
			4,90,435
	Other Services—		
	Civil Buildings—		
	Original Works	1,92,037	
	Repairs	4,003	
	Communications—		
	Original Works	...	
	Repairs	...	
	Miscellaneous Public Improvements—		
	Original Works	545	
	Repairs	1,669	
	Establishment	64,311	
	Tools and Plant	6,627	
	Less Expenditure in England	...	
			2,69,192
	Madras Harbour Works—		
	Productive Public Works—		
	Works	6,63,858	
	Establishment	71,084	
	Tools and Plant	54,817	
	Other Public Works—		
	Works	...	
	Establishment	...	
	Tools and Plant	...	
	Suspense Balance—		
	Stock	— 95,477	
	Stock Purchases and Sales	739	
	Miscellaneous Advances	— 4,976	
	London Invoices	15,668	
	London Stores	—16,653	
			6,89,060
Provincial.	General—		
	Civil Buildings—		
	Original Works	3,90,175	
	Repairs	1,16,701	
	Communications—		
	Original Works	82,970	
	Repairs	26,038	
	Miscellaneous Public Improvements—		
	Original Works	1,150	
	Repairs	5,183	
	Establishment	7,05,784	
	Tools and Plant	— 31,802	
	Profit and Loss	11,788	
	Suspense Balances—		
	Stock	21,567	
	Stock Purchases and Sales	22,274	
	Miscellaneous Advances	—1,13,802	
	London Invoices	— 84	
	London Stores	11,269	
			12,49,211

ADMINISTRATION REPORT OF THE PUBLIC WORKS DEPARTMENT,

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

Fund.	Class, Departmental and Service Heads.	Outlay.	Total.
		Rs.	Rs.
Local.	Incorporated—		
	Civil Buildings—		
	Original Works	4,716	
	Repairs	1,501	
	Communications—		
	Original Works	70,646	
	Repairs	1,37,092	
	Miscellaneous Public Improvements—		
	Original Works	13	
	Repairs	5,449	
	Establishment	23,628	
	Tools and Plant	3,588	
	Excluded—		2,46,638
	Civil Buildings—		
	Original Works	4,212	
	Repairs	6,027	
	Communications—		
	Original Works	...	
	Repairs	...	
	Miscellaneous Public Improvements—		
	Original Works	12,775	
	Repairs	10,249	
	Establishment	8,304	
	Tools and Plant	825	
			42,392

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

IMPERIAL.

Sub-Head.	Heads.	Marine Harbour. Productive Public Works. Original Budget Grant.	Modified Grant.	Outlay.	Outlay compared with Modified Grant. More.	Outlay compared with Modified Grant. Less.	Other Services. Original Budget Grant.	Modified Grant.	Outlay.	Outlay compared with Modified Grant. More.	Outlay compared with Modified Grant. Less.
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Original Works.	Military										
	Civil Buildings										
	Communications										
	Miscellaneous Public Improvements										
	Total ..										
Repairs.	Military										
	Civil Buildings										
	Communications										
	Miscellaneous Public Improvements										
	Total ..										
	Establishment										
	Tools and Plant										
	Profit and Loss										
	Add Net Increase of Suspense Balances ..										
	Grand Total ..										
	Loss Expenditure in England ..										
	Net Total ..										
	Net Excess ..										
	Net Saving ..										

Sub-Head.	Heads.	Military. Original Budget Grant.	Modified Grant.	Outlay.	Outlay compared with Modified Grant. More.	Outlay compared with Modified Grant. Less.
		Rs.	Rs.	Rs.	Rs.	Rs.
Original Works.	Military	1,18,628	1,16,648	1,15,574	..	1,074
	Civil Buildings	..	..	..	..	..
	Communications	..	..	..	..	..
	Miscellaneous Public Improvements	..	..	..	..	..
	Total ..	1,18,628	1,16,648	1,15,574	..	1,074
Repairs.	Military	2,50,000	2,65,314	2,69,097	3,783	..
	Civil Buildings	..	..	..	..	..
	Communications	..	..	..	..	..
	Miscellaneous Public Improvements	..	..	..	..	..
	Total ..	2,50,000	2,65,314	2,69,097	3,783	..
	Establishment	92,157	95,490	96,161	671	..
	Tools and Plant	9,215	9,548	9,603	55	..
	Profit and Loss	..	..	..	..	..
	Add Net Increase of Suspense Balances ..	..	..	..	..	..
	Grand Total ..	4,70,000	4,87,000	4,90,435	4,509	1,074
	Loss Expenditure in England ..	..	..	..	..	..
	Net Total ..	4,70,000	4,87,000	4,90,435	4,509	1,074
	Net Excess ..	..	..	3,435	..	..
	Net Saving ..	..	..	..	..	..

Statement showing Outlay compared with Grant under Departmental and Service Heads—cont.

Heads.	Sub-Head.	PROVINCIAL. GENERAL. Original Budget Grant.	Modified Grant.	Outlay.	Outlay compared with Modified Grant. More.	Less.	LOCAL. INCORPORATED. Original Budget Grant.	Modified Grant.	Outlay.	Outlay compared with Modified Grant. More.	Less.	EXCLUDED. Original Budget Grant.	Modified Grant.	Outlay.	Outlay compared with Modified Grant. More.	Less.
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Original Works	Military	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Civil Buildings	3,45,819	4,98,768	3,90,175	..	1,08,593	8,817	13,714	4,716	..	8,998	..	..	..	..	..
	Communications	95,000	85,466	82,570	..	2,486	1,11,300	1,37,961	79,646	..	58,415	15,065	6,553	4,214	..	2,348
	Miscellaneous Public Improvements	1,00,000	1,00,813	1,150	..	99,668	..	..	13	13	..	12,000	13,787	12,775	..	1,012
	Total ..	5,40,819	6,85,042	4,74,295	..	2,10,747	1,20,117	1,50,776	75,375	13	75,413	29,065	20,345	16,987	..	3,358
Buildings	Military	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Civil Buildings	64,175	1,25,125	1,16,701	..	6,424	1,200	9,584	..	..	..	..	..	..	..	..
	Communications	29,053	27,259	26,038	..	1,221	1,14,010	1,46,105	1,501	..	1,082	..	6,078	6,027	..	49
	Miscellaneous Public Improvements ..	2,000	6,710	5,183	..	1,527	9,000	9,009	1,37,092	..	9,018	..	..	..	..	..
	Total ..	95,228	1,57,094	1,47,922	..	9,172	1,24,210	1,67,669	5,449	..	3,551	..	10,055	10,249	194	..
		6,46,580	6,61,263	7,05,784	40,331	..	53,304	70,421	1,44,042	..	13,647	..	16,131	16,276	194	49
	Establishment	27,232	1,20,407	−31,802	..	1,52,209	5,631	6,949	23,628	..	16,303	7,266	9,183	8,504	..	679
	Tools and Plant	..	..	11,788	11,788	..	..	..	3,688	..	3,261	726	900	825	..	75
	Profit and loss	..	..	−58,776	..	58,776	..	..	..	..	..	..	..	..	..	..
	Net Net Increase of Suspense Balances	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Grand Total ..	13,10,808	16,27,496	12,49,211	52,619	4,30,504	3,02,962	3,85,844	2,46,633	13	1,39,224	37,957	46,559	42,292	194	4,361
	Less Expenditure in England ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Net Total ..	13,10,808	16,27,496	12,49,211	52,619	4,30,504	3,02,962	3,85,844	2,46,633	13	1,39,224	37,957	46,559	42,292	194	4,361
	Net Excess ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Net Saving ..	..	..	..	..	3,78,285	..	..	..	..	1,39,211	..	..	..	..	4,167

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

Circle.	Divisions.	IMPERIAL. Military. Original Works.	Military. Repairs.	Other Services. Original Works.	Other Services. Repairs.	Other Public Works. Original Works.	Other Public Works. Repairs.	Productive Public Works. Original Works.	Productive Public Works. Repairs.	PROVINCIAL. Original Works.	PROVINCIAL. Repairs.	LOCAL. Incorporated. Original Works.	Incorporated. Repairs.	Excluded. Original Works.	Excluded. Repairs.	IRRIGATION. Original Works.	Repairs.	Total.	Establishment.	Grand Total.
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1st Circle	Ganjam ..	296	986	..	..	..	..	..	..	..	197	..	..	..	..	..	..	1,479	9,898	11,377
	Vizagapatam ..	2,414	6,198	5,294	234	..	..	..	..	88,445	5,444	151	..	32	..	1,963	1,311	1,35,076	49,511	1,84,587
	Eastern Godávari.	3,437	..	..	1,366	..	..	..	..	5,306	8,648	19,373	..	367	452	83,821	88,914	3,21,603	1,22,256	3,43,919
	Western Do ..	..	20	..	..	..	..	..	..	7,276	..	..	..	..	..	92,994	76,527	1,36,037	61,772	2,28,409
	A Project Division.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2nd do.	Eastern Kistna.	..	..	..	1,543	..	..	..	..	1,791	1,562	..	111	10,013	3,399	17,010	32,620	1,25,075	94,982	2,20,057
	Western do ..	..	..	13	..	..	..	..	..	2,981	117	..	..	..	..	94,538	60,324	1,57,967	60,805	2,18,572
	Nellore ..	..	..	303	..	..	..	..	..	11,107	997	..	..	..	..	20,012	91,414	82,832	42,419	1,26,251
	Sungam Project Division.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1,29,622	..	1,20,522	31,913	1,52,435
3rd do.	Bellary ..	4,340	9,677	..	535	..	..	..	..	1,087	378	..	−720	..	..	..	..	15,307	14,230	29,537
	Cuddapah ..	3,458	15,210	2,314	71	..	..	..	..	8,704	1,112	..	452	3,667	..	24,152	52,139	1,00,719	51,290	1,52,009
	Kurnool ..	..	..	..	220	..	..	..	..	185	262	8,067	65,854	..	..	13	..	44,617	9,305	53,922
	Madras Irrigation and Canal Company's Canal.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	C. Project Division.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1,980	1,980
4th do	West Coast ..	5,668	35,633	15,109	591	..	..	..	..	1,02,846	7,571	−175	..	2,568	683	..	1,364	1,72,958	63,552	2,36,510
	Coimbatore ..	251	526	..	..	..	..	..	..	7,845	1,000	..	..	..	..	11,853	35,638	87,114	57,956	1,45,070
	Salem ..	9,623	5,734	95	..	..	..	..	..	18,702	5,892	..	..	−10	..	21,167	10,872	71,778	27,779	99,557
	North Arcot ..	95	3,132	12	139	..	..	..	..	17,953	1,793	..	..	..	..	36,168	70,587	1,29,880	48,922	1,78,802
	B Project Division.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	227	..	227	4,504	4,731
5th do.	South Arcot ..	..	..	315	..	..	..	..	..	12,449	3,862	..	4,083	..	..	79,153	1,54,724	2,81,586	65,231	3,49,817
	Chingleput ..	42,400	30,373	548	..	..	..	..	..	26,273	8,610	..	..	..	..	35,306	39,604	1,83,174	39,900	2,23,074
	Buckingham Canal.	..	..	2,195	135	..	..	..	..	..	..	..	..	..	..	1,42,463	84,503	2,26,296	63,139	2,89,435
6th do.	Presidency ..	41,786	1,53,535	..	255	..	..	..	..	66,662	75,302	..	..	..	3,262	..	263	3,41,068	3,96,345	7,37,413
	Trichinopoly ..	1,806	7,581	..	..	..	..	..	..	21,765	258	31,386	91,683	−1,631	..	4,650	35,493	2,22,976	86,111	3,09,107
	Tanjore ..	..	..	1,252	188	..	..	..	..	9,477	22,564	9,570	8,520	..	..	18,166	82,982	1,52,709	62,894	2,15,603
	Negapatam ..	..	..	1,436	..	..	..	..	..	5,912	355	7,050	3,276	500	2,453	2,159	60,046	83,181	43,409	1,26,590
	Madura ..	..	..	..	..	..	..	..	..	13,394	790	13	..	1,385	..	580	4,214	20,376	8,507	28,883
	Tinnevelly ..	..	471	2	406	..	..	..	..	10,791	1,217	..	2,187	..	..	26,738	77,775	1,19,587	52,417	1,72,004

Statement showing Outlay on Works under each Fund distributed by Divisions with the Total Outlay on Establishment against each Division—cont.

Circle.	Divisions.	IMPERIAL.						PROVINCIAL.								LOCAL.								Grand Total.
		Military.		Other Services.				Irrigation.								Irrigation.								
		Original Works.	Repairs.	Original Works.	Repairs.	Original Works.	Repairs.	Original Works.	Repairs.	Original Works.	Repairs.	Original Works.	Repairs.	Original Works.	Repairs.	Original Works.	Repairs.	Original Works.	Repairs.	Original Works.	Repairs.	Establishment.	Total.	
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Superintendent of Works	Consulting Architect.	..	..	..	..	1,63,730	..	..	..	..	..	..	..	..	..	..	..	..	..	1,63,730	..	81,623	2,45,353	2,45,353
Chief Engineer for Irrigation.	D. Project Division.	..	..	..	..	..	..	..	..	..	..	6,63,858	..	..	..	..	..	..	..	6,63,858	..	2,927	6,66,785	6,66,785
Special.	Madras Workshops (Downshire)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Harbour Works (Perambur)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Irish Workshops, Presidency.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Presidency). (Presidency Stores Agency).	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9,280	9,280	9,280
	Grants-in-aid to Minor Irrigation Repairs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1,15,668	1,15,668	1,15,668
		1,13,571	2,69,097	1,63,730	5,672	1,63,730	5,672	33,345	..	6,63,858	..	6,63,858	..	1,22,582	5,672	1,22,582	5,672	1,22,582	5,672	1,22,582	5,672	16,14,357	42,47,450	58,61,787

Statement of Grants and Outlay appertaining to all works other than Budget Works.

Fund.	Departmental and Service Heads.	Reserve.		Incomplete Works.		New Works.		Total Outlay.
		Budget.	Final.	Number.	Outlay.	Number.	Outlay.	Columns 6 + 8.
1	2	3	4	5	6	7	8	9
		Rs.	Rs.		Rs.		Rs.	Rs.
Imperial.	Military—							
	Original Works.. ..	31,863	60,715	20	21,475	128	32,702	54,177
	Repairs	2,50,000	2,65,314	..	..	769	2,69,097	2,69,097
	Other Service—							
	Civil Buildings—							
	Postal—							
	Original Works.. ..	7,000	6,909	5	3,549	8	3,447	6,996
	Repairs	3,000	3,091	..	..	31	2,083	2,083
	Telegraph—							
	Original Works.. ..	3,000	14,710	..	..	1	4,710	4,710
	Repairs	2,000	2,000	..	..	4	1,920	1,920
	Salt—							
	Original Works.. ..	9,000	6,889	4	1,696	2	14	1,710
	Repairs	9,000	411	..	..	..	..	..
	Miscellaneous Public Improvements—							
	Original Works.. ..	1,000	609	..	..	1	545	545
	Repairs	2,000	1,900	..	..	3	1,669	1,669
Provincial.	Civil Buildings—							
	Original Works.. ..	1,02,485	3,51,638	63	1,20,782	98	1,25,920	2,46,702
	Repairs	64,175	1,23,125	..	..	229	1,16,701	1,16,701
	Communications—							
	Original Works.. ..	..	23,579	..	..	5	23,563	23,563
	Repairs	29,053	27,259	..	..	49	26,038	26,038
	Miscellaneous Public Improvements—							
	Original Works.. ..	..	818	1	559	2	591	1,150
	Repairs	2,000	6,710	..	..	8	5,183	5,183

IMPERIAL—MILITARY.

GODAVARI EAST.—The construction of lines for a detachment of Native Infantry at Sámalkót was commenced, and Rs. 3,437 were spent up to the end of the official year.

GANJAM.—The verandah of the Military Hospital at Berhampore was renewed at a cost of Rs. 1,580.

BELLARY.—The Bellary water-supply project was proceeded with and Rs. 2,663 were spent on the work during the year. The revetment was strengthened. This will be raised to 3 feet above full tank level. Against an estimate of Rs. 1,41,628 the total amount expended to the end of the year was Rs. 1,35,332.

A store-room for the Royal Artillery was built for Rs. 2,292. V-shaped drains were provided for the Royal Artillery barracks for Rs. 825, and a rifle range for the Native Cavalry was constructed at a cost of Rs. 851.

WEST COAST.—The verandah of the officers' quarters at West Hill, Calicut, was asphalted and the floors boarded at a total cost of Rs. 2,612.

A third block of married quarters at Wellington was completed at a cost of Rs 3,685, and additions to the hospital guard-room at the same station were made at a total outlay of Rs. 4,630.

The doors and windows of the barracks at Cannanore were painted at a cost of Rs. 4,798.

SALEM.—Rs. 7,825 were spent on the sick horse stables at the Remount Depôt, Hosúr, the work being completed at a total outlay of Rs. 22,746 against an estimate of Rs. 23,000. The work of reconstructing the Committee stand at the depôt was commenced, and Rs. 1,119 were spent during the year chiefly in the collection of materials. The south and west side of the stud lines were repaired at a cost of Rs. 3,723.

PRESIDENCY AND BANGALORE.—The work of converting the old European Infantry Hospital at Bangalore into a Garrison Hospital was completed at a total cost of Rs. 12,694, the expenditure during the year having been Rs. 7,086. Improvements to the Damlur Tank at the same station were carried out at a total outlay of Rs. 3,048.

At the Presidency a store-room for the Military Prison in Fort St. George was constructed at a cost of Rs 9,320, and Rs. 14,108 were expended on the improvements to the Gun Powder Factory, the press and corning houses with shaft bed having been almost completed.

25 minor new works at the Presidency and 35 at Bangalore were in progress, and of these 23 at the former and 34 at the latter were completed. 130 repair works at the Presidency and 106 at Bangalore were carried out during the year, the total expenditure under this head, including Barrack Master's petty repairs, compensation for quarters, &c., having been Rs. 88,940 at the Presidency and 63,954 at Bangalore.

CHINGLEPUT.—Two more blocks of the 30 family quarters at Poonamallee were completed, the expenditure to the end of the year having been Rs. 14,838 against a total estimate of Rs. 82,300.

The work of demolishing the east and west blocks and renewing the roof of the north and south blocks of the old European barracks at the same station was completed at a total expenditure of Rs. 24,902.

The additions and alterations to the new and old hospital were also finished, the total cost having been Rs. 5,877 and Rs. 3,715, respectively. Seven private dwelling-houses at St. Thomas' Mount were purchased, and these and the old east and west tiled barracks were demolished in view to clearing a site for new barracks for two batteries of Field Artillery. The total expenditure on this project was Rs. 10,504.

TRICHINOPOLY.—The repairs to the lines of the 21st Regiment, Native Infantry, begun in the previous year, were completed at a cost of Rs. 3,950.

IMPERIAL OTHER SERVICES.

VIZAGAPATAM.—A new Post Office at Párvatipur was completed at a cost of Rs. 1,226.

The Post Office buildings at Bimlipatam and Narsipatam were repaired at an outlay of Rs. 236.

A building for the Telegraph Office at Vizagapatam was purchased for Rs. 4,710.

GODAVARI EAST.—The Hope Island Lighthouse was repaired at a cost of Rs. 1,355.

NELLORE.—A fifth-class Post Office at Kávali was completed.

BELLARY.—The new Post Office at Penukondah was completed and handed over to the Postal authorities. Total expenditure Rs. 1,436.

CUDDAPAH.—A fifth-class Post Office at Rájampet was constructed at a cost of Rs. 1,177.

WEST COAST.—The new Post Office at Kótagiri, commenced in the previous year, was finished at a total outlay of Rs. 3,370.

Progress on the combined Post and Telegraph Office at Ootacamund was continued. The original estimate for this work amounted to Rs. 34,100, but a revised estimate for Rs. 46,760 has since been sanctioned. The allotment for the work during the year was Rs. 16,100, out of which Rs. 13,221 were spent, bringing the total outlay up to Rs. 18,235. The short expenditure was due to the additional allotment having been received late in the year, to the failure of the contractor to make bricks, and to other works in progress taking up the available labor.

SOUTH ARCOT.—A second revised estimate, amounting to Rs. 3,255, for constructing a head-sluice to the Merkanam brine supply-channel was sanctioned, but the execution of the work was delayed in an unsatisfactory manner. The outlay during the year amounted to only Rs. 315.

CHINGLEPUT.—A new Post Office at Sattiavedu was completed at a cost of Rs. 954.

PRESIDENCY AND BANGALORE.—During the year an outlay of Rs. 165,711 was incurred on the combined Post and Telegraph Offices at Madras, bringing the total expenditure up to Rs. 2,65,103 against the estimate of Rs. 5,07,890. Shortly after the close of the previous official year the site for the Post Office was cleared and the

946
12

foundations sunk. The whole building, which covers an area of 56,862 square feet, progressed most favorably. On the Telegraph Office side the building was brought up to the level of the second floor, and on the Post Office side the whole of the basement was completed and the inner walls raised to the second storey. The central portion, common to the two buildings, was raised to the level of the top of the basement.

In regard to the architectural features of the building it may be mentioned that a geometrical view was well hung in the Royal Academy of London, and received the favorable comments of the professional press. A reproduction of this drawing subsequently appeared in the "Building News," London.

TANJORE.—Improvements to the Post Office at Tanjore were carried out at a cost of Rs. 1,252.

NEGAPATAM.—The work of constructing one head-constable's and nine constables' huts at Kuttumadavi for the Salt Department was completed. Expenditure Rs. 5,706 against an estimate of Rs. 5,540.

PROVINCIAL PRODUCTIVE PUBLIC WORKS.

MADRAS HARBOUR WORKS.—The total expenditure for the year was Rs. 6,89,060 as follows, exclusive of outlay amounting to Rs. 47,929 on Beach Improvements within the Harbour, which was met from Port Funds :—

	Rs.
For the Harbour Works only	5,38,027
„ Moorings	1,70,542
„ Beach Protective Works	23,203
„ Compensation for loss of land at Ráyapuram and purchase of remainder of lot	51,341
Total ...	7,83,113
Add adjustments against works carried out in the Suspense Accounts for March 1882	6,646
	7,89,759
Deduct Credits on account of Suspense heads	1,00,699
	6,89,060

The total expenditure on the works from their commencement up to end of the official year was Rs. 60,41,950, and the various estimates for completing it, exclusive of certain incidental charges for protective works to the north, drainage, &c., range from a minimum of 15½ to 27 lakhs of rupees. For further remarks in reference to this work see "*General Observations*" *infra*.

PROVINCIAL, CIVIL BUILDINGS.

VIZAGAPATAM.—The alterations and additions to the Hill Jail at Párvatipur were completed at a cost of Rs. 16,959.

The additions and alterations to the Zillah Jail at Vizagapatam were also completed at a total outlay of Rs. 20,619.

A Cutcherry for the Senior Assistant Collector at Párvatipur was constructed at a cost of Rs. 3,070.

GODAVARI EAST.—Rs. 2,500 were spent in the preparation of materials for a Police head-quarter office at Rajahmundry.

The Public Works Department Dispensary at Dowlaishweram was completed at a cost of Rs. 1,987.

GODAVARI WEST.—The construction of quarters for the divisional officers at Chettipett was in progress. The lower storey was completed with the exception of plastering, &c., and the upper storey was ready for the roof. The expenditure to the end of the year amounted to Rs. 12,870.

KISTNA EAST.—Alterations and improvements to the Gudiváda Taluk Cutcherry were carried out at a cost of Rs. 1,190, and the roof and wood-work of the old St. J[illegible]n's Church in the Fort of Masulipatam were removed at outlay of Rs. 335.

KISTNA WEST.—Improvements to the Guntúr Jail were nearly completed. Expenditure to the end of the year Rs. 36,671.

NELLORE.—The conversion of the old barracks at Ongole into a residence for the Sub-Collector was under execution, but progress was delayed pending sanction to a revised estimate. Expenditure Rs. 7,386.

A Sub-Registrar's Office at Ongole was completed at a cost of Rs. 2,243.

A bungalow for the Assistant Superintendent of Police at Ongole was purchased for Rs. 2,000, and repairs to the building, amounting to Rs. 1,643, put in hand.

CUDDAPAH.—The main buildings of the Taluk Cutcherries at Madanapalle and Kadiri were completed and the out-buildings nearly so. The total expenditure on the former amounted to Rs. 31,869, and on the latter to Rs. 34,289.

The improvements to the Jail Hospital at Cuddapah were almost completed. Total expenditure Rs. 7,675.

COIMBATORE.—A Sub-Collector's Cutcherry at Erode was completed at a cost of Rs. 12,916.

The construction of Police huts at Hassanúr and additions and improvements to the District Munsiff's Court at Collegal, which were commenced in the previous year, were finished during the year under review.

WEST COAST.—A revised estimate, amounting to Rs. 4,02,914, for Government House, Ootacamund, was sanctioned in February 1882, and Rs. 39,099 were spent out of an allotment for the year of Rs. 60,000.

The building known as Crewe Hall at Ootacamund was purchased for Rs. 9,600, for the accommodation of the Clerks of the Government Secretariat, and Rs. 1,090 spent on repairs.

A commencement was made with the Government Chinchona buildings at Naduvatam, the estimate for which amounted to Rs. 31,074; but from deficiency of establishment and other causes the progress of the work was slow.

Rs. 1,541 were spent on the new cemetery at St. Thomas' Church at Ootacamund, against an estimate for Rs. 2,890.

Additions to the warders' cottages at the European Prison, Ootacamund, were made at a cost of Rs. 5,813.

A Registrar's Office at Calicut was in progress.

Additions and improvements to the Lunatic Asylum at Calicut commenced in the previous year were continued, the total expenditure being Rs. 4,084, against an estimate of Rs. 8,865.

A new Telegraph Office at Devála in the Wynaad was almost completed at the close of the year. The work was constructed of framed timber, with a corrugated iron roof and tiles, most of the materials having been obtained and fitted at Calicut. The estimate amounted to Rs. 10,400.

A Head Assistant Collector's Cutcherry at Cundapur, commenced in the previous year, was completed, the expenditure to the end of the year being Rs. 8,117.

A District Munsiff's Court at Udipi, also an incomplete work of the previous year, was finished at a cost of Rs. 8,955.

The conversion of the Sub-Divisional Office at Puthur into a Taluk Cutcherry was in progress.

Alterations and additions to the District Munsiff's Court at Mangalore were carried out at a total cost of Rs. 6,511.

The reconstruction of the District Jail at Mangalore, commenced in the previous year, was continued, but with slow progress. Total expenditure Rs. 7,206.

SALEM.—Alterations and improvements to the Taluk Cutcherry at Krishnagiri were completed at a total cost of Rs. 4,055.

Mr. Longley's bungalow at Salem was purchased for Rs. 15,000, as a residence for the Collector of the district.

A first-class Police Station-house at Tirupatúr was completed at a cost of Rs. 2,003.

Two quarters for the Hospital Assistants attached to the Central Jail at Salem were constructed for Rs. 1,484.

Two rooms for a Sub-Registrar's Office were added to the Taluk Cutcherry at Krishnagiri at a cost of Rs. 2,014.

Repairs and alterations to the Civil and Sessions Court at Salem were in progress.

NORTH ARCOT.—A Sub-Magistrate's Cutcherry at Tirutani was in progress.

An Assistant Collector's Cutcherry at Chittoor was completed at a cost of Rs. 4,068.

Alterations and improvements to the Taluk Cutcherry at Palmanér were finished at an outlay of Rs. 4,185.

The restorative works to the temple in the Vellore Fort were completed. Total expenditure Rs. 4,254.

PRESIDENCY.—An upper storey to the Government Stationery Office was completed at a cost of Rs. 8,602.

Iron sheds were constructed and a truck turn-table placed in the import-yard of the Sea Custom House at an outlay of Rs. 16,215.

A new wall along the northern boundary of St. Andrew's Kirk was finished for Rs. 4,904.

A new godown for the office of the Inspector-General of Police was built for Rs. 4,180.

The reconstruction of the roof of the infirmaries attached to the Monegar Choultry was in progress. Expenditure, Rs. 4,913 against an estimate of Rs. 5,835.

Rs. 3,872 were expended to the end of the year on the cricket ground in the Chepauk Park.

The boundary wall and gate for the west side of Chepauk Park were finished. Total expenditure, Rs. 10,257.

Alterations and additions to the Government Work-house at Ráyapuram were carried out at a cost of Rs. 19,062.

The Medical School at the Monegar Choultry was completed at a total cost of Rs. 15,086.

A new picture gallery at the School of Arts was in progress.

In addition to the above, 33 minor new works were in progress at the Presidency, of which 31 were completed.

CHINGLEPUT.—The lower storey of the Agricultural College at the Government Farm, Saidápet, was completed at a cost of Rs. 31,928.

A Subsidiary Jail with out-houses at Mannárgudi was in progress.

SOUTH ARCOT.—Rs. 10,000 were spent in the collection of materials for a new Collector's Cutcherry at Manjakuppam.

TRICHINOPOLY.—Improvements to the Taluk Cutcherry at Jayankondacholapuram were completed.

New teak-wood barred gates and gate pillars at the Central Jail at Trichinopoly were nearly completed.

TANJORE.—A Sub-Registrar's Office at Kumbakónam was completed at a cost of Rs. 5,069.

A District Registrar's Office at Tanjore was in progress. The expenditure to the end of the year was Rs. 3,651 against an estimate of Rs. 10,280.

Rs. 2,531 were spent in the collection of materials for a District Jail at Tanjore.

The repairs to the Tanjore Palace were continued through the year, but were still incomplete. The outlay to the end of the year was Rs. 20,417 against an estimate of Rs. 28,988.

Rs. 2,646 were spent to the end of the year on repairs to the Tiruvadamarudúr Palace against an estimate of Rs. 9,000.

TINNEVELLY.—The expenditure during the year on the new jail at Palamcottah amounted to Rs. 9,722 bringing the total outlay to the end of the year to Rs. 94,558. The new work is still in progress.

A new Police Station at Sivalaperi was nearly completed.

MADURA.—Rs. 24,991 were spent during the year in connection with the restoration of Tirumala Naick's Palace:—for further remarks see under "General Observations" below.

NEGAPATAM.—Three Police huts at Mahadevapatam were constructed for Rs. 1,000.

The Taluk Cutcherry at Patukóta was provided with a lightning conductor. A corrugated iron roof was put on St. Peter's Church at Negapatam at a slight saving on an estimate of Rs. 6,750.

Sub-Registrars' Offices at Tiruturaipúndi, Tiruválúr, and Negapatam were in progress.

PROVINCIAL COMMUNICATIONS.

GODAVARI EAST.—Rs. 6,612 were spent during the year on the maintenance of the navigation works at Dumagudiem.

VIZAGAPATAM.—The expenditure on the new Potinghi Ghât amounted to Rs. 54,496. The progress of the work was much retarded during the first half of the year by insufficiency of establishment, but under the new scale which came into force on the 1st October 1881 the Upper Subordinate Establishment on the ghât was increased, and the work then progressed fairly, considering all the difficulties connected with it. One of the most serious drawbacks regarding this ghât is fever, which frequently prostrates the officers and subordinates engaged on the work.

Almost all the blasting operations on the ghât were carried out with dynamite. The description used was "Nobel's Kisselgurt" Explosive No. 1; it was employed in all cases on hard rock, chiefly granite and gneiss. Powder was used only in a few places on soft rock, &c.

MADURA.—Rs. 5,701 were spent on the preparation of materials for the new Cumbum-Gúdalúr road, the estimate for which amounts to Rs. 72,148.

This work has now been handed over to the Local Fund Board for execution from Provincial Funds.

PROVINCIAL IRRIGATION AND NAVIGATION.

BUCKINGHAM CANAL.—The net Provincial grant for this work for the year and the total outlay are shown below:—

	Grant.	Outlay.
	Rs.	Rs.
Original Works	1,47,218	1,44,413
Revenue Extension and Improvements and Repair ...	87,115	83,877
Tools and Plant	3,900	3,645
Total ...	2,38,233	2,31,935

The major works carried out in the different sections of the canal were as follows:—

Extension of Canal from Pálár to Merkanum Backwater.—Work completed.

The construction of a Lock at the head of the Sadras Canal on the right bank of the Adyar River was in progress.

The construction of a Lock at the southern end of the Junction Canal on the left bank of the Adyar River was commenced, but work had to be suspended for want of baling appliances.

Extension from Adyar to the Cooum River.—An expenditure of Rs. 7,108 was incurred in the adjustment of land compensation.

Embankment on west side of Canal from 46 miles 3 furlongs to 62 miles 6 furlongs.—This work was nearly completed.

Diversion along the east border of the Pulicat Lake.—Between 38 miles at the north end of the Thettupett cut and 43 miles 5 furlongs near Jamagopolliem. But little progress was made in this portion.

Diversion at the Soornamuki River crossing including an embankment for forcing the river to its old bar at Kottapatam.—The south side of the river was cut through, and the cross bund to Salla Calva was built to full height. Flood banks to Salla Calva, north and south of the cross bund, were completed.

The flood bank on the right side of the Soornamuki River was finished. Scouring channels were excavated, and the high banks along the diversion of canal on the north side of the river were partly removed. A small cross bund between the river and Salla Calva was made; the course of the Salla Calva was straightened above the cross bund; the nose of the island was rounded off; a projection on the right bank of the river was removed, and a flood bank on the left side partly made.

First-class Inspection Bungalow at Ramapatam.—Work completed.

Bund across the head of the North Branch of the Pennér River.—Work completed.

Basin at Kottapatam.—Work completed.

Raising the Ongole-Kottapalam Road and constructing a road dam of 300 yards to the west of the old road dam which was destroyed.—Work completed.

Diversion at the Manneru south entrance from 159 miles 7 furlongs and constructing right and left banks.—Work completed with the exception of planting rabbit wort on the spoil banks of the south diversion and the turfing of the right and left flood banks.

Drainage Channel from Uppukunduruvagu to Pedda Ganjam Creek.—This work was carried out by the Executive Engineer, Kistna Western Division.

Inlet and Outlet crossing at the Pedda Ganjam Creek.—Work completed.

Under tunnel at the crossing of the Uppukunduruvagu.—This work was also under execution by the Executive Engineer, Kistna Western Division.

Junction from the Buckingham to the Commamur Canal.—Work completed.

The bulk of the outlay on repairs was incurred on the Northern Canal from Cusba to Kundaleru and from the Pennér to Romperu. The silting in the latter was principally caused by the canal receiving the whole upland drainage, especially at 170 and 177 miles. The most extensive clearances were only effective for a short time, particularly at the Pennér, Chippaleru, Paleru, Manneru, Gundlakamma, and Thonderu river crossings, where shoals are rapidly formed, and the work of removal had to be constant; but this will not continue when all the contemplated improvements have been carried out. Many shallow places in the Pálár, the Southern Canal, the back-waters between Madras and Pulicat, the silted portions between 47 and 89 miles and near Kundaleru were deepened, and on the whole the canal was kept in passable order. The traffic receipts, consisting of license fees and tolls collected during the year, amounted to Rs. 1,20,055, showing an increase of Rs. 10,247 over the receipts of the previous year. The tonnage of boats plying on the canal was registered at 10,215 tons.

Progress was made during the year in framing the complete estimates for the work, the whole of those connected with the Northern Canal were nearly finished and the final report with the general abstract will shortly be submitted. When these have been disposed of, the preparation of the estimates connected with the Southern Canal will be taken in hand.

PROVINCIAL MISCELLANEOUS PUBLIC IMPROVEMENT.

PRESIDENCY.—An outlay of Rs. 2,215 was incurred on the conservancy of the Cooum River, Rs. 900 on the opening and closing of the Cooum bar, and Rs. 1,234 on the closing of the Adyar bar.

SPECIAL CIVIL BUILDINGS.

GODAVARI WEST.—A school-house at Víravásaram was nearly completed.

CUDDAPAH.—A Middle School at Madanapalle was completed at a cost of Rs. 4,687.

NEGAPATAM.—A dispensary at Tiruturaipúndi was constructed at a total cost of Rs. 3,946.

Rs. 500 were expended in improving the port of Negapatam, leaving work to the extent of Rs. 5,915 to be completed.

The harbour wall was repaired and completed. The jetty and lighthouse were repaired.

SPECIAL COMMUNICATIONS.

GODAVARI.—The expenditure during the year on the Covur-Munjair Junction Canal amounted to Rs. 19,318. About six miles of the earth-work were completed at the end of the year. The Bhavaram aqueduct and two irrigation sluices were completed, and the girder bridge under the Cocanada Kotapilli about three-fourths done. Arrangements were made for commencing the Kurada aqueduct.

TRICHINOPOLY.—An outlay of Rs. 24,232 was incurred by the department in forming or repairing eight roads in the division.

TANJORE.—Seventeen roads in this division were formed or repaired at a total cost of Rs. 16,601.

NEGAPATAM.—The bridge across the Ordamboghiaur at Tiruválúr was widened at a total cost of Rs. 3,835.

GODAVARI QUARRIES.

The quantity of stone despatched from the Godávari quarries during 1881-82 and the two previous years was as follows :—

Years.	Quantity in Cubic Yards.	
1879-80	20,904	Including building dressed, Cyclopean groyne and concrete stone.
1880-81	22,881	
1881-82	18,991	

DOWLAISHWERAM WORKSHOPS.

The total expenditure during the year was Rs. 81,049, of which Rs. 41,068 were for new works, Rs. 22,927 for repairs, Rs. 9,966, the value of work done for private parties, and Rs. 7,088, the amount spent on workshop stores and sundries. The charge for establishment was Rs. 10,650, or 14·39 per cent. on the value of work turned out, not including stores and purchases. The recoveries by bills amounted to Rs. 71,603. At the end of the year this workshop was converted into an ordinary sub-division of the Godávari Eastern Division, and the special additional allowance previously drawn by the Executive Engineer in charge of the shops discontinued.

PRESIDENCY PUBLIC WORKS STORES AND WORKSHOPS.

The opening balance of serviceable stock in store on the 1st April 1881 was valued at Rs. 3,92,645, or Rs. 58 in excess of the amount entered in the Administration Report for 1880-81. This excess was owing to credits afforded after the report was drawn up. The receipts from all sources during the year amounted to Rs. 1,66,770, which, with the opening balance, made a total of Rs. 5,59,418. The remains on the 31st March 1882 amounted to Rs. 4,70,505, or Rs. 77,857 more than the opening balance of previous year. The closing balance did not include the value of repairable and unserviceable instruments, &c., received in store during the year. These are borne on the books numerically, and when repaired are brought on the stock accounts with value, while the unserviceable articles are sold.

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The receipts were from the following sources :—

	RS.	A.	P.
From London	14,437	1	8
„ Civil Departments	1,850	8	5
„ Military	798	13	2
„ Public Works Divisions	37,291	7	8
„ Presidency Public Works Workshops	90,212	5	1
„ Railway	378	1	3
„ Local Market	21,802	2	4
Total ...	1,66,770	7	7

and the issues were as under :—

	RS.	A.	P.
To Public Works Divisions	43,762	10	9
„ Presidency Public Works Workshops	12,592	3	1
„ Dowlaishweram Workshops	267	13	11
„ Civil Departments	5,890	7	10
„ Military Department	1,318	14	4
„ Native States	8,208	9	10
„ Railways	768	3	11
„ Municipalities	400	14	10
„ Local Fund Boards...	8,407	7	3
„ Private parties	7,296	4	0
Total ...	88,913	9	9

The surplus stores of the Presidency Public Works Workshops were transferred to the Store Department, as also a large quantity from divisions, and the entire stock of the Public Works Stores was carefully checked during the year.

The amount received from Government for the operations of Workshops was Rs. 1,02,139 in cash and Rs. 16,942 in stores, making a total of Rs. 1,19,081, against which credits were afforded by cash Rs. 24,906, and by book adjustments Rs. 2,22,703, or a total of Rs. 2,47,609.

The advances made by Government were therefore more than repaid by Rs. 1,28,528.

The work turned out was as usual of a most varied character, and a considerable quantity was executed for nearly all departments of Government. For further remarks see "*General Observations.*"

PLANS AND PUBLICATIONS.

The following is a summary of the work turned out by the Lithographic Branch attached to the Chief Engineer's Office during the official year 1881-82 :—

Different Departments.	Amount. RS.	A	P.	Remarks.
General Branch, Public Works Department ...	3,484	6	1	
Irrigation Branch do. do. ...	3,606	8	0	
Examiner of Public Works Accounts	3	0	0	
Consulting Engineer for Railways	57	8	0	
Secretary, Board of Examiners	36	8	0	
Civil Engineering College	55	8	0	
Sanitary Commissioner	676	12	0	
Through Gazette Press. — Military Department ...	172	9	7	
Through Gazette Press. — Public do. ...	2,781	4	4	
Through Gazette Press. — Revenue do. ...	42	0	0	
Through Gazette Press. — Board of Revenue ...	120	0	0	
Marine Department	274	0	7	
Quartermaster-General	2,090	5	9	
Director of Public Instruction	6	0	0	
Private sources	* 106	5	0	* By cash and paid in to the Executive Engineer, Presidency.
Total value of Work turned out ...	13,512	11	4	
Deduct cost of Establishment ...	11,100	0	0	
Balance in favor of the Government Lithographic Branch ...	2,412	11	4	

GENERAL OBSERVATIONS.

MADRAS HARBOUR WORKS.—At the date of the last Administration Report the piers forming the breakwaters of the Madras Harbour were approaching completion as originally designed, though the pier heads and so-called "horns" (100 feet long each) had, from certain difficulties connected with this portion of the work, to be left unfinished.

The north pier was brought to its full length of 3,866 feet 6 inches from the shore end of the work in September.

At the extreme end the width is made up with a thickness of four concrete blocks; 239 blocks being here in all employed.

The rubble base, with the exception of a small amount which it had been the practice to leave for levelling up as the work of block-setting proceeded, was completed about April 1881. Only 1,411 tons of stone were used, as the base had very nearly been completed during the previous year. The total amount of stone used for the north pier rubble base, including the surf bank, from the commencement of the work has been 474,841 tons.

At the close of the previous official year a greater length remained for the completion of the south than the north pier. During 1881-82, 765 blocks were set, completing a length of 335 feet. This brought the total length of the pier from the shore end to 3,970 feet, and finished it, with the exception of the "horn," as at the north pier. Some delay and a good deal of inconvenience were experienced during the south-west monsoon, by the seas at high water frequently washing over the pier. The open space between the two pier heads was brought to the exact width for the Harbour entrance (550 feet,) according to the last sanctioned design.

The rubble base was completed, 44,905 tons of granite having been deposited by lighter boats.

It will thus be observed that for the year the amount of stone deposited for rubble bases was 46,316 tons, the number of blocks set 1,004, and the length of pier built 356 feet. The number of blocks made and completed by 7th June 1881 was 558. The amount of stone quarried was 94,410 tons, being 32,836 tons of laterite from Ambattúr (chiefly used for the beach protection and beach improvement works,) and 61,574 tons of granite from Pallávaram hills, chiefly used for rubble base and block-making.

As owing to the damage done by the cyclone of November last the progress of the work has been stopped, it may be as well to observe here that the total amount of stone deposited since the commencement of the work for the surf banks and rubble bases has been 930,758 tons; length of break-water constructed 7,836 lineal feet; number of concrete blocks set 13,809, and of blocks made 13,643.

The moorings and apparatus for screwing them down arrived from England in the autumn. As a preliminary arrangement the two hopper barges, *Salisbury* and *Hobart* (having completed their legitimate work of depositing rubble base), were made fast together so as to form a twin vessel, in order to give a sufficiently wide platform for the screwing engine and for supporting the shear legs, &c. Delays were at first experienced from the ill-fitting of some of the apparatus, but these being overcome, the first screw was pitched and driven on 2nd August 1881, the time occupied being four and a half hours; within another three and a half hours one of the new small iron buoys was shackled on. In this way up to 9th November fifteen screws were screwed home, nine for small buoys, intended for small craft, which were shackled on, and six for large buoys. Only one of the latter was made fast, as each requires four screws, and only a pair had been driven of one set, when, owing to the heavy swell entering the harbour with the north-east monsoon, the twin vessel had to be shifted.

The progress of the protective works north of the harbour was also steadily maintained during the year under review. In October the sea began its usual encroachment on the shore to the north, at a distance of one mile from the north pier, and a narrow gauge railway having been specially laid down, the revetment work was by this means pushed on to a distance not previously reached; though here, and even further north, groynes of large stones had been constructed with the object of maintaining the line of beach. Till the occurrence of the cyclone of the 12th November,

the extension of the revetment work had the desired effect of fairly protecting much of the valuable private property, but as will subsequently be seen the storm alluded to did considerable damage. Altogether 18,357 tons of stone were used, including the amount employed after the cyclone in closing the breaches in the revetment and extending its length.

Beach improvements were undertaken under Government sanction at the suggestion of the Master Attendant. The work consisted of reclaiming the beach within the limits of the harbour, bringing it up to the level of the beach road for a general width of 225 feet, and covering it with stone and gravel so as to form a wide level platform for facilitating the work of the port. The construction of two small jetties, each about 400 feet long, one on each side of and parallel with the iron pier and furnished with small hand cranes, formed part of the plan. The construction of lines of railway from the jetties into the Custom-house yard, and the building of large warehouses for the storage of goods were to complete the arrangements. The beach was raised, the sea-face pitched with stone and the whole metalled with laterite. The jetties were formed with a laterite core, a few satin-wood piles being employed as a frame work. The cyclone of November dispersed much of the stone deposited for these jetties, and in other respects clearly demonstrated the inutility of proceeding with this portion of the work on the original design, so long as the breaches of the piers remained open and admitted so much swell from the open sea. Other arrangements for facilitating the lading and discharge of goods direct from cargo boats are therefore now under consideration. The raised beach, however, is not only a great improvement in every respect to the frontage of the harbour, but has proved to be of considerable use to the trade of the port. Goods which formerly had to be carried by coolies across the sand to and from the carts which lined and blocked up the beach road are now placed directly in the carts from the boats. Cleanliness has, moreover, been insured by the necessity which these works entailed of discharging all the drains previously vented across the sands into the intercepting sewer which delivers north of the harbour all the drainage collected from the town.

The cyclone which occurred on 12th November 1881 struck Madras with great suddenness. It may be mentioned as an instance of this that the Assistant Superintendent of the Harbour Works was on the sea in a jolly-boat making observations on the currents on the evening of the 11th November, and landed without much difficulty. Still as foul weather was to be expected in this the normal cyclone period, the titan cranes had as a precaution been withdrawn and made fast to the portion of the pier heads, which having a thickness of four concrete blocks was necessarily held to be the strongest portion of the work.

The Government Astronomer describes the cyclone as "having exhausted its greatest force while crossing the bay before reaching the coast of Southern India, which would account for the high destructive sea far beyond what might have been expected from the Metecrological indications accompanying its progress. The centre of the cyclone must have struck the coast considerably southward of Madras.* * *" The force of the wind was, at no time, very great, the maximum recorded velocity being not more than 33 miles an hour. Various opinions have been expressed as to the height and force of the sea, the weight of professional opinion (Marine Department) and of old experienced native boatmen going, however, to show that the sea was much less than in the cyclone of May 1872. Mr. Parkes, basing his conclusions mainly on the evidence of the Consulting Architect, who had witnessed both storms, came to the conclusion that the one of the 12th November "must rank with those of the great historical cyclones," at the same time not considering it one of maximum intensity. Mr. Molesworth, who was deputed by the Government of India to examine the work immediately after the occurrence, considered that, owing to the point at which the cyclone had its origin somewhere in latitude 10°, and the path followed till it struck the coast a little north of Pondicherry in latitude 12°, the wave of translation thus generated at a distance from the shore proved itself to be a most formidable agent of destruction, very much more so than any mere surface waves which could have assailed the work.

Great weight must no doubt be attached to the opinion of so distinguished an Engineer, but the Marine authorities and other practical seamen who witnessed this

and other storms are so unanimous in their opinion that the sea, though much higher than might fairly be expected from the low wind pressure, was not of expectional height, and certainly less than that of 1872, that this view must apparently be accepted as correct. The first damage to the works was the overthrow of the south pier titan, which, as above shown, had sometime before been withdrawn from the end of the pier and made fast to the blocks by chains, &c., as an extra precaution. Before noon the north pier titan was overthrown, and it was then observed that there was a breach about 50 feet in length in that pier, a short way astern of the titan, and a breach, about 300 feet in length at the outer end of the straight portion of the south pier. After that very little could be seen of what was taking place on account of the spray and rain. On examining the work next evening in a boat, the damage found to have been done within the twelve hours during which the sea was highest was half a mile of breakwater breached, and, on an average, the two top courses of concrete blocks thrown over into the harbour, two titan cranes overthrown and destroyed, a mile and a half of single line of railway destroyed, the rubble base lowered and spread out, and the twin barges, *Salisbury* and *Hobart*, foundered and lost, besides a quantity of minor damage, such as the loss of small boats, injury to the platform, piles and bracing of the iron pier, the encroachment of the sea at Ráyapuram and damage the boundary walls and out-buildings of private property in that neighbourhood.

Most unfortunately Captain A. C. Berlie (an old and respected officer), Master of the twin barges *Salisbury* and *Hobart*, and twelve of his native crew lost their lives when these vessels foundered, but Mr. Boteler, Foreman of Mooring Operations, and three lascars, managed to swim ashore and were saved. The syrang and two lascars were, moreover, rescued on the following morning, having clung all night to the mast of the wreck. Gratuities were granted by the Government to Captain Berlie's widow, and to the families and representatives of the men who lost their lives, and of six months' pay to the men saved.

On the 29th, 30th, and 31st December another cyclone passed over Madras, but having its centre near that place the sea was not very high and no further damage was sustained by the works.

Full accounts of the 12th November cyclone were at an early date furnished by the Superintendent and the Engineer-in-Chief of the works, by Mr. Molesworth and Lieutenant Stiffe (deputed by the Government of India), and the Chief Engineer, Public Works Department, accompanied by proposals for completing the Harbour. No decision having as yet been arrived at by the Government of India and the Secretary of State, to whom the several reports, &c., were submitted, it need only here be observed that there is a concensus of opinion, whatever may be the modifications to be introduced in completing the works so as to withstand future storms, that

(1) the piers had up to the occurrence of the last cyclone been pushed forward on a plan which insured both economy and expedition in a marked degree;

(2) shelter had thus in great measure been provided in all ordinary weather and still exists, to the great advantage of the port;

(3) the injuries can be made good and the work rendered safe within about three years at a cost which will still make this harbour (which is wholly artificial) a comparatively cheap work of its kind.

From January to the close of the official year the chief work consisted of levelling up with concrete the top of the north pier, relaying the lines of railway, in clamping together the walls of the north pier by old rails bent and let into the lewis holes of the top blocks, repairing and strengthening the North Beach Protective Works, making good the damage done to private property, and in extending the protective revetment further to the north.

Mr. Parkes, the Engineer-in-Chief of the Harbour, arrived in Madras at the end of December, and having examined the Harbour Works and made his report to Government, visited on special duty and reported on the ports of Vizagapatam, Bimlipatam, Calingapatam, and Quilon. He left for England on 9th April 1882. Mr. Thorowgood, Superintendent of the Harbour Works, after $5\frac{1}{2}$ years of arduous and constant responsibility in execution of this great work, was obliged to take

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sick leave for England on 3rd February 1882, Mr. N. St. B. Beardmore, C.E., assuming charge as his *locum tenens*.

Colombo Harbour.—In the course of the year the Colombo Harbour was visited and reported on by the Chief Engineer and Master Attendant. As it appeared to these officers that the section given to this work was much more massive than that of the piers of the Madras Harbour, and as some of the concrete blocks of the latter had to some extent been undermined and had slipped down during the heavy sea of November 1879, it was deemed desirable to bring the facts under notice in view to Mr. Parkes' attention being drawn to them. It was also submitted whether some such extra precaution as that taken at Colombo Harbour, by tipping large masses of granite over the seaward face of the work, particularly along the exposed portions of the north arm, should not be considered.

Mr. Parkes, in his reply, submitted through the Secretary of State, did not however consider that his piers required strengthening to the extent followed in Sir John Coode's work.

Only portions of the Madras work would be subject to a destructive force similar in kind to that which had injured the Wick Harbour. At the ends of each pier his work would be 45 feet wide, and he thought it "impossible to imagine them liable to any such damage;" also as regarded the shocks of heavy seas, the last-built lengths constructed as they were on the unbonded system, had "uniformly served to consolidate them and improve their condition," and that this had been the "most important result of our experience at Kurrachee and Madras."

As regarded the covering of the surface of the foreshore by tipping over large blocks of granite, Mr. Parkes did not consider this to be necessary, as "in these particulars the design of the Madras breakwaters is carried further than in any other work" with which he was acquainted.

The time has not arrived for placing on record other matters connected with the discussions on the subject of the Madras work, but it is necessary to advert to the above as the outcome of the inspection of the Colombo work in the year under review.

Mangalore Harbour.—During late years at this Port great inconvenience has been experienced from the mouth, common to both the Netrávati and Gurpur Rivers (which here debouch in the backwater), having in process of time moved so far north as to necessitate all cargo and other boats, plying between the shipping in the offing and the Custom House, having to make such a detour as to seriously hamper trade. Shoals also from the same cause established themselves in the backwater opposite the Custom House, and between that and the mouth, which had in 1880 moved nearly as far north as Sultan's Battery on the Gurpur River. In addition to this rather critical state of matters another danger presented itself of a no less serious character. All rivers along both coasts of the peninsula on reaching the coast line are diverted north by a spit of sand, the head of which is pushed yearly further north by the action of the south-west monsoon, till from want of discharging power by the northern mouth, a maximum limit to this action is reached, and the river bursts its way through the sandspit at its most southern point. This new mouth recommences the same movement as before to the north. At Mangalore the action described is greatly complicated by the convergence of the two rivers; but the southernmost one, the Netrávati, having much the greatest volume, it was to be expected that the mouth, which had been moving north at the rate of about 300 feet per annum, and had apparently reached its maximum limit in this direction, would soon, in case of severe flood, suddenly establish itself south in the normal direction of the stream. Should this occur, the Custom House, which is placed $1\frac{1}{2}$ miles up the backwater, would be more than ever exposed to isolation from shoals, and the trade of the port to very serious risks.

Under these circumstances, after an inspection of the port by the Chief and Superintending Engineers and Master Attendant, it was decided, with the sanction of Government, to attempt to open a new mouth for both rivers nearly opposite to, but slightly south of, the Custom House.

Work was commenced early in April by cutting a deep but narrow channel very nearly through the sandspit, and arrangements made for soliciting through this cut

the next flood of the Netrávati if judged to be in sufficient volume to open the small channel, and thus establish the new mouth. On the 28th May the sea, which was high and rough, burst into the cut, filled it with sand, and for the moment prevented further chance of opening the new mouth. In June the cut was re-established, and all kept in readiness. The Netrávati River began to rise in flood on the 3rd August. On the 5th there was apparently sufficient water to do what was required, and after some failures the mouth was successfully opened. The flood, however, which lasted 40 hours, was insufficient to maintain the current, and the surf, which unfortunately was strong for this time of year, gradually shallowed and eventually closed the outlet.

Further attempts were useless for the year, but it may here be mentioned that in the current year arrangements having been made for repeating the process, a flood which came down the Netrávati on the 6th July has opened the new mouth successfully. The reports were not altogether favorable at first, as, although 800 feet wide on 17th July, the new mouth appeared shallow, and had not drawn the main current into it. A later report however shews that the width of the newly-formed mouth has reached 1,100 feet, has a depth from 14 to 18 feet with very strong current in side and a clear minimum depth of 5½ feet over the bar outside. To the north morever, the backwater has shallowed and the old mouth contracted with a diminished current. The prospects of complete success are thus considerable, and much credit is due to Lieutenant West for his management of a very difficult operation.

Calicut Pier.—As in the previous year, so during that under review, the question as to what should be done with the pier at this place has engaged attention. On the very pressing representation of the influential European firms at Calicut an estimate for a screw pile pier, with double set of rails, cranes, and plant, amounting to Rs. 64,000, was sanctioned in June 1869; but as laterite was found on the sea bottom close opposite the old Custom House, where all the native business of the port was carried on, it was decided, in order to facilitate the screwing home of the piles, to erect the new pier, and with it also the new Custom House about a mile further to the north.

When, after completion of both works, it became a question of moving the Custom House work to the new site, serious opposition was manifested by the native merchants, who have practically four-fifths of the trade in their hands, against moving from the old Custom House, immediately opposite which was the best and most sheltered anchoring ground for patimars. The validity of these contentions was admitted by Government, and while the European merchants have since then used the screw pile pier and new Custom House, the natives still adhere to the old site. There is little surf to disturb landing operation, excepting for a few days each year, and all the conditions are so suitable that there exist no reasons or inducement for the Native merchants to use the new works.

The pier was never a very strong structure, and what with shocks from heavy cargo boats, corrosion of the iron work, &c., its condition deteriorated so much that an estimate was submitted last year, amounting to Rs. 24,500, for its thorough repair. As the capital outlay to date against the work amounted in all to Rs. 73,000, this additional outlay, if sanctioned, would have raised it to one lakh charged to Port Funds. As the mere cost of the pier establishment, irrespective of ordinary repairs and interest, about Rs. 980, had never been quite covered by the receipts, and as the work existed solely in the interest of the European firms, the Government, before entering on any further unprofitable outlay, have considered it desirable to submit certain proposals for the acceptance of the firms in question, which, if not agreed to, the work will be sold or abandoned.

Beypore Harbour.—A little south-west of the river mouth here and distant from the shore about 200 yards is a small laterite island, close north of which is the river bar some 7 feet in depth. Formerly this island was merely connected with the shore by a low sandspit which, during heavy weather, the fishermen occupying a village to the south used to cut through, to allow of the passage of their boats with a view to saving themselves the trouble of going out to sea round the island.

Mr. Robertson, the Harbour Engineer, who examined and reported on the port in 1871, recommended that this practice of the fishermen should be prevented, and a sea wall built connecting the island with the shore, so as to concentrate as much as possible

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the floods of the Beypore River, and thus secure all the effluent water for scouring out and deepening the water on the bar.

The work was duly carried out, but its conservation has occasioned some trouble, as, owing to the form of the island and its position, peculiar currents are occasionally established which have injured and breached the work, especially at its shore end. The sea wall then constructed having been injured, a small estimate (Rs. 1,110) for its repair was sanctioned in February 1881, but in the following June, on the occurrence of unusual weather, the wall was again much injured. This action went on for some months, and the Local Fund road running along the shore south, and adjoining the property of the railway (which here lies only a very little way in from the shore) was encroached on by the sea, and to some extent washed away.

The charge, Rs. 5,340, for the work rendered necessary by this action was shared by Port Funds, and operations were commenced in last March.

Owing to circumstances unnecessary here to detail, the work made unsatisfactory progress, and early in commencement of the south-east monsoon a still more dangerous set of the ocean took place to the south of the island, which not only caused a further encroachment on the shore, but brought the sea so close to the line of railway as to cause anxiety for its safety, should the erosion which had set in be continued.

Works are now being pushed on for the protection of the shore under the Railway Engineers, and these, it may be hoped, will have the desired effect; there can however be little doubt that the action along the coast during the late monsoon, which has been one of exceptional severity, has been very extended, the safety of the Cochin light-house, of the Cruz Milagre dam, and of the railway at Beypore being all alike to some extent endangered. The peculiar character of the currents which occasioned this erosion of the shore is as yet insufficiently understood, and will call for careful study. On this will depend whether the cheap expedient of rough-stone groynes run out at intervals from the shore, or the more expensive plan which has been found necessary north of the Madras Harbour, of a longitudinal revetment [illegible] will have to be resorted to.

Cruz Milagre Dam.—During the year 1862 the sea, which had been for some years previously making gradual inroads upon the coast to the north of Cochin, broke through into the backwater at a point called "Cruz Milagre" (or the Miraculous Cross, from a church of that name which formerly stood there, and which had been submerged), about a mile and-a-quarter to the north of the Cochin Channel. The gap then formed, though it varied in size from year to year, and had the effect of lessening the depth of water in the regular ship channel, was left unclosed till 1873, when, after great exertion, the needful work was carried out at a total outlay of Rs. 82,827.

There having been for some time no member of the Public Works Department at Cochin, it was decided in last August to make over formal charge of the dam, as also of the sea groynes at Cochin, to the Port Officer, acting under orders of the Master Attendant, leaving this department merely to afford such professional advice when called on to do so, and occasionally to inspect the works.

This arrangement is the only feasible one under the circumstances, but, judging from subsequent occurrences, it cannot be considered altogether satisfactory. In September repairs to the dam, amounting to Rs. 1,350, were called for, and in the current year the action of the south-west monsoon, in bringing down land floods which attacked the dam on the backwater side, and in occasioning a dangerous set of the sea on the west face, has been such as to cause much anxiety for the safety of the work, which in fact at one time was reported to have been again breached.

Cochin Harbour.—The circumstances of this case were sufficiently adverted to in last year's report. Accepting the conclusion arrived at by the professional officers and Mr. Parkes, the Government have decided, by an order issued early in April, that no permanent improvement of this harbour is attainable except at a cost the interest of which could not possibly be met by the trade of the port, even allowing for the increase which might reasonably be expected.

PAMBAN PASS.—In the previous year the question of excavating a ship canal through the pass, or in its immediate neighbourhood, had been examined and reported on by the Chief Engineer and Master Attendant. On this report, which was not favorable to the scheme, Government expressed their opinion that it was undesirable to carry out the costly works which it appeared would be necessary, but that as a matter of general information it would be as well to obtain a section with borings to 26 feet below mean sea level along the line understood to have been originally selected by Sir William Denison about 2 miles east of the Pass, and running directly north and south through the Rámesvaram Island. Owing to the absence of the Port Officer, who was to be charged with this duty, the work could not be commenced till January 1882, and was therefore incomplete at the close of the official year.

A line of levels has now been run from Captain Baird's bench-mark, situated on the western side of the cable house at Pámban, to a bench-mark cut on the south-west edge of the south-east port limit beacon, to which all the levels could in future be referred, and boring operations were commenced. The result of these seem to show that a wavy stratum of rock of no great thickness runs through the island in a nearly easterly direction from the great dam of the Pámban channel. This stratum is about 3,000 feet wide, and at the spot selected for the operations comes within 3 or 4 feet of the surface. The longitude of the trial line is 79° 14″ 40° east, and is through the narrowest part of the island—total length from high water to high water being 11,350 feet. The southern entrance of the proposed canal has a sandy bottom at a depth of 22 feet within 1,000 feet of the shore. Off the northern entrance is a coral reef 500 feet wide, which is nearly dry at low water. Outside of this the bottom is sandy, but interspersed for a short distance with boulders and coral formation, and quickly deepens into 18 and 20 feet of water. Probably further information will be needed before even an approximate estimate could be framed.

In the meanwhile the only further contribution to the general question has been made in a letter from the Master Attendant in September last. This goes to show that while no advantage would be secured by a ship canal to steamers making for the eastern ports of Australia, the Straits, China, Japan, or even Moulmein or Rangoon, it is only with reference to Calcutta or Madras that any sensible advantage can be proved. He shows that, far from an advantage of 350 miles being here gained as claimed by the advocates of the scheme, vessels passing between Aden and Calcutta calling at Colombo would on an average only shorten the distance round Ceylon by 94 miles, or by about nine hours with ordinary steaming. Against this trifling saving would stand "the expense, delay, and risk of the canal, its approaches and passages." Where no Ceylon port was touched at—a very rare case—the saving in distance would not exceed 190 miles. Vessels bound for Madras would save 167 miles if touching at Colombo, or 264 miles if not doing so.

The selection of Colombo as the great calling place for vessels has materially altered the original condition of the question, and, setting aside the grave difficulties to be overcome in the rapid growth of the coral, which gives so much trouble in keeping the present shallow pass clear, the apparent impossibility of providing any reasonable return for the enormous outlay in first construction and subsequent maintenance, is such as to make it extremely doubtful whether the work can ever be seriously undertaken.

IMPROVEMENTS OF THE NEGAPATAM HARBOUR.—It having been brought under the notice of Government that, owing to neglect of planting and other precautions connected with the maintenance of the spit of sand which separates the backwater from the sea at Negapatam, the Kodamurty River might very possibly when in flood establish a new mouth for itself, and thus lead to rather serious complications as regards the trade of the port, the place was visited and jointly reported on by the Chief Engineer and Master Attendant in May.

Briefly the conclusions arrived at, and subsequently approved by Government, were, to plant and otherwise secure by groynes the sandspit; to remove the projecting portions of the west shore at Salt Depôt and deepen the channel of the backwater; to retire slightly with the object of giving a clear run for the river a portion of paved platform constructed by the South Indian Railway for landing coal; to

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extend northward the seaward end of the revetment which fixes the present mouth of the river; to prevent the anchoring of boats along the sandspit and form a new boat harbour close to the Custom House. These works have all been fairly commenced, and though individually small, will, on completion, it is hoped, prove beneficial to the port and its trade.

CUDDALORE HARBOUR.—The question here is somewhat complicated for the same reason as that at Mangalore on the other coast, by the fact of two rivers (the Paravanár south and the Gudalur north) falling into the same backwater and discharging ordinarily by a common mouth into the sea. The place was visited and reported on jointly by the Chief Engineer and Master Attendant in last May.

Some years ago an unsuccessful effort was made to open and fix a new mouth immediately opposite the Custom House, but a renewal of this effort did not commend itself to these officers, who considered that it would be best to investigate and complete the arrangements for allowing the present mouth in ordinary course to move a little to the north and then fix it in the manner which has proved successful at Negapatam, viz., by the construction of a revetment north of the bar. It is thought that within two or three years' time the needful action can be taken with the greatest advantage, and in the meanwhile the requisite surveys, &c., are in progress.

One difficulty, however, presents itself in this case, which will need careful consideration in view to possible removal. Owing to the check given to the velocity of the effluent waters of the Gudalur River at their junction with those of the Paravanár a deposit of sand invariably occurs immediately north of their common mouth, wherever or however formed, and at low water there is from this reason often only a foot in depth of water. Laden cargo boats have thus, as a rule, to wait for half tide to get to the Custom House. No immediate remedy suggests itself for this difficulty other than that of constant dredging which the present trade could not afford. But after all it is a difficulty which frequently occurs in ports both at home and abroad, and if irremediable except at large outlay must be put up with.

SEA DYKE AT MASULIPATAM.—In October the Superintending Engineer brought to notice that the sea dyke was in bad order and would in all probability be breached should a rise of 2 feet above spring tide occur at any time. Such a rise often happens during storms at Masulipatam, and the work was consequently at once sanctioned and has been completed during the year under review. The place has on previous occasions, notably in 1864, suffered so seriously from cyclone waves, against which a dyke of this description is of little or no protection, that much further information on all the circumstances of the case is necessary and will be collected. Further attention will no doubt soon be required to this work for opposite reasons, as during the late exceptionally high land floods the dyke has had to be breached in order to discharge these into the sea.

HARBOURS AT CALINGAPATAM, BIMLIPATAM, VIZAGAPATAM, AND QUILON.—As shown in the preceding year's report, the question of constructing first-class harbours, at Vizagapatam and Cochin particularly, had received a good deal of consideration, numerous projects having throughout a number of years been brought forward without any very definite conclusion being arrived at. The result of the joint examination by the Chief Engineer and Master Attendant in 1880 was generally unfavorable to the construction of any such works, which, under the existing conditions of the coasting trade, they found to be unnecessary, and if carried out, certain not to pay.

During the year under review the question of establishing harbours at one or other of the three northern ports mentioned came up indirectly for solution in connection with the proposed railway between the littoral of Vizagapatam and Raipur in the Central Provinces, as it was considered that the selection of a suitable terminus for any such line on the coast would in great measure depend on the facilities for constructing a harbour at any future time. On the West Coast also the Travancore Government expressed themselves anxious to have the capabilities of Quilon examined, the position appearing to them favorable for the construction of a work of this class.

Under these circumstances advantage was taken of the presence of Mr. Parkes, after the completion of his report on the Madras Harbour Works, to have the capabilities of the four ports mentioned examined and reported on. On the whole his conclusions in reference to Calingapatam, Bimlipatam, and Vizagapatam were sub

stantially those which had previously been arrived at; Vizagapatam, which he considered to be the best of the three, would, if it had thirty times its present trade be in the same position as that held by Madras when Mr. Parkes projected his harbour at that place. Although an exterior harbour might be made some where off the Dolphin's nose, there was not the remotest probability, in the existing state of trade, that it would pay. In view, however, to possible improvements of the bar, as leading up at some future time to the construction of a dock in connection with the tidal basin, he recommended the prosecution of detailed hydrographic surveys, and the cessation, if not also the removal, of all the works which for some years have been in hand for reclaiming a large portion of the backwater. He also advised that hydrographic surveys should be made of the two other ports. For these surveys, &c., arrangements are now to be made.

As regards Quilon, the results of Mr. Parkes' examination were much more favorable, as at comparatively small expense in constructing a breakwater to connect a succession of laterite ridges west of the port a well-sheltered harbour could at first be made for vessels of moderate draft, and eventually, if desired, much increased in capacity. No very sensible remuneration could at first be anticipated from the works he recommended, but it would be apparently quite feasible, by means of a short canal, to connect the proposed harbour with the backwater and canals on the coast. He thought it by no means improbable that Quilon might thus in time draw to itself a large trade. The question is under the consideration of the Travancore Government.

Santopilly Reef.—The subject of the removal of this reef of rock came under the notice of Government in July in consequence of a despatch received from the Secretary of State forwarding certain proposals on the subject to the Government of India, on representations made by the Committee of Lloyds. The reef in question is situated in latitude 18° 4′ 56″ north and longtitude 83° 37′ 35″ east 5½ miles from land, the depth of water over it varing from 7 to 15 feet; and proposals emanating from the Agent of Nobel's Explosives Company to remove the reef by dynamite were submitted. This department has only been indirectly concerned in the matter, and as Commander Dundas Taylor is now engaged with the *Celerity* and *Margaret Northcote* steamers in surveying the reef, the question it is presumed, will be fully dealt with in the Marine Administration Report. It will suffice here to observe that from all the available information the reef is apparently much larger than supposed by the Committee of Lloyds, the expense of its removal will be very great and the utility of the work extremely doubtful, as the light-house together with the use of the lead, are, in the opinion of the Master Attendant, sufficient safeguards for any navigation. The latter authority also considers it would be far better to try dynamite on "the whale rock off Galle, a most dangerous pinnacle, or the Crocodile Rock off Muttum."

Level Bench-marks, Madras.—On the application of Captain Baird, R.E., in charge of Tidal and Levelling Operations under the Surveyor-General, arrangements were made in June for placing the bench-marks at the iron pier and Master Attendant's Office under charge of the Master Attendant, and those at the Cornwallis' fountain, Anderson's memorial, Munro's statue, and Memorial Hall under the President, Municipal Commission.

Dumagudiem Anicut.—Reports having been received of impending serious injury to this large work, which is connected with the great scheme for the navigation of the Upper Godávari—now for some years in abeyance—the place was first visited and reported on by the Officiating Superintending Engineer in September, and subsequently by the Executive Engineer. It was found that although the anicut undoubtedly required attention, nothing of serious moment was the matter, and as regarded the lock gates which had been kept closed throughout the season on a statement that they were decayed, that there was no cause for anxiety.

It is now quite recognised that the amount of traffic using the lock cannot for very many years at all meet the cost of upkeep, and that again the work requiring at times to be executed, though possibly small, is of a character which needs the presence of a man of training and resource when the place (which, moreover, is very unhealthy) may be most difficult of access to any of the supervising staff of the department.

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Notwithstanding the many drawbacks thus briefly adverted to, and others needless to dwell on, the Government, in reliance on the future prospects of the trade, have decided to place a responsible subordinate in charge, to execute such timely repairs, &c., as may be needed for thoroughly maintaining the works. Advantage is to be taken of the presence of the subordinate selected for the position to re-investigate the details for a navigable canal, which, having its commencement at end of the short lock channel at Dumagudiem, is proposed to skirt the left bank of the Godávari as far as Bhadráchalam. The object in view is to turn by this means a succession of rocky obstructions in the main stream between Dumagudiem and Bhadráchalam, from which to Dowlaishweram there is a sufficiently good channel for navigation throughout a considerable portion of the year. There is reason to hope that the outlay may eventually be justified.

Tramways.—Proposals have from time to time reached the Government from interested parties to construct steam tramways between various stations on the Madras Railway and some of the main towns along the route, and chiefly one between the terminus at Beypore and Calicut. Though no final decision has been arrived at in reference to these schemes, it may be observed that in all probability early practical effect will ere long to be given to a sufficient number to test the principle as applied to the particular object in view, which is one of acknowledged importance.

Railway between the littoral of Vizagapatam and Raipur in the Central Provinces.—The necessity of establishing better communications between the coast of Vizagapatam and the cheap grain-producing districts of Chattisgarh and Bustar above the ghâts having pressed itself on the attention of Government, both as a safeguard in case of famine, and as giving these tracts means of communicating with the rest of India while the coast is closed during the monsoon, it was decided, with the concurrence of the Government of India, to have the intervening country fully explored for the location of a railway. With this object, Mr. K. F. Nordmann, Executive Engineer, and Sub-Conductor Cormac were, in September last, ordered to reconnoitre and report fully on the matter.

With a well equipped camp and the aid of four elephants, obligingly placed at disposal by the Maharajah of Vizianagrum, who all along has evinced the most lively and enlightened interest in the undertaking, a start was made in October, the initial point being Parvatipuram, 53 miles north of Vizianagrum.

The reconnoitring party travelled in all upwards of 1,100 miles. Longitudinal sections (taken with the perambulator and aneroid barometer) of 900 miles of country traversed, were prepared and heights above mean sea level determined, on an average, at every mile.

Mr. Nordmann, as the result of his reconnoissance, recommended two alternative routes for acceptance, viz. :—

(1.) *East of the Noagarh Hills*; viâ Rayaguddah 687 feet about mean sea level, Bisemkattak, Ombadola, Bogor, up the course of the Sunder River, then viâ Karial, Torbor, Talbal, Nara, Mahásamnud, across the Mahánadi to Arang and Raipur 963 feet. Distance 372 miles; summit elevation near Satikóna, south of Bisemkattak, 1,300 feet above mean sea level. Ruling gradient 1 in 100. This he considered to be the easier but longer line of the two.

(2.) *West of the Noagarh Hills.*—From Sálúr 35½ miles north-west of Vizianagrum up the Eastern Ghâts (at gradients varying on the several lines proposed from 1 in 35 to 1 in 125) to a natural ghât head called the "Merialpád Saddle" (3,250 feet); thence across the Upper Jeypur plateau (averaging 3,000 feet) to Dumriput; down to Mádeoputi (2,500 feet); then following the course of the Kuradi Nullah downwards to Ránigar (2,018 feet); across the Jeypur Champaign country (averaging 2,000 feet elevation) to Narangpur, Omorkót and Raigarh; to the edge of the Jeypur table land near Koliapodor (2,100 feet); ruling gradient from Ránigar 1 in 100; thence following the drainage downwards to Risgaon (1,569 feet); along the banks of the Soral or Sondor River, viâ Baltema (1,295 feet) to Karti; there crossing the Pairi River; following this river to Rájim (958

feet); thence across the Mahánadi and to Raipur (963 feet). The length of this line would vary from 356 to 343 miles, according to the gradients which may be decided on for the ghât portion of the line, and would thus be from 15 to 30 miles shorter than that east of the Noagarh Hills; but it would not on that account be less expensive owing to the extra cost caused by the heavy ghât work on the western route. The country along both lines he held to be of equal importance as regards population, fertility, productiveness, resources, trade, traffic, and political importance.

The line from Singapore through Kalahandi over the Músa Ghât viâ Bondesor, (Bhavanipatnam), Dádpur, &c., he rejected, owing to the high summit level encountered on the Músa Ghât (2,048 feet), while on the Ombadola line the greatest height does not exceed 1,300 feet.

Similarly, the line viâ Tarnot, Tenddbarra, Kamariah, and Karti was not recommended, because, although a good line for an ordinary cart road, it has this drawback for a railway, that it encounters two ghâts, while there are none such on the Ombadola line.

A direct line from Dhamteri (formerly examined by Colonel Francis) viâ Sihoa, to Raigarh, which is sufficiently favorable for making an ordinary road, was rejected for the railway on account of the hilly nature and irregular configuration of the country.

Any line from Raipur viâ Dhamteri, and Kanker or Sihoa to Raigarh or Omerkót would, Mr. Nordmann reported, be longer and more difficult than the line viâ Rájim up the Pairi River, through the Bindra-Noagarh Estate and up the Soral or Sonder River to the Jeypur plateau, although he thought it would be desirable to take the rail viâ Dhamteri in order to open out that rich grain-producing district.

A line from Jeypur to Kurapati would not he thought be advisable, as it has to cross a high ridge to enter the Upper Jeypur plateau near Kuraputi; steeper gradients and heavier ghât work would be needed on this line than on the Ránigar-Mádeoputi line. The whole of the papers, sections, &c., are now being forwarded to the Government of India, who, it is hoped, may ere long arrive at a decision on a subject of such vital importance to Vizagapatam, and the vast tract of promising but at present sparsely populated country above the ghâts.

Wynaad Communications.—These communications, which for years received the attention of the department in the interests of the coffee plantations, have lately, owing to the demands on account of the development of the gold industry, assumed greater importance. During a tour made early in last January, His Excellency the Governor was enabled personally to ascertain on the spot the extent of the various requirements in this and other respects, and since then the Chief Engineer and other officers (who accompanied His Excellency) have, with the Collector, Board of Revenue, and other authorities, been enabled to submit their views as to the works which it may, in the interests of all concerned, be feasible to undertake.

It may in the first instance be observed that in making the Periyár, Támrachéri, and Karkúr Ghât roads leading down to the West Coast, and in creating a net work of fair weather bridged lines throughout Wynaad, the Government had, in the interests of the planters, incurred an outlay which, viewed with reference to the pressing demands on Provincial Funds from all other portions of the Presidency, was certainly larger in proportion than a strictly equitable distribution of the latter would have warranted.

At the same time lines of road constructed only to meet the needs of fair weather traffic must of necessity, in a broken mountainous country and with an exceptionally heavy rainfall like that of the Wynaad, be of little, if any, use throughout the monsoon. Notwithstanding, therefore, that the Government have strained the public resources to meet the requirements, and the planters on their side have devoted large sums to the construction of private roads in the Wynaad, the results attained have hitherto been most unsatisfactory, as viewed from the stand point of a system of communications capable of bearing monsoon traffic.

To place the matter in a clear light the Chief Engineer, after personal inspection, drew up a scheme of metalled monsoon road, embracing only the lines of primary

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importance, which he with other professional officers, considered as the maximum to be eventually undertaken from Provincial Funds, viz.:—

(1) From Calicut to Vayitri by the Támrachéri Ghât.
(2) Vayitri by the Gúdalúr Ghât to Ootacamund;
(3) the bifurcation about 4 miles out of Vayitri to Sultan's Battery (Gunnypudawúttam) and on to the Mysore frontier.
(4) Vayitri to Manantoddy.
Total length 173 miles.

The rough estimate amounted to the following:—

		Rs.
(*a*)	Works including repairs for the five years that the scheme would be in execution	13,97,000
(*b*)	Establishment	4,01,100
(*c*)	Tools and Plant	33,425
	Total ...	18,31,525

If commenced in the middle of the current year the whole might be completed in the middle of 1887-88 or within five years.

It is needless here to follow the details of a scheme the vast cost of which at once places it beyond the sphere of Provincial resources. The Government on a full consideration of all the circumstances of the case have decided, by means of such yearly grants as can be spared from Provincial Funds, to raise in class the through road between Ootacamund, *viâ* Naduvatam to Gúdalúr, 27 miles (involving a probable outlay of Rs. 1,32,000 exclusive of establishment and plant) so as to make it thoroughly equal to monsoon traffic, leaving the remaining lines of road for some years at least to depend on the assignments available from Local Funds, with possibly some slight grants-in-aid from Provincial and Special Local contributions.

If, as may be hoped, the Mysore State Railway be, as lately suggested, extended from its present terminus, Mysore, *viâ* Nunjengode, Gundulpett, to the Madras frontier near Tippacadu (from which it would be easy to connect with Gúdalúr), the above decision though falling far short of a complete scheme of communications will be seen to promise very substantial results in the near future: in fact meeting all and more than all that could reasonably be demanded. Should the gold industry prove successful it can scarcely be matter of doubt that much more extended operations in regard to communications may become feasible.

Restoration and Preservation of Ancient Monuments.—During the past year a Curator of Ancient Monuments having been appointed under the Government of India, and a Director of Archæological Survey for this Presidency, it appears the less necessary to notice the subject in detail in the reports of this Department; in the last two years' reports, moreover, such information as was available has already been given.

Tirumala Naik's Palace, Madura.—The following shows the year's work in adapting this ancient structure for public offices. A partition wall was built across the range store-room, its windows provided with iron bars, and all other openings covered with perforated zinc to keep out bats. Repairs were executed in the two rooms for the accommodation of the Sub-Division Office. Iron ties to the buttresses on the north side of the palace were fixed; good progress was made with the restoration of the bays in the interior of the Civil and Sessions Court. The ornamental mouldings on the north and south sides were completed down to the springing of the lower arches. The pilasters between the arches at the western end were restored and the mouldings completed up to the crown of the lower arches. The ornamental mouldings at the eastern end were also brought up to the string course of the lower arches. Terracing with concrete over the north, south, and eastern galleries was carried out, and the restoration of the western gallery was nearly completed. The ceilings and arches of the upper galleries and lower passages were plastered; the building of the new porch and the construction of the north and south turrets were carried out up to the fourth flight of steps, and a portion of the granite steps leading to the roof of the palace was executed. Plastering was carried out to the bases of the six columns of the "Napier" gateway, and the roof covered with concrete. The lower course of the stone bases to the columns around the court-yard

and under the wagon vault, and the upper moulded course to the latter, were completed. The clock tower was replastered, and the restoration of the upper member around the court-yard was completed. The underpinning of the north and south walls of the Judge's Court was extended to the end of the chamber, and the only work remaining to be done was the stone flooring, raised dais for the Judge, Court furniture, and other minor details.

The total expenditure on the work from its commencement up to the end of the official year has been Rs. 1,52,018.

Vellore Temple.—The work of cleansing and preserving the Vellore temple was satisfactorily completed in the previous year, and arrangements have been made for the proper custody of the beautiful remains at this place.

Seven Pagodas.—The works commenced during the previous year at the seven Pagodas (Mavalipuram) have now been completed. This consisted chiefly in the removal of drift sand from the immediate neighbourhood of the Monolithic *raths*, in cutting off the drainage which was injuriously affecting the sculptures at the Krishna Mandapum and the great rock carving known as "Arjuna's penance" (probably the largest and most important single work of ancient art in India), the restoration of the Naga Rajah's head and of the Elephant's tusk to their proper places in the latter tableau, the securing as far as possible of the insecure stones of the Shore Temple, and a few minor works. Some further slight work may have yet to be under taken in accordance with the suggestions of Captain Cole, but for the present at least the most necessary action for the preservation of the monuments at this place has been taken.

Bishop Heber's Bath.—During the course of the year the attention of Colonel Yule having been drawn to a statement made by Captain Cole as to the neglected state of the old Bath at Trichinopoly in which Bishop Heber lost his life, the subject of the preservation of this most interesting relic was brought under the notice of Government, and the Right Honorable the Governor has lately on a personal inspection of the locality decided that the Bath should be protected by an ornamental iron railing, placed at a sufficient distance to prevent interference with the water. The Bath will retain its original character, and arrangements will be made for always keeping it full and properly conserved. The following inscription drawn up by the Right Rev. the Bishop will be carved on a slab to be erected on the side wall:—

In Memory
of the
devoted, accomplished, beloved,
and universally honored servant of God
Reginald Heber, D.D.,
third Bishop of Calcutta and
one of India's
truest and most loving benefactors.
This stone
was erected in the year 1882
at the expense of Government
on the margin of the Bath
in which he was drowned while bathing
on the 3rd April 1826.
His body was laid under the chancel
in the Church of St. John, Trichinopoly,
in the hope of the
Resurrection of the just to eternal life
Through Jesus Christ.

Ruins of Hampi.—As regards the work required to be done at Hampi and chiefly the Vitala Swami temple (probably the most beautiful example of Dravidian art in India) little more, as previously reported, has been attempted than the clearance of injurious vegetation and making arrangements for the protection of the monument from wanton injury. It remains yet to be seen whether it will be feasible to undertake any extensive works of restoration, or merely adhere to a policy of strict conservancy in future. Much the same may be said as regards the remains of the Gingee Fort and some other ancient monuments, but they are not either architecturally or otherwise of at all the same importance as the ruins of Hampi.

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Palace of Chandernagiri.—No definite scheme has as yet come up for the restoration of the old palace of Chendernagiri and its adaptation for public offices, though the subject has received a good deal of consideration from the Consulting Architect, Mr. Chisholm, and an estimate may ere long be looked for. Restoration strictly carried out on the old lines of the building would here appear to be both suitable and desirable.

Bhadrachalam Coal Field.—The last year's report on the exploration of this field, situated a few miles below Bhadráchalam, near the small village of Tiperpenti on the left bank of the Godávari, brought down the record to a point where, owing to the heavy rush of water into the trial shaft, coupled with the known small area of the field, and poor ashy character of the coal, grave doubts were entertained as to the utility of proceeding further with the experimental workings.

A communication subsequently received in October from the Government of India showed that, in the opinion of the Superintendent of the Geological Survey, there "are no coal resources of any economic value in the Madras Presidency except in the region of the lower Godávari, and the seams that there exist are for the most part the property of His Highness the Nizam of Hyderabad."

Evidence of such decisive character, coupled with the almost insurmountable practical difficulties which had already presented themselves in prosecuting the exploration of the Bhadráchalam coal field, finally decided Government to stop further efforts in this direction and to await the results of such operations as may be decided on by the Hyderabad Government, which has been addressed by the Government of India on the subject.

The results of the working of the known coal deposits on the right bank of the Godávari have thus yet to be tested, but already those of the best known field in the Hyderabad territory, at Singareni, are such as to make it extremely probable that they will prove valuable in case the extension of railways in the Deccan, and more especially for any line leading from the Central Provinces, through Hyderabad towards Bezváda. In the opinion of experts from experiments made with the Singareni coal, this mineral cannot, owing to the large proportion of contained ash, fairly compete with patent fuel at Madras, unless it can be delivered there at 13 rupees a ton, which by no conceivable improvement in the communications between the two places is likely to be accomplished. This coal, moreover, belongs to the non-coking class, the characteristic of the mineral in so many parts of India.

Public Works Workshops, Madras.—Considerable attention has been given to the working of the shops at Madras throughout the year, and as to the policy of continuing them on their present footing. That at the time of their first institution they supplied a want for the department which could not be met by private enterprise; that they have since then, and particularly during the last famine, proved very convenient to this and other Departments of Government and even to the public; and that their abolition may be attended with some inconvenience, are all admitted facts. On the other hand, as worked on commercial principles they do not pay, are in a chronic condition of deficit, in some sensible degree hamper by competition private enterprise at Madras, and present serious difficulties in regard to continuous technical supervision. As regards the training afforded for both workmen and foremen, the railway and other shops present equally good, if not better, means of instruction, and for supply of all manufactured articles there can be little doubt that, failing the establishment of suitable private firms in Madras to take their place, Calcutta, Bombay, and England are so near in point of time that no very serious inconvenience should be experienced in regard to such. On a full consideration of all the facts, the Government has lately decided to discontinue the Workshops on their present footing, but the precise arrangements to be made with this object have not as yet been finally decided.

Superfluous Stock.—As shown in the previous year's report, this question had engaged for some time the attention of a special Committee of Officers of the department, and final orders were issued on their Report in April. The subject covered a wide field of inquiry, relating to the stock of all Executive Divisions, floating plant of the Godávari, the Presidency, Dowlaishweram and Bezváda Workshops, famine tools,

&c., satisfactory decisions in regard to all of which were arrived at, and the needful action taken in the course of the year.

The unsold remains of the superfluous stock are being disposed of as opportunity arises, and to the best advantage. Following on this measure, which on completion should afford considerable relief to the department, it has been possible to fix the reserve stock for each division.

TELEPHONE.—By an agreement entered into with the Madras Agents for the Oriental Telephone Company in last March, the establishment of five lines was arranged for as follows, at a yearly charge of Rs. 1,100, viz. :—

		M.	F.
1.	To Government House		
2.	„ Chief Secretary's Office	1	0
3.	„ Public Works Secretary's Office	1	5
4.	„ Revenue Board Office	1	5
5.	„ Master Attendant's Office	1	3
		1	4

2. By this arrangement the Government have a separate exchange under their own control at the Chief Secretary's Office in Fort St. George, and the latter is connected with the Central Exchange Office at Madras, so as to admit of communication being, whenever required, established with the whole telephone system at the Presidency Town.

DYNAMITE.—This material continued to be employed with advantage on the works of the Potinghy Ghât, with much the same economical results as previously reported.

BEAUMONT'S SYSTEM OF SUB-AQUEOUS ROCK BLASTING.—A reference having been made from the Secretary of State in regard to the applicability of this system, which professes to admit of rocks being efficiently bored and blasted in deep water without the use of divers, the Chief Engineer and Master Attendant considered it unsuitable for marine engineering in this Presidency, *e.g.*, at such places as the Pámban Channel, the Santopilly Rock, &c. A smoother sea surface being a necessary element of success in applying the system, which has apparently only hitherto been applied in rivers and quiet waters, is here unattainable.

PUBLIC WORKS CODE.—The Code, which, so far as is possible with a work of this special character had been completed in the previous official year, has had its text re-arranged so as to bring the subject-matter throughout into more logical sequence than has been the case with it, or with the Government of India Code, on which the work was chiefly based. The labor of this re-arrangement has almost entirely fallen on the Examiner and the office of accounts, and it is expected that the complete Code brought up to date, embodying all standing orders in one volume, as also the whole of the new forms of account in another, will in the new shape be printed and issued to the department before the end of the year; the whole is, in fact, now in the hands of the printers.

MANUAL.—A complete Secretariat Manual for the department was issued in the course of the year, and its compilation by Mr. R. Parsons, Chief Assistant in the Public Works Secretariat, elicited the approval of Government.

SCHOOL OF ARTS, MADRAS.—In connection with this school, and particularly in view to the preservation and proper exhibition of several very valuable copies of works of the old masters, obtained from Italy under exceptionally favorable circumstances some years ago for this institution, the Government in last January sanctioned Rs. 7,648 for the construction of a picture gallery, and have since added a small sum for its ornamentation. The pictures alluded to, and others lately purchased by the Fine Arts Society, will form a nucleus of, it may be hoped, a collection worthy of Madras.

CIVIL ENGINEERING COLLEGE CURRICULUM.—Under proposals emanating from the Principal of the Civil Engineering College, and supported by the Director of Public Instruction with a view to extend and render more practical the training of persons desirous of making a profession of Civil Engineering, a Committee was last

year assembled by Government to consider fully the question of altering the College curriculum, &c.

The Committee, which was a representative one, under the presidency of Colonel Shaw-Stewart, R.E., submitted a very able and exhaustive report on the subject; but owing to circumstances unnecessary here to mention, it has not been found possible as yet to take the decision of Government. The question of altering the whole course of study of an important institution of the kind is however so serious in itself that the matter is one which will need most careful consideration.

All authorities are fully agreed that the time hitherto given in the College course to purely theoretical subjects, has been too short to admit of their thorough acquirement, and that arrangements must be made for imparting much more instruction on the practical side of the profession, than has hitherto been feasible.

In the course of the year the Government decided that five appointments as Apprentice Overseers should be reserved annually for such of the British Non-Commissioned Officers and Soldiers as succeeded in gaining the requisite certificates at the College, and since then a similar guarantee has been given in regard to Civilian Students.

With a view to filling up the sanctioned normal scale of the department under the late sanction of the Government of India, an exceptionally large number of passed students, both Military and Civil, viz.:—

Military	4
Civil	15

all of whom, as provided in the Code, have been placed under selected departmental Instructors at large works, in order, during their first year's probation, to acquire practical acquaintance with their future duties. It may be observed that this is the first time that the plan has been systematically tried in this Presidency.

NORMAL STRENGTH OF THE DEPARTMENT.—During the year under review the normal strength of the department was sanctioned by the Government of India in September, showing increases as follows:—

Classes.	From	To
Superintending Engineers	3	6
Executive do.	26	36
Assistant do.	36	47
Upper Subordinates	160	185

The additional number of Superintending Engineers has admitted of an arrangement of circles fairly adequate for present departmental working and for such expansion of the operations as can be readily foreseen. The number of Executive and Assistant Engineers and of Upper Subordinates has, however, proved insufficient, as owing to the number of non-effectives from sickness, absence on furlough, from the large proportion of young men under practical training with a newly increased department, &c., there have on the whole been over 22 per cent. non-effective from all causes, whereas the normal sanctioned scale only admits of 10 per cent. for casualties.

The proportion of non-effectives will with time, no doubt, gradually decrease, but it can scarcely be expected to be better than 20 per cent., which is that allowed in other Civil Departments. This matter is the more important from the exposure of the members of the department on the Potinghy Ghât and in other unhealthy tracts, which occasions a continued drain.

The policy adverted to last year, of providing definitely for the preparation of projects both under the "Productive" and "Protective" classes of work and which has received such strong support from the Famine Committee of this Presidency, has now been followed up by the sanction of four Project Divisions included in the sanctioned normal scale.

It is difficult to over-rate the importance of this arrangement, which, if the Presidency be spared a visitation of severe famine for the next three or four years, should

enable it to meet the catastrophy then and henceforward with a programme of sanctioned works, the value of each and all of which will have been thoroughly tested professionally. Considering the enormous financial losses which have, without any exception, attended the execution of the hastily improvised works which, for want of adequate prior preparation, the Governments in India, and indeed authorities in all parts of the world, have hitherto been compelled on such occasions to resort to, the importance of this measure cannot easily be over-stated.

But the details of such a scheme are necessarily so voluminous that to enter further into them would here be impossible. It may thus be considered sufficient to record in the two following tables, first, the work of projection already accomplished during the past year, and, second, the schemes which are still only partly investigated or which have only been sketched. The lists are, it will be observed, entirely confined to Irrigation Projects of greater or less magnitude, but there are others for which the needful information is incomplete connected with light railways or tramways for distributing food in the worst of the famine zone, for the maintenance of all the minor irrigation works throughout the Presidency, water-supply of towns and the like, which for some time have received close attention, and will, when matured, claim all the available energy of the department, and probably call for a substantial increase to its strength :—

STATEMENT of Irrigation Projects in the past year.

District.	System or Source of Supply.	Name of Project.	Probable Number of Years' Work.	Amount of Estimate remaining to be worked out	Remarks.
1	2	3	4	5	6
Godávari ..	Godávari Delta System.	Eastern Delta Completion.	Four years from 1882-83.	Direct Charges. Rs.	
		Central do. ..	Eight years from 1882-83.	20,59,305	Sanctioned by the Government of India.
		Western do. ..	Four years from 1882-83.		
Kistna ..	Kistna Delta System.	Eastern do.	Twenty-five years from 1882-83.		
		Western do. ..		95,82,871	Do.
Nellore ..	Pennér River ..	Sangam Project ..	Eight years from 1882-83.	26,03,187	Do.
Tanjore ..	Cauvery Delta System.	Upper Anicut. Regulation of the Cauvery at Grand Anicut.	Five years ..	11,19,350	Do.
Tinnevelly ..	Támbraparni ..	Srivaikuntham Anicut ..	Do. ..	1,39,729	Completion estimate submitted to Government of India.
Ganjam ..	Rushikulya ..	Rushikulya Project ..	Ten years ..	25,81,386	Not yet sanctioned. Estimate about to be resubmitted to Government of India.

STATEMENT showing Irrigation Projects in progress or to be taken up in order of importance.

Division or Circle to which Work is allotted.	District.	System or Source of Supply.	Name of Project.	Remarks.
B. Project Division.	Salem	..	Pennacondapuram Tank ..	
	Do.	Sanmath Comara River.	Marandahully Project ..	These are nearly completed.
	Do.	Ponniár River ..	Bargoor Channel	In progress.
	Do.	..	Vaniar Reservoir ..	It is possible that very little work will be needed here.
	Do.	Ponniár River ..	Krishnagiri do. ..	The work will probably be superseded by the Bhavání Reservoir near Satyamangalam, reported on by Major Montgomerie, which it is now proposed to investigate.
	Do.	Cauvery ..	Narinjapett Anicut ..	.....
	.. ..	Swetanadi ..	Goodamully Reservoir ..	.....
	Salem	Cauvery ..	Allumbody do. ..	

Statement showing Irrigation Projects in progress or to be taken up, &c.—*cont.*

Division or Circle to which Work is allotted.	District.	System or Source of Supply.	Name of Project.	Remarks.
C. Project Division.	Bellary ..	Pennér ..	Hindupur do. ..	These are nearly completed.
	Do.	Do. ..	Roddam do. ..	
	Madura ..	Vaigai ..	Periyar Project ..	This has been nearly completed by Major Pennycuick.
	Cuddapah ..	Punnér ..		It is intended that the rivers should be taken up successively and thoroughly investigated. All projects hitherto proposed, including those investigated by the Madras Irrigation and Canal Company, the surveys and plans of which were made over to Government, being taken into consideration.
	Kurnool and Bellary ..	Hindri .. Hagari and Minor Rivers.	....	
	Ganjam ..	Korkey River ..	Mullada Tampara Project ..	This has to be put into shape.
	Bellary ..	Tungabhadra River.	Upper Bellary Project ..	.....
D. Project Division.	North Arcot ..	Palár	Improving River Channels. North Section.	The north section only is mentioned, but the south section has to be taken up also. Much of the work has been done.
	Tinnevelly ..	Támbraparni ..	Papanasam Reservoir ..	.....
	Trichinopoly ..	Cauvery ..	Vengur Channel Project ..	.....
	..	Do. ..	Koduntheray Tank Project.	.....
	South Arcot .. Tanjore ..	Coleroon River ..	Lower Coleroon Anicut ..	.....
Fourth Circle ..	Coimbatore ..	Cauvery ..	Pugalur Channel ..	.....
	Do. ..	Bhavání ..	Channel from Bhavání to Nóyil.	.....
Fifth Circle ..	South Arcot ..	.. ..	Athur Project	.....
	North Arcot ..	Cheyár ..	Cheyár River	.....
	..	Trimanemoottoo nadi.	Pullapurcherry Channel Project.	.....
Not allotted ..	Nellore ..	.. ..	Restoring Adurapillai Tank of Griddalore.	.....
Do. ..	Do. ..	.. ..	Restoring Timmalapady Tank.	.....
Do. ..	Do. ..	.. ..	Restoring Gandipalam large tank.	.....
Do. ..	Chingleput ..	Naranyáram River.	Improving irrigation under Narnayaram River.	.....
Do. ..	.. ..	Kortalayár River	Channel from Anicut at Tamarapakam.	.....
Do. ..	Godávari ..	Yernagudem ..	Lakamadoka Reservoir ..	.....
Do. ..	.. ..	Peonér ..	Gandicotta do. ..	.....
Do. ..	Nellore ..	Do. ..	Do. do. ..	.....
Do. ..	Kurnool ..	Kistna ..	Great Kistna do. ..	.....
Do. ..	Madura ..	Pitchlur ..	Tank in Thalianoothi Manoor Valley.	Will not be taken up if the Periyár Project is sanctioned.
Do. ..	.. ..	Palár	Palrí Reservoir	
Do. ..	.. ..	Vaigai	Gullapuram do. ..	
Do. ..	.. ..	Do. ..	Reservoir near Bailacoondee.	

ESTABLISHMENT CHARGES.—The method of distributing between Provincial and Imperial Funds the Madras Public Works Establishment charges was modified during the year. The percentage borne by Imperial funds on the grants for Imperial works and repairs was reduced from 25 to 23 per cent., and it was considered equitable to allow as a further charge to Imperial funds 10 per cent on all direct receipts realized on Navigation and Irrigation Works, whether Productive or Ordinary, and 6 per cent. on the gross Indirect Revenue due on Productive Irrigation and Navigation Works alone. The Government of India considered that this relief to Provincial Revenues would place Madras in as favorable a position as other Provinces in India; the Provincial funds of this Presidency having previously been unduly charged with the cost of Public Works Establishments.

The actual relief to the charge on Provincial funds in current year will be Rs. 1,11,150, but as no retrospective effect has been given to the order the actual excess amounts which "Provincial" has hitherto paid on account of "Imperial" in the last three years are shown in the margin.

	Rs.
1879-80	39,182
1880-81	1,36,968
1881-82	1,13,387
Net excess debit ...	2,14,176

The question of similar percentage charges to be allowed on the Indirect Revenue of Irrigation and Navigation Works other than Productive, amounting to 3 per cent. of the same, was still unsettled at the end of the year, a further loss to "Provincial" is thus inevitable. The amount thus lost in the last three years is roughly estimated at Rs. 2,10,000 per annum, or Rs. 6,30,000 in all. The total loss which Provincial has sustained may thus be approximately stated to amount to Rs. 2,14,173 + Rs. 6,30,000 = Rs. 8,44,000.

The percentage of establishment on the grants for works under all heads excluding the Madras Harbour Works was ... ... 43·07
Including the Madras Harbour Works it amounted to ... ... 38·01
But had the 1,11,150 shown as the net relief during 1882-83 been allowed by the Government of India as well as the 2,10,000 on account of indirect revenue the percentage would have been reduced to ... ... 30·45

EXPENDITURE.—The total grant under Provincial amounted to Rs. 19,55,496, of which Rs. 3,78,285 lapsed at the end of the year. This lapse has, in round numbers, been traced to the following heads :—

		Rs.
(*a*)	Original Works, Civil Buildings	63,000
(*b*)	Miscellaneous Public Improvement	1,00,000
(*c*)	Tools and Plant	1,52,000
(*d*)	Suspense	59,000

The sum of Rs. 1,00,000 under (*b*) represents the provision made for the refund to Imperial on account of the Madras Water Supply Project, which, under orders from the Government of India, was subsequently adjusted in the Civil Accounts. The actual amount of the lapse was thus *pro tanto* reduced to Rs. 2,78,000. Of this a sum of Rs. 2,11,000, Items (*c*) and (*d*), was due to adjustments in the accounts carried out by the Examiner, leaving about Rs. 63,000, Item (*a*), as the actual short expenditure on works. Owing to active measures being taken during the year to clear the surplus store lists of the several Executive Divisions and Workshops it was doubtless difficult at any time to gauge precisely the financial results of the operations, but after making due allowance for such exceptional circumstances the results must be considered as indicating incomplete and unsatisfactory relations in regard to suspense accounts between the Executive and Accounts Branch, for which a remedy will have to be devised if a recurrence of similar results is to be avoided in future.

COMMITTEES.—In the course of the year the Chief Engineer was engaged on a Committee for framing the Famine Code for the Presidency, and another for an Irrigation Law and Kudimaramut Rules, and a third for improvement to the hill station of Ootacamund.

Proceedings in reference to the first and third were completed and submitted to Government, and those of the second so far advanced as to ensure early disposal.

It will suffice here to observe that as regards the Committee's report on the Ootacamund improvements, the Government have since adopted the recommendations submitted. These embraced suitable water-supply and drainage schemes, buying-out objectionable occupations, construction of a new market, removal of present slaughter-house, improved lighting of the roads, lowering slightly the water level and the ornamental planting the margins of the lake, &c., &c. To aid in carrying out the work thus involved, Government engage by small annual grants to carry out the drainage schemes, while the Municipality will be given powers to raise a loan for the market and other remunerative undertakings. It may be mentioned in this connection that the market, in memory of the late lamented Governor, is to be called the "Adam Market," and that a considerable sum has been raised by private subscription for a handsome fountain and basin to be placed in the centre of the quadrangle.

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List of Major Works undertaken during the Year.

Division.	Work.	Main Head.	Estimate.	Outlay to end of previous Year.	Outlay during year reviewed.	Total of Columns 6 and 7.	Allotment during year reviewed.	More than Allotment.	Less than Allotment.
1	2	3	4	5	6	7	8	9	10
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Chingleput ..	New barracks for Royal Artillery; demolishing old east and west barracks and cut-houses at Chingleput.	Military ..	2,130	..	17,672	17,672	10,509	7,163	..
Cuddapah ..	Store-room for Royal Artillery at Bellary	Do.	2,295	..	2,293	2,293	2,295	..	2
Presidency ..	Converting the Warder's room into three cells and constructing store-room, wash-house, cook-room for prison, and bath-room, cook-room, and privy for the Provost Sergeants, and Warders' quarters, and laying pipes, &c., in Fort St. George.	Do.	9,323	3,952	6,068	9,320	8,200	868	..
Chingleput ..	New double-storeyed barracks for 200 men with cut-houses. New quarters for thirty families with cut-houses. New quarters for Apothecary and alterations to existing buildings and demolitions, &c., in Poonamallee.	Do.	2,70,506	17,429	4,675	22,104	5,427	..	752
Do. ..	Renewing the roof of the north and south blocks of the old barracks in Poonamallee	Do.	25,105	15,007	9,894	24,901	10,000	..	106
Do. ..	Additions to the new hospital in Poonamallee	Do.	5,852	4,184	1,693	5,877	1,648	45	..
Do. ..	Do. to the old hospital in Poonamallee	Do.	2,778	851	2,864	3,715	2,925	..	61
West Coast ..	Painting doors and windows of barracks at Cannanore	Do.	4,430	4,108	690	4,798	765	..	75
Do. ..	Completing the third block of married quarters at Wellington, ..	Do.	3,730	2,311	1,274	3,585	1,410	..	36
Do. ..	Additions to the hospital guard-room for prisoners at Wellington.	Do.	4,500	4,056	674	4,730	633	41	..
Do. ..	Asphalting verandah and boarding floors of officers' quarters at Calicut.	Do.	2,700	2,585	27	2,612	..	27	..
Godavari Eastern ..	Lines for a detachment of Native Infantry at Sirnalikoh ..	Do.	7,495	..	2,437	2,437	7,005	..	3,568
Presidency ..	Latrines for regiments, two for females and two for males, Queen's Own Sappers and Miners, Bangalore.	Do.	1,97,403	1,69,771	14,109	1,83,879	13,900	293	43
Do. ..	Improvements to the Gunpowder Factory at Vyasrapady, Madras.	Do.	12,900	5,003	7,086	12,604	6,992	94	..
Do. ..	Converting the old Infantry Hospital into Garrison Hospital, Bangalore.	Do.	11,38,310	8,60,622	—1,213	8,59,409	..	..	1,213
West Coast ..	Constructing Lawrence Asylum at Ootacamund	Do.	4,800	..	401	401	..	401	..
Do. ..	Providing additional hospital accommodation at the Girls' School, Lawrence Asylum, Ootacamund.	Do.	23,000	74,921	7,825	22,746	7,800	26	..
Do. ..	Constructing sick horse-stable at the Remount Depôt, Mathaleery	Do.	3,130	1,656	1,392	3,048	3,230	..	1,838
Presidency ..	Improvements to the Damalur Tank, Bangalore	Do.	1,41,698	1,32,669	2,663	1,35,332	1,000	1,663	..
Bellary ..	Water-supply Project at Bellary	Do.	6,426	5,953	273	6,226	..	273	..
Ganjam ..	Stone drainage for carrying off surface drainage of regimental lines at Berhampore.	Do.	..	..	..	..	..	..	..
Nagapatam ..	Constructing Police huts for two Head Constables and nineteen Constables at Aprathimalle.	Other Services	5,670	2,066	400	2,466	604	..	204
Do. ..	Constructing Police huts for one Head Constable and nine Constables at Kadumavadi.	Do.	5,540	4,676	1,030	5,706	865	165	..
South Arcot ..	Constructing a head-sluice to Merkanum brine supply channel at Merkanum.	Do.	3,365	108	315	423	387	..	72

List of Major Works under Imperial undertaken during the Year—cont.

Division.	Work.	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
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Buckingham Canal.	Opening and maintaining the Ennore Bar at Ennore	Other Services.	18,300	9,523	49	9,474	..	..	49
Do. ..	Do. do. the Covelong Bar at Covelong ..	Do. ..	1,350	..	1,337	1,337	1,400	..	63
Do. ..	Do. do. the Ennore Bar at Ennore	Do. ..	200	..	362	362	475	..	113
West Coast ..	Constructing a Post Office at Kótagiri	Do. ..	3,500	2,392	978	3,370	1,108	..	130
Architect ..	Do. do. at Madras	Do. ..	2,47,854	..	85,948	85,948	80,925	5,023	..
Do. ..	Do. a Telegraph Office at Madras	Do. ..	2,60,036	1,01,403	77,752	1,79,155	77,500	252	..
West Coast ..	Do. do. at Ootacamund	Do. ..	34,100	5,014	13,221	18,235	16,109	..	2,879
Vizagapatam ..	Purchasing a building for Telegraph Office at Vizagapatam ..	Do. ..	..	..	4,710	4,710	4,710	..	..

List of Major Works under Provincial undertaken during the Year.

Division.	Work.	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
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Chingleput ..	Government House furniture charges at Guindy	Civil Buildings.	..	..	1,000	1,000	1,000	..	..
Do. ..	Additional room to Treasury, Hood's Garden at Saidápet ..	Do. ..	3,080	1,714	1,364	3,078	1,126	238	..
Do. ..	Purchase of Miss O'Brien's bungalow for a Cutcherry for the Sub-Collector.	Do. ..	4,500	..	3,000	3,000	4,500	..	1,500
Coimbatore ..	Sub-Collector's Cutcherry at Erode	Do. ..	12,550	5,990	6,926	12,916	8,500	426	..
Cuddapah ..	Taluk Cutcherry at Madanapalle	Do. ..	32,218	30,219	1,650	31,869	1,999	..	349
Do. ..	Do. at Kadiri	Do. ..	33,070	33,070	1,219	34,289	1,500	..	381
Godávari Eastern.	Constructing an office and quarters for the Special Assistant Agent at Kannavaram.	Do. ..	9,600	397	77	474	..	77	..
Do. ..	Sea Custom House godown at Cocanada	Do. ..	6,450	6,397	— 1	6,396	..	..	— 1
Madura ..	Sub-Collector's bungalow at Dindigul	Do. ..	8,355	5,000	1,000	6,000	1,000	..	..
Nellore ..	Converting the old barracks into a dwelling for the Sub-Collector at Ongole.	Do. ..	7,365	3,008	4,378	7,386	4,367	21	..
North Arcot ..	Constructing an office for the Assistant Collector attached to Collector's Office at Chittoor.	Do. ..	3,900	..	4,068	4,068	3,900	168	..
Do. ..	Altering and improving the Taluk Cutcherry at Palmanér ..	Do. ..	4,180	2,809	1,376	4,185	1,371	5	..
Presidency ..	Government House furniture charges	Do. ..	..	..	3,409	3,409	3,000	409	..
Do. ..	Iron sheds in the Import yard of the Sea Custom House at Madras.	Do. ..	16,375	..	14,636	14,636	13,419 631	686	..
Do. ..	Improvements to the Import and Export sheds of the Sea Custom House at Madras.	Do. ..	..						
Do. ..	Construction of an upper storey to the Government Stationery Office at Madras.	Do. ..	8,710	..	8,602	8,602	8,710	..	108
Salem ..	Purchase of Mr. Longley's house for the Collector's residence at Salem	Do. ..	..	..	15,000	15,000	15,000	..	..
Do. ..	Alterations and improvements to the Taluk Cutcherry	Do. ..	4,830	3,212	843	4,055	992	..	142
South Arcot ..	Taluk Cutcherry and Sub-Registrar's Office at Manjakuppam ..	Do. ..	17,380	..	9,999	9,999	10,000	..	1
Vizagapatam ..	Senior Assistant Collector's Cutcherry at Párvatipur	Do. ..	2,800	1,907	1,163	3,070	1,162	..	..
West Coast ..	Government House furniture charges at Ootacamund	Do. ..	..	..	1,000	1,000	1,000	..	..
Do. ..	Constructing Cutcherry with out-houses for Head Assistant Collector.	Do. ..	8,685	4,710	3,521	8,231	2,585	916	..
Do. ..	Government House at Norwood, Ootacamund	Do. ..	4,02,914	3,08,342	39,099	3,47,441	60,000	..	20,901
Do. ..	Purchasing and repairing Crewe Hall bungalow with out-houses, and providing furniture so as to accommodate eight Government Office Clerks at Ootacamund.	Do. ..	10,690	..	20,254	20,254	10,700	9,554	..
Do. ..	Converting the late Sub-Divisional Office into a Taluk Cutcherry ..	Do. ..	8,340	..	4,863	4,863	4,000	863	..
Do. ..	Constructing Taluk Cutcherry at Manamtoddy	Do. ..	22,000	21,964	25	21,989	..	25	..
North Arcot ..	Restoring the temple in the Fort of Vellore	Do. ..	4,280	1,655	2,599	4,254	1,727	872	..
Nellore ..	Second-class Taluk Cutcherry at Venkatagiri	Do. ..	12,950	12,313	232	12,545	380	..	148
Kistna Eastern.	Sub-Magistrate's Cutcherry at Avanigudu	Do. ..	..	3,843	— 189	3,654	..	..	189
Do. ..	Converting the Nazir's bungalow into a District Court and Registrar's Office, Masulipatam.	Do. ..	6,818	458	106	564	90	16	..
North Arcot ..	Second-class Sub-Magistrate's Cutcherry with out-houses at Tiruttani	Do. ..	13,150	..	9,553	9,553	9,450	103	..

List of Major Works under Provincial undertaken during the Year—cont.

Division.	Work.	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
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Coast ..	Additions and improvements to the Munsif's Court at Mangalore ..	Civil Buildings.	7,200	1,211	5,300	6,511	2,200	3,100	..
o. ..	District Munsif's Court at Udipi	Do. ..	9,100	6,237	2,718	8,955	2,863	..	145
atam ..	Putting a corrugated iron roof to St. Peter's Church	Do. ..	6,750	3,496	3,205	6,701	2,746	459	..
ncy ..	Wall along the northern boundary of St. Andrew's Kirk, Madras ..	Do. ..	4,959	4,110	794	4,904	856	..	62
oast ..	Forming the enclosed ground around St. Thomas' Church at Ootacamund Cemetery.	Do. ..	2,820	240	1,301	1,541	1,769	..	468
ah ..	Improvements, additions, and alterations to the Jail Hospital ..	Do. ..	7,452	5,563	2,112	7,675	1,889	223	..
Western.	Improvements to the Guntur Jail	Do. ..	37,313	34,431	2,240	36,671	2,892	..	652
cot ..	Subsidiary Jail with out-buildings at Mannárgudi	Do. ..	6,660	128	2,448	2,576	2,450	..	2
..	New jail at Tanjore	Do. ..	..	..	2,531	2,531	4,000	..	1,469
ly ..	Do. at Palamcottah	Do. ..	2,08,000	84,836	9,722	94,558	9,000	722	..
poly ..	Improvements to the Central Jail at Trichinopoly	Do. ..	13,594	12,700	819	13,519	894	..	75
am ..	Alterations and additions to Zillah Jail, Vizagapatam	Do. ..	23,300	16,083	4,536	20,619	4,520	16	..
..	Do. do. to Hill Jail at Párvatipur	Do. ..	17,540	13,572	3,387	16,959	3,388	..	1
st ..	Rebuilding the outer wall of the District Jail at Mangalore ..	Do. ..	4,400	4,508	2,698	7,206	2,722	..	24
..	Additions to the quarters of the Warders of the European Prison at Ootacamund.	Do. ..	6,040	..	5,813	5,813	6,040	..	227
East-	Constructing Police Head-quarters Office at Rajahmundry ..	Do. ..	14,660	..	2,500	2,500	2,500	..	..
..	Residence for Assistant Superintendent of Police, Ongole ..	Do. ..	3,643	..	2,889	2,889	3,142	..	253
..	Erecting new godowns to the office of the Inspector-General of Police at Madras.	Do. ..	4,180	..	4,180	4,180	4,180	..	..
..	Constructing six Police huts at Rajahmundry	Do. ..	2,551	395	536	931	563	..	27
..	Do. the Agricultural College at Saidápet	Do. ..	33,085	15,093	16,335	31,928	17,992	..	1,157
..	Do. Lying-in Hospital at Madras	Do. ..	1,77,795	1,61,821	15,689	1,77,510	15,650	39	..
..	Do. Medical School, Monegar Choultry, Madras ..	Do. ..	18,080	5,287	9,799	15,086	10,384	..	585
..	Two Cornish boilers for working the punkah-pulling machinery at the General Hospital, Madras.	Do. ..	7,100	..	200	300	..	300	..
..	Re-roofing the Infirmary attached to the Monegar Choultry at Madras.	Do. ..	5,835	..	4,913	4,913	6,000	..	1,087
..	Additions and improvements to the Lunatic Asylum, Calicut ..	Do. ..	8,865	328	3,746	4,084	5,739	..	1,993
..	Converting a portion of the School of Arts premises into a picture gallery, Madras.	Do. ..	7,648	..	7,654	7,654	7,648	6	..
..	Dwelling-house for Public Works Officers, Chettipet	Do. ..	18,594	5,594	7,276	12,870	6,550	726	..
..	Constructing a Divisional Office at Dugarala	Do. ..	14,520	..	741	741	3,606	..	2,760
..	Completing the restoration of Tirumal Naik's Palace, digging the court-yard of do. as garden and under pinning do. do.	Do. ..	1,62,956	1,27,127	9,723 15,268	1,52,018	9,732 15,268	..	9
..	Alterations and additions to the Government Workhouse, Ráyapuram.	Do. ..	18,700	1,367	17,695	19,062	17,700	..	5
..	Boundary wall and gates at Chepauk	Do. ..	10,270	9,873	384	10,257	..	384	..
..	Sub-Registrar's Office at Kumbakónam	Do. ..	5,136	2,833	2,236	5,069	2,303	..	67
..	District Registrar's Office at Tanjore	Do. ..	10,280	..	3,851	3,851	4,000	..	349
West Coast ..	Chinchona building at Naduvatam	Do. ..	31,074	185	4,786	4,971	5,000	..	214
Do. ..	Sub-Registrar's Office at Badagara	Do. ..	4,100	4,108	20	4,128	..	20	..
Do. ..	Registrar's Office at Calicut	Do. ..	5,710	..	4,420	4,420	4,710	..	290
Do. ..	Constructing a Telegraph Office at Devála with out-houses ..	Do. ..	10,400	..	10,252	10,252	10,000	252	..
Madura ..	Road from Cumbum to the foot of the Gúdalúr Ghát	Communications.	72,148	972	2,081	5,701	5,229	..	3,148
Trichinopoly ..	Do. do. do.				2,648		2,648	..	..
Vizagapatam ..	New Potinghy Ghát at Jeypore	Do. ..	1,30,400	1,07,674	54,496	1,62,170	54,000	496	..
Do. ..	Compensation paid on account of widening tank road from Tuni to Chittavalsa and Chicacole	Do. ..	..	..	23,146	23,146	23,558	..	412
Do. ..	Canal from Chilka Lake to Ganjam Port	Do. ..	1,41,370	1,41,188	182	1,41,370	..	182	..
Godavari Eastern.	Bhadráchalam coal-field operations	Miscellaneous Public Improvements.	7,128	6,558	559	7,117	..	559	..

List of Major Works under Other Incorporated and Excluded Local Funds undertaken during the Year.

Divisions.	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
			Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Godávari Eastern.	Kovur Junction Canal from Kovur Lock to Munjur Lock ..	Communications.	1,87,810	24,931	19,318	44,249	20,000	..	..
Trichinopoly ..	Constructing a chattram at Togamalai	Civil Buildings.	5,500	..	— 1,631	..	..	..	682
Godávari Western.	Constructing a Taluk School-house at Viravásaram	Do. ..	4,655	2,378	695	3,073	1,177	..	1,631
Salem ..	Constructing a school-house and a latrine at Krishnagiri	Do. ..	4,940	4,990	— 10	4,980	..	..	482
Cuddapah ..	Constructing a Middle School-house at Madanapalle	Do. ..	4,935	1,020	2,667	4,687	..	..	10
Kistna Eastern.	Quay wall in the creek below the tidal lock	Miscellaneous Public Improvements.	13,525	3,402	10,587	13,989	10,025	562	248
Do. ..	Do. do. ..	Do. ..	8,200	579	— 574	5	..	..	574
Godávari Eastern.	Constructing a house for Master Attendant	Do. ..	8,100	650	— 328	322	..	..	328
Negapatam ..	Improvements to the Port of Negapatam	Do. ..	6,415	..	500	500	500	..	..

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India Office,
London, 22nd February 1883.

Public Works,
No. 7.

To His Excellency The Right Honourable The Governor in Council, Fort St. George.

SIR,

Para. 1. The Administration Report of your Public Works Department, General and Buildings and Roads Branch, for 1881–82, has been before me in Council, and I desire to draw your Excellency's attention to one or two points which seem to deserve notice.

2. The large appropriations from the Provincial Public Works grant of money to "Civil Buildings," as compared with the grants made for "Communications," has frequently been the subject of communication between my predecessors and the Government of India, and I observe that in the review of the Regular and Budget Estimates of "Other Public Works" for 1880–81 and 1881–82, dated 21st March 1881, Nos. 150—62 A. G., the Government of India noticed the disproportion of the provision for communications to that for Civil Buildings in the Budgets submitted by your Excellency's Government, and expressed a hope that the matter would be considered.

3. From the figures given in the present Report it would appear that the same disproportion continues, for while Rs. 7,19,372 has been appropriated to civil buildings, official residences, &c., under all heads, only Rs. 3,16,746 is devoted to communications. I again, therefore, draw the attention of your Government to the subject, in view to your taking such steps as you may deem fit for securing a different distribution in future, or offering some explanation of the circumstances which may satisfy your Excellency that this large outlay on buildings is essential.

4. With regard to the paragraphs in the Report relative to the curriculum of the Civil Engineering College at Madras, I shall be glad to be informed what steps have been taken to provide for the practical training of the students in the manner suggested by my predecessor in para. 2 of his

Public Works Despatch, No. 18, of the 19th October 1882.

5. I also request information as to the rules under which official residences are provided in the Madras Presidency.

I have the honour to be,

Sir,

Your most obedient humble Servant,

(Signed) KIMBERLEY.

No. 2

Public Works Department,
22nd February 1883.

Copy

Letter to Fort St. George,
No. 7

India Office,
London, 22nd February 1883.

Public Works,
No. 7.

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Sir,

Your most obedient humble Servant,

Kimberley

9166/32

P.W.C. No. 2450

No. 3

Rec'd 22/3/83

Public Works

22 Feb 1883.

The

Secretary to Govt

Fort St. George

No. 7.

Rec'd 16 March 1883.

£0. 2732 W - 20. Aug/82
" - 919 W - 6 April/82
- 3057 W - 18 Nov/82
- 2849 W - 30 Aug/82
- 2218 W - 28 Aug/82
- 1842 W - 18 July - "
- 544 W - 2 Nov -
- 361 - 25 Sept/80

2nd Dept.

1671 W - 6 July/81 -
591 W - 11 Mar/80 -

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A No 946 W dy 28 March/83

Ordered that the following reply be sent.

B Clerk

P.W. Department

No 946 W

Madras 28th March/83.

946/33

To

The Rt. Honble the Secy. of State

for India

My Lord,

In reply to your Lordship's Despatch No 7 of 22d February 1883 we have the honor to observe that your Lordship is under a misapprehension as regards the expenditure on Communications in this Presidency.

2. The figures Quoted in the Despatch under reply show merely the sums expended by the direct agency of the P.W. Department but the great bulk of expenditure on Communications is met from Local Funds

Funds, and is controlled by the Local Fund Boards who have engineering staff of their own. Expenditure from Provincial Funds is only incurred when the finances of the Local Fund Circles concerned are unequal to the demands upon them and the agency of the P. W. Department is only employed when from unusual Engineering difficulties, or other exceptional Causes, the Local Fund Engineering staff is unable to carry out the work.

The actual expenditure on communications during the official year 1881/82 was Rs 30,99,070 in addition to the Rs 31,746 noted in your Lordship's Despatch, making a total of ~~Rs 34,~~ Rupees 34,15,816.

Out of the sum of Rs 7,19,372 shewn by the Administration Report to

To this should correctly speaking be added the amount Rs 2,31,935 spent during the year on the Buckingham Canal which though classed under Irrigation is purely a work of Communication.

have been expended on "Civil Buildings" only Rs 98,441 was for official Residences, and this includes Rs ~~44,496~~ 39,099 for the new Govt. House at Ootacamund.

No fixed rules are laid down in Madras (nor it is believed elsewhere in India) regarding the provision of official residences, but such residences are never provided unless urgently required in the interests of good administration; when provided, rent sufficient to cover interest and Cost of repairs is in almost all Cases recovered from the Occupants.

The proposed improvements in the Curriculum of the Civil Engineering College are under Consideration in the Educational Department

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Govt. of (1883) Madras

PUBLIC WORKS.

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