No 377 Dated 5.5.98

Communicated to the Chief Engineer for Irrigation.

(Signed) W. H. I.

To

The Chief Engineer for Irrigation

" Examiner, P. W. Accounts.

Public Works (1898) Department.

G.O., No. 378

Dated 5th May 1898

7/5/98

[Despatch Abstract.]

Funds — Certain transfers of — under 43 Minor Works and Navigation, Sanctioned

80/4

Indexed.

[P. W. 26. 1,000—13-2-98.]

The aggregate tonnage carried per mile amounted to 47⅘ millions, the estimated value of cargoes to 1,157½ lakhs of rupees, and the number of passengers was 551,295.

15. The rules for conducting crop experiments, to which reference was made in last year's review, were issued, but they were not brought fully into operation during the year under review.

16. The following table shows the duty of water on the Sone and Orissa Canals :—

Canals.	Average discharge, cubic feet per second.				Area in acres irrigated per cubic foot per second.			
	At head.		Utilised.		Discharge at head.		Utilised.	
	Kharif.	Rabi.	Kharif.	Rabi	Kharif.	Rabi.	Kharif.	Rabi.
1	2	3	4	5	6	7	8	9
Orissa	1,964	1,235	1,645	872	...*	...*	...*	...*
Sone	5,227	2,627	4,706	2,166	60·64	81·99	67·34	99·44

* Information not given. See footnote to table I-E, page 97 of report.

It is observed that the duty of water on distributaries is not recorded. In the Punjab and North-West Provinces much importance is attached to maintaining correct discharges of distributaries and comparing the duties obtained on different lines and on the same lines in different years, the end in view being to secure the closer attention of officers to the economical distribution of water in detail and to indicate localities where waste obviously occurs.

17. The Government of India notice with satisfaction the approval bestowed by the Lieutenant-Governor on the officers mentioned in paragraph 35 of the Resolution by the Local Government reviewing the revenue report.

The report was received by the Government of India on the 31st December 1897. It has been carefully prepared and is accompanied by the usual maps, but the map of the Sone canals is not nearly so clear as that submitted with the report of 1895-96. The map of the Orissa Coast canal should indicate more clearly the navigable connection between the tail of the canal at Charbatia lock and the Dhumrah river.

ORDER.—Ordered, that copies of this Review and of the report be forwarded to the Revenue and Agricultural Department for information.

The Governments of Madras, Bombay, the North-Western Provinces and Oudh, the Punjab and Burma.
The Chief Commissioners, Central Provinces, Assam, and Coorg.
The Residents at Hyderabad and Mysore.
The Agents to the Governor General in Central India, Rajputana and Baluchistan.

Ordered also, that copies of this Review be forwarded to the Government of Bengal for information and guidance, and to the Local Governments and Adminstrations in the Public Works Department, noted on the margin, for information.

Ordered further, that this Review be published in the *Gazette of India*, and that copies of this Review and of the Report and the Resolution by the Government of Bengal be forwarded to Her Majesty's Secretary of State for India.

J. S. BERESFORD,
Offg. Joint Secy. to the Govt. of India.

G. C. Press Simla.—No. 1484 P. W. D.—20-4-98.—216.

5. The results of the year's working of the Major Works are very satisfactory, the percentage of net revenue on capital outlay having risen from 0·19 in 1895-96 to 0·83 in the year under review. This improvement was due chiefly to the Sone Canals which yielded a net revenue of Rs. 4,62,181 as compared with Rs. 1,90,882 in 1895-96 and an average of Rs. 1,18,275 for the last 9 years.

The percentage of net revenue on Capital outlay on the Minor Works for which Capital and Revenue Accounts are kept, was 1·76 as against 1·71 in the previous year.

6. The following table gives details for the three Major Irrigation Works of the unrealised balances of demands at the beginning and at the end of the year :—

Canals.	Balance unrealised at beginning of year.	Demands of year.	Total.	Less collection and remissions.	Balance unrealised at close of year.
	Rs.	Rs.	Rs.	Rs.	Rs.
Orissa	34,343	4,62,957	4,97,300	4,92,703	4,597
Midnapore	10,124	2,84,799	2,94,923	2,83,484	11,439
Sone	22,993	10,56,633	10,79,626	10,70,198	9,428
Total .	67,460	18,04,389	18,71,849	18,46,385	25,464

The improvement in administration noticed in the three previous years' reviews still continues. The balance uncollected at the end of the year was Rs. 25,464 as compared with Rs. 67,460 at its commencement.

7. The areas irrigated and the assessed water-rates on the three Major Irrigation Works are shown in the following table :—

Canals.	Area irrigated.		Assessed water rates.		Rate per acre irrigated.	
	1896-97.	1895-96.	1896-97.	1895-96.	1896-97.	1895-96.
	Acres.	Acres.	Rs.	Rs.	Rs.	Rs.
Orissa	185,048	119,460	2,63,420	1,71,025	1·42	1·43
Midnapore . . .	65,183	65,251	1,05,661	1,04,111	1·62	1·59
Sone	(a)555,156	395,222	11,24,449	7,83,921	2·02	1·98
Total .	805,387	579,933	14,93,530	10,59,057	1·85	1·82

(a) Includes 22,825 acres on account of hot weather irrigation.

The increase in the area irrigated was chiefly on the Sone Canals, where, it is stated, the rainfall was very deficient, and failed entirely at the periods when it was most required. There was also a considerable increase in the area under the Orissa Canals; in Orissa the rainfall was above the average, but it was not well distributed, and in October, a most critical month, was practically *nil*. The rainfall statement for the rabi season as printed in paragraph 15 of the Chief Engineer's note requires to be corrected, the fall in February was 2·87 inches and not 0·80 of an inch as shown.

8. The areas irrigated in the kharif and rabi seasons were as follows :—

Canals.	Kharif.	Rabi.
	Acres.	Acres.
Orissa	171,748	13,300
Midnapore	65,183	...
Sone*	316,941	215,390
TOTAL	553,872	228,690

* Exclusive of 22,825 acres of hot weather irrigation.

The area irrigated by lift was 6,233 acres or 4·75 per cent. of the whole.

9. The area irrigated on all the canals in Bengal excluding 11,251 acres on the Madhuban canal for which no rates are charged, was 830,761 acres, and the areas of the principal crops irrigated were—

	Acres.
Rice	570,315
Wheat	68,399
Barley	23,339
Sugarcane	64,474

Over 95 per cent. of the sugar-cane and practically the whole of the wheat and barley crops were on the Sone Canals. It should be noted that the total area of sugar-cane given in the report is misleading, for according to the system in Bengal the same fields are recorded in the separate areas shown as irrigated in each of the three seasons into which the year is divided. (*See footnote* to statement III-E, page 98 of report.) Further, in case of long leases the area of sugar-cane is only approximate. It is probable that not more than 25,000 acres of sugar-cane, as a complete crop, was irrigated by canals in Bengal during 1896-97. The system of repeating the area of the same crop irrigated in different seasons of the year has, it is understood, been adopted owing to complications arising out of the existence of leases. In future an estimate of the area of sugar-cane irrigated during the year as one crop might always be given.

The estimated value of the irrigated crops was 381 lakhs of rupees excluding those on the Madhuban Canal.

10. The details of the working expenses, omitting the Eden and Madhuban Canals, are as follows :—

Canals.	1896-97. Works.	Establishment.	Tools and Plant.	Indirect charges.	Total.	1895-96. Total.
1	2	3	4	5	6	7
MAJOR WORKS.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
I.—Irrigation—						
Orissa Canals	2,23,552	2,23,345	17,578	31,268	4,95,743	4,72,395
Midnapore Canal	1,17,211	74,799	30,827	10,472	2,33,309	2,76,113
Sone Canals	1,76,746	3,48,525	23,400	48,793	5,97,464	5,74,434
TOTAL I.—IRRIGATION	5,17,509	6,46,669	71,805	90,533	13,26,516	13,22,942
Per acre irrigated by Major Works	...	...	...	...	1·64	2·28
II.—Navigation—						
Hijili Tidal Canal	22,343	12,147	4,000	1,701	40,191	61,398
MINOR WORKS AND NAVIGATION.						
I.—Irrigation—						
Saran Canals	9,417	2,185	26	306	11,934	1,354
II.—Navigation—						
Orissa Coast Canal	53,525	26,542	4,000	3,716	87,783	70,119
Calcutta and Eastern Canals	1,80,715	19,336	28,001	2,707	2,30,759	2,91,640
Nadia Rivers	59,718	60,925	1,646	8,529	1,30,818	1,46,281
Gaighatta and Buxi Khals	484	175	...	25	684	13,504
GRAND TOTAL	8,43,711	7,67,979	1,09,478	1,07,517	18,28,685	19,07,238

On the Orissa Canals, the expenditure on Extensions and Improvements was Rs. 5,859 and on Repairs Rs. 2,17,693 against Rs. 4,768 and Rs. 1,95,059 respectively, during the previous year, and Rs. 10,959 and Rs. 2,10,134 the average of the previous five years.

On the Midnapore Canal, the expenditure on Extensions and Improvements was Rs. 9,056 against Rs. 5,785 in the previous year. The expenditure on Repairs was Rs. 1,08,155 compared with Rs. 1,14,284 the average of the previous five years.

On the Sone Canals, the expenditure on Extensions and Improvements was Rs. 25,029 as against Rs. 20,428 in the previous year. The expenditure on Repairs was Rs. 1,51,717 against Rs. 1,32,057 in the previous year. Compared with the average expenditure of the five years ending March 1896, the saving on Maintenance and Repairs during 1896-97 amounts to Rs. 60,000. It is explained that the cost of Maintenance and Repairs was larger than in the previous year mainly because there was a closure of the canals during the year under review, but also because extra silt clearance in front of the locks on the canals was necessary on account of the unusually large amount of silt in the water. As mentioned in the concluding part of paragraph 178 of the Chief Engineer's note, the expense of maintenance cannot be brought down below the sum necessary for keeping the canals in a thoroughly efficient state and a continuous record of reduced expenditure cannot therefore be expected. The measures adopted to check the deposit of silt at the heads of the canals continued to work successfully, but the results were not considered quite so good as those of the preceding year.

It is noticed that the average cost of maintenance per mile of distributary on the Midnapore canal is considerably more than twice that on the Orissa and Sone canals. The average cost per mile for the last three years are as follows on these three canals :—

	Rs.
Orissa Canals	33
Midnapore Canal	80
Sone Canals	31

11. The charge for establishment in the table in paragraph 10 is made up as follows :—

	Revenue management.	Maintenance.	Total.	Percentage.
	Rs.	Rs.	Rs.	
Direction	21,122	21,122	42,244	5·50
Executive	1,81,861	1,81,861	3,63,722	47·36
Collection	2,45,971	...	2,45,971	32·03
Navigation	1,16,042	...	1,16,042	15·11
GRAND TOTAL	5,64,996	2,02,983	7,67,979	100·00

The total cost of maintaining the Major Irrigation Works amounted to 73·2 per cent. of the gross revenue realized from them, the charge for revenue management being 35·1 per cent. of the total cost of maintenance.

12. The following table gives particulars of the disposal of objections to assessments during the year :—

Systems.	Pending from previous year	Filed during year.	Total.	Disposed of.	Balance left pending.
Orissa	105	1,745	1,850	1,739	111
Midnapore	106	587	693	611	82
Sone	511	9,005	9,516	8,476	1,040
Total .	722	11,337	12,059	10,826	1,233

The large number of complaints filed on the Sone Canals, nearly three times the usual number, is attributed to the increased area irrigated during the year. In seasons of strong demand for water and inadequate supply complaints against assessments must be expected to increase in a greater proportion than the area irrigated increases.

13. The Navigation receipts and expenditure are shown below :—

Canals.	Length of navigable channels.	Receipts.	Expenditure.
	Miles.	Rs	Rs.
Orissa Canals	205	1,94,100	40,029
Midnapore Canal	72	1,62,231	12,380
Hijili Tidal Canal	29	89,511	40,191
Sone Canals	218	70,006	27,455
Calcutta and Eastern Canals	47	4,26,425	2,30,885
Orissa Coast Canal	102	83,856	87,901
Nadia Rivers	455	93,392	1,30,818
Total .	1,128	11,19,521	5,69,659
Figures for 1895-96 .	1,128	10,81,691	6,60,410

There was an increase in the receipts on all systems with the exception of the Calcutta and Eastern Canals and the Nadia Rivers. On the latter the very marked decline of traffic noticed in paragraph 13 of the previous year's review continues, and is said to have been aggravated by the unusually low level of the Ganges. The expenditure on navigation during the year was Rs. 5,69,659 as against Rs. 6,60,410 in the previous year. An expenditure of Rs. 9,851 was incurred on the improvement of the Bhil route connecting Khulna with Madaripur which is now open for steamers.

14. The Navigation receipts were made up as follows :—

	Rs.
Tollage on private boats	10,40,234
„ „ rafts	16,442
Transport service	49,399
Fines and sundries	13,446
Total .	11,19,521

3. The total length of canals in operation was 916 miles, of which 495¼ miles are for irrigation and navigation, 242¾ miles for irrigation only, and 178 miles for navigation only. There were 2,605 miles of distributaries capable of irrigating 1,572,005 acres.

4. The financial results of the year's working are shown in the following statement :—

Canals.	Direct and indirect Capital outlay to end of 1896-97.	Gross Revenue collected.			Working Expenses.			Net Revenue.	Percentage of net Revenue on Capital outlay.
		Irrigation Revenue.*	Miscellaneous receipts.	Total.	Direct.	Indirect.	Total.		
1	2	3	4	5	6	7	8	9	10
Major Works.									
I.—Irrigation.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Orissa Canals	2,62,37,029	2,45,597	2,27,440	4,72,947	4,64,475	31,268	4,95,743	—22,796	...
Midnapore Canal	84,60,252	99,528	1,79,139	2,78,667	2,22,837	10,472	2,33,309	45,358	0·54
Sone Canals	2,68,97,368	9,52,678	1,06,967	10,59,645	5,48,671	48,793	5,97,464	4,62,181	1·71
Total I.—Irrigation . .	6,15,94,649	12,97,713	5,13,546	18,11,259	12,35,983	90,533	13,26,516	4,84,743	0·79
II.—Navigation.									
Hijili Tidal Canal	26,14,942	...	90,946	90,946	38,490	1,701	40,191	50,755	1·94
Total Major Works, 1896-97 .	6,42,09,591	12,97,713	6,04,492	19,02,205	12,74,473	92,234	43,66,707	5,35,498	0·83
Total for 1895-96 .	6,41,80,078	9,92,835	5,14,894	15,07,729	12,90,819	93,521	13,84,340	1,23,389	0·19
Minor Works and Navigation.									
Works of which Capital and Revenue Accounts are kept—									
I.—Irrigation.									
Saran Canals	6,96,753	—317	1,251	934	11,628	306	11,934	—11,000	...
II.—Navigation.									
Orissa Coast Canal	44,98,290	...	86,141	86,141	84,067	3,716	87,783	—1,642	...
Calcutta and Eastern Canals . .	59,55,328	...	4,39,938	4,39,938	2,28,052	2,707	2,30,759	2,09,179	3·51
Total II.—Navigation. .	1,04,53,618	...	5,26,079	5,26,079	3,12,119	6,423	3,18,542	2,07,537	1·98
Total Minor Works, Irrigation and Navigation, 1896-97 . .	1,11,50,371	—317	5,27,330	5,27,013	3,23,747	6,729	3,30,476	1,96,537	1·76
Total for 1895-96 .	1,06,60,714	1,064	5,43,983	5,45,047	3,48,926	14,187	3,63,113	1,81,934	1·71
GRAND TOTAL, 1896-97 .	7,53,59,962	12,97,396	11,31,822	24,29,218	15,98,220	98,963	16,97,183	7,32,035	0·97
GRAND TOTAL, 1895-96 .	7,48,40,792	9,93,899	10,58,877	20,52,776	16,39,745	1,07,708	17,47,453	3,05,323	0·41
Minor Works of which only Revenue Accounts are kept—									
Nadia Rivers	...	...	93,474	93,474	1,22,289	8,529	1,30,818	—37,344	...
Gaighatta and Buxi Khals . .	...	...	3,820	3,820	659	25	684	3,136	...
Total Minor Works, Revenue Accounts, 1896-97 . . .	...	...	97,294	97,294	1,22,948	8,554	1,31,502	—34,208	...
Total for 1895-96 .	...	...	1,25,171	1,25,171	1,50,409	9,376	1,59,785	34,614	...
Minor Works of which neither Capital nor Revenue Accounts are kept—									
Eden Canal	...	36,219	316	36,535	1,08,457	...	1,08,457	—71,922	...
Madhuban Canal	...	...	100	100	5,791	...	5,791	—5,691	...
Total Minor Works, neither Capital nor Revenue, 1896-97 . .	...	36,219	416	36,635	1,14,248	...	1,14,248	—77,613	...
Total for 1895-96 .	...	30,518	476	30,994	59,734	...	59,734	—28,740	...

* Refunds deducted from Revenue.

Public Works Department.

No. 70 I.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

CIVIL WORKS.

Irrigation.

Simla, the 19th April 1898.

Review of the Revenue Report of Irrigation and Navigation Works in Bengal for 1896-97.

Read—

The Revenue Report of Irrigation Works in Bengal for 1896-97, and the Resolution thereon by the Government of Bengal, No. 1390-I. A., dated the 7th December 1897.

OBSERVATIONS.—Of the seven canal systems in Bengal for which Capital and Revenue Accounts are kept, four are Major Works and three are Minor Works. One Major Work and two Minor Works are for navigation only.

The principal transactions of the year under review are summed up in the following table:—

Class of Works.		Capital outlay incurred during the year.	Capital outlay to the end of the year.	Area Irrigated.	Percentage of net revenue on Capital outlay.	Remarks.
		Rs.	Rs.	Acres.		
Major Works .	I. Irrigation.	—7,637	6,15,94,649	805,387	0·79	
	II. Navigation	37,150	26,14,942	...	1·94	
Minor Works for which Capital and Revenue Accounts are kept.	I. Irrigation.	...	6,96,753	4,080	...	No Capital expenditure on the Saran Canals during the year.
	II. Navigation	4,89,657	1,04,53,618	...	1·98	

2. The Capital outlay on these works during and up to the end of 1896-97 was as follows:—

—	Number of works.	During the year 1896-97. Works.	Establishment.	Tools and Plant.	Suspense Account.	Total direct charges.	Indirect charges.	Total direct and indirect charges.	Total direct and indirect to end of 1896-97.
1	2	3	4	5	6	7	8	9	10
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
MAJOR WORKS.									
Irrigation Works not charged against Revenue (Account head 49), *viz.*:—									
Orissa Project . . .	...	9,431	2,059	...	3,405	14,895	288	15,183	2,62,37,029
Midnapore Canal . .	...	4,927	1,133	...	...	6,060	159	6,219	84,60 252
Hijili Tidal Canal . .	...	25,731	5,631	5,000	...	36,362	788	37,150	26,14,942
Sone Project . . .	...	—12,322	1,780	—18,485	—261	—29,288	249	—29,039	2,68,97,368
TOTAL .	4	27,767	10,603	—13,485	3,144	28,029	1,484	29,513	6,42,09,591
MINOR WORKS AND NAVIGATION.									
Works for which Capital and Revenue Accounts are kept—									
Provincial—in operation (Account head 43) *viz.*:—									6,96,753
Saran Project . . .	...	...	...	...	...	...	...	...	44,98,290
Orissa Coast Canal . .	...	12,697	2,920	1,000	3,656	20,273	409	20,682	59,55,328
Calcutta and Eastern Canals	...	3,61,859	81,164	10,903	472	4,54,398	14,577	4,68,975	
TOTAL .	3	3,74,556	84,084	11,903	4,128	4,74,671	14,986	4,89,657	1,11,50,371
GRAND TOTAL .	7	4,02,323	94,687	—1,582	7,272	5,02,700	16,470	5,19,170	7,53,59,962

The largest work on which Capital outlay was incurred is the canalisation of the Bhangore Khall, an important channel in the series comprising the inner boat route of the Calcutta and Eastern canals system. Rs. 4,54,398 were spent during the year bringing up the total expenditure on this work to Rs. 5,90,041, against a sanctioned estimate of Rs. 10,57,364. Great difficulties are said to have been experienced in the construction of the locks at each end of the channel, but the description of these difficulties given by the Superintending Engineer as quoted in paragraph 111 of the Chief Engineer's note appears to indicate that considerable labour and expense would have been saved had a more thorough preliminary examination of the site been made by means of trial pits.

Public Works Department

No. 70 I.

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The principal transactions of the year under review are summed up in the following table:—

Class of Works.		Capital outlay incurred during the year.	Capital outlay to the end of the year.	Area Irrigated.	Percentage of net revenue on Capital outlay.	Remarks.
		Rs.	Rs.	Acres.		
Major Works .	I. Irrigation.	—7,637	6,15,94,649	805,387	0·79	
	II. Navigation	37,150	26,14,942	...	1·94	
Minor Works for which Capital and Revenue Accounts are kept.	I. Irrigation.	...	6,96,753	4,080	...	No Capital expenditure on the Saran Canals during the year.
	II. Navigation	4,89,657	1,04,53,618	...	1·98	

2. The Capital outlay on these works during and up to the end of 1896-97 was as follows:—

—	Number of works.	During the year 1896-97. Works.	Establishment.	Tools and Plant.	Suspense Account.	Total direct charges.	Indirect charges.	Total direct and indirect charges.	Total direct and indirect to end of 1896-97.
1	2	3	4	5	6	7	8	9	10
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
MAJOR WORKS.									
Irrigation Works not charged against Revenue (Account head 49), *viz.*:—									
Orissa Project . . .	...	9,431	2,059	...	3,405	14,895	288	15,183	2,62,37,029
Midnapore Canal . .	...	4,927	1,133	...	...	6,060	159	6,219	84,60 252
Hijili Tidal Canal . .	...	25,731	5,631	5,000	...	36,362	788	37,150	26,14,942
Sone Project . . .	...	—12,322	1,780	—18,485	—261	—29,288	249	—29,039	2,68,97,368
TOTAL .	4	27,767	10,603	—13,485	3,144	28,029	1,484	29,513	6,42,09,591
MINOR WORKS AND NAVIGATION.									
Works for which Capital and Revenue Accounts are kept—									
Provincial—in operation (Account head 43) *viz.*:—									
Saran Project . . .	...	...	...	...	...	...	...	...	6,96,753
Orissa Coast Canal . .	...	12,697	2,920	1,000	3,656	20,273	409	20,682	44,98,290
Calcutta and Eastern Canals	...	3,61,859	81,164	10,903	472	4,54,398	14,577	4,68,975	59,55,328
TOTAL .	3	3,74,556	84,084	11,903	4,128	4,74,671	14,986	4,89,657	1,11,50,371
GRAND TOTAL .	7	4,02,323	94,687	—1,582	7,272	5,02,700	16,470	5,19,170	7,53,59,962

The largest work on which Capital outlay was incurred is the canalisation of the Bhangore Khall, an important channel in the series comprising the inner boat route of the Calcutta and Eastern canals system. Rs. 4,54,398 were spent during the year bringing up the total expenditure on this work to Rs. 5,90,041, against a sanctioned estimate of Rs. 10,57,364. Great difficulties are said to have been experienced in the construction of the locks at each end of the channel, but the description of these difficulties given by the Superintending Engineer as quoted in paragraph 111 of the Chief Engineer's note appears to indicate that considerable labour and expense would have been saved had a more thorough preliminary examination of the site been made by means of trial pits.

3. The total length of canals in operation was 916 miles, of which 495¼ miles are for irrigation and navigation, 242¾ miles for irrigation only, and 178 miles for navigation only. There were 2,605 miles of distributaries capable of irrigating 1,572,005 acres.

4. The financial results of the year's working are shown in the following statement :—

Canals.	Direct and indirect Capital outlay to end of 1896-97.	Gross Revenue collected.			Working Expenses.			Net Revenue.	Percentage of net Revenue on Capital outlay.
		Irrigation Revenue.*	Miscellaneous receipts.	Total.	Direct.	Indirect.	Total.		
1	2	3	4	5	6	7	8	9	10
Major Works.									
I.—Irrigation.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Orissa Canals	2,62,37,029	2,45,597	2,27,440	4,72,947	4,64,475	31,268	4,95,743	—22,796	...
Midnapore Canal	84,60,252	99,528	1,79,139	2,78,667	2,22,837	10,472	2,33,309	45,358	0·54
Sone Canals	2,63,97,368	9,52,678	1,06,967	10,59,645	5,48,671	48,793	5,97,464	4,62,181	1·71
Total I.—Irrigation	6,15,94,649	12,97,713	5,13,546	18,11,259	12,35,983	90,533	13,26,516	4,84,743	0·79
II.—Navigation.									
Hijili Tidal Canal	26,14,942	...	90,946	90,946	38,490	1,701	40,191	50,755	1·94
Total Major Works, 1896-97	6,42,09,591	12,97,713	6,04,492	19,02,205	12,74,473	92,234	43,66,707	5,35,498	0·83
Total for 1895-96	6,41,80,078	9,92,835	5,14,894	15,07,729	12,90,819	93,521	13,84,340	1,23,389	0·19
Minor Works and Navigation.									
Works of which Capital and Revenue Accounts are kept—									
I.—Irrigation.									
Saran Canals	6,96,753	—317	1,251	934	11,628	306	11,934	—11,000	...
II.—Navigation.									
Orissa Coast Canal	44,98,290	...	86,141	86,141	84,067	3,716	87,783	—1,642	...
Calcutta and Eastern Canals	59,55,328	...	4,39,938	4,39,938	2,28,052	2,707	2,30,759	2,09,179	3·51
Total II.—Navigation.	1,04,53,618	...	5,26,079	5,26,079	3,12,119	6,423	3,18,542	2,07,537	1·98
Total Minor Works, Irrigation and Navigation, 1896-97	1,11,50,371	—317	5,27,330	5,27,013	3,23,747	6,729	3,30,476	1,96,537	1·76
Total for 1895-96	1,06,60,714	1,064	5,43,983	5,45,047	3,48,926	14,187	3,63,113	1,81,934	1·71
GRAND TOTAL, 1896-97	7,53,59,962	12,97,396	11,31,822	24,29,218	15,98,220	98,963	16,97,183	7,32,035	0·97
GRAND TOTAL, 1895-96	7,48,40,792	9,93,899	10,58,877	20,52,776	16,39,745	1,07,708	17,47,453	3,05,323	0·41
Minor Works of which only Revenue Accounts are kept—									
Nadia Rivers	...	...	93,474	93,474	1,22,289	8,529	1,30,818	—37,344	...
Gaighatta and Buxi Khals	...	...	3,820	3,820	659	25	684	3,136	...
Total Minor Works, Revenue Accounts, 1896-97	...	...	97,294	97,294	1,22,948	8,554	1,31,502	—34,208	...
Total for 1895-96	...	...	1,25,171	1,25,171	1,50,409	9,376	1,59,785	34,614	...
Minor Works of which neither Capital nor Revenue Accounts are kept—									
Eden Canal	...	36,219	316	36,535	1,08,457	...	1,08,457	—71,922	...
Madhuban Canal	...	...	100	100	5,791	...	5,791	—5,691	...
Total Minor Works, neither Capital nor Revenue, 1896-97	...	36,219	416	36,635	1,14,248	...	1,14,248	—77,613	...
Total for 1895-96	...	30,518	476	30,994	59,734	...	59,734	—28,740	...

* Refunds deducted from Revenue.

5. The results of the year's working of the Major Works are very satisfactory, the percentage of net revenue on capital outlay having risen from 0·19 in 1895-96 to 0·83 in the year under review. This improvement was due chiefly to the Sone Canals which yielded a net revenue of Rs. 4,62,181 as compared with Rs. 1,90,882 in 1895-96 and an average of Rs. 1,18,275 for the last 9 years.

The percentage of net revenue on Capital outlay on the Minor Works for which Capital and Revenue Accounts are kept, was 1·76 as against 1·71 in the previous year.

6. The following table gives details for the three Major Irrigation Works of the unrealised balances of demands at the beginning and at the end of the year :—

Canals.	Balance unrealised at beginning of year.	Demands of year.	Total.	Less collection and remissions.	Balance unrealised at close of year.
	Rs.	Rs.	Rs.	Rs.	Rs.
Orissa	34,343	4,62,957	4,97,300	4,92,703	4,597
Midnapore	10,124	2,84,799	2,94,923	2,83,484	11,439
Sone	22,993	10,56,633	10,79,626	10,70,198	9,428
Total	67,460	18,04,389	18,71,849	18,46,385	25,464

The improvement in administration noticed in the three previous years' reviews still continues. The balance uncollected at the end of the year was Rs. 25,464 as compared with Rs. 67,460 at its commencement.

7. The areas irrigated and the assessed water-rates on the three Major Irrigation Works are shown in the following table :—

Canals.	Area irrigated.		Assessed water rates.		Rate per acre irrigated.	
	1896-97.	1895-96.	1896-97.	1895-96.	1896-97.	1895-96.
	Acres.	Acres.	Rs.	Rs.	Rs.	Rs.
Orissa	185,048	119,460	2,63,420	1,71,025	1·42	1·43
Midnapore	65,183	65,251	1,05,661	1,04,111	1·62	1·59
Sone	(a)555,156	395,222	11,24,449	7,83,921	2·02	1·98
Total	805,387	579,933	14,93,530	10,59,057	1·85	1·82

(a) Includes 22,825 acres on account of hot weather irrigation.

The increase in the area irrigated was chiefly on the Sone Canals, where, it is stated, the rainfall was very deficient, and failed entirely at the periods when it was most required. There was also a considerable increase in the area under the Orissa Canals; in Orissa the rainfall was above the average, but it was not well distributed, and in October, a most critical month, was practically *nil*. The rainfall statement for the rabi season as printed in paragraph 15 of the Chief Engineer's note requires to be corrected, the fall in February was 2·87 inches and not 0·80 of an inch as shown.

8. The areas irrigated in the kharif and rabi seasons were as follows :—

Canals.	Kharif.	Rabi.
	Acres.	Acres.
Orissa	171,748	13,300
Midnapore	65,183	...
Sone*	316,941	215,390
Total	553,872	228,690

* Exclusive of 22,825 acres of hot weather irrigation.

The area irrigated by lift was 6,233 acres or 4·75 per cent. of the whole.

9. The area irrigated on all the canals in Bengal excluding 11,251 acres on the Madhuban canal for which no rates are charged, was 830,761 acres, and the areas of the principal crops irrigated were—

	Acres.
Rice	570,315
Wheat	68,399
Barley	23,339
Sugarcane	64,474

Over 95 per cent. of the sugar-cane and practically the whole of the wheat and barley crops were on the Sone Canals. It should be noted that the total area of sugar-cane given in the report is misleading, for according to the system in Bengal the same fields are recorded in the separate areas shown as irrigated in each of the three seasons into which the year is divided. (*See footnote* to statement III-E, page 98 of report.) Further, in case of long leases the area of sugar-cane is only approximate. It is probable that not more than 25,000 acres of sugar-cane, as a complete crop, was irrigated by canals in Bengal during 1896-97. The system of repeating the area of the same crop irrigated in different seasons of the year has, it is understood, been adopted owing to complications arising out of the existence of leases. In future an estimate of the area of sugar-cane irrigated during the year as one crop might always be given.

The estimated value of the irrigated crops was 381 lakhs of rupees excluding those on the Madhuban Canal.

10. The details of the working expenses, omitting the Eden and Madhuban Canals, are as follows :—

Canals.	1896-97. Works.	Establishment.	Tools and Plant.	Indirect charges.	Total.	1895-96. Total.
1	2	3	4	5	6	7
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Major Works.						
I.—Irrigation—						
Orissa Canals	2,23,552	2,23,345	17,578	31,268	4,95,743	4,72,395
Midnapore Canal	1,17,211	74,799	30,827	10,472	2,33,309	2,76,113
Sone Canals	1,76,746	3,48,525	23,400	48,793	5,97,464	5,74,434
Total I.—Irrigation	5,17,509	6,46,669	71,805	90,533	13,26,516	13,22,942
Per acre irrigated by Major Works	...	...	...	...	1·64	2·28
II.—Navigation—						
Hijili Tidal Canal	22,343	12,147	4,000	1,701	40,191	61,398
Minor Works and Navigation.						
I.—Irrigation—						
Saran Canals	9,417	2,185	26	306	11,934	1,354
II.—Navigation—						
Orissa Coast Canal	53,525	26,542	4,000	3,716	87,783	70,119
Calcutta and Eastern Canals	1,80,715	19,336	28,001	2,707	2,30,759	2,91,640
Nadia Rivers	59,718	60,925	1,646	8,529	1,30,818	1,46,281
Gaighatta and Buxi Khals	484	175	...	25	684	13,504
GRAND TOTAL	8,43,711	7,67,979	1,09,478	1,07,517	18,28,685	19,07,238

On the Orissa Canals, the expenditure on Extensions and Improvements was Rs. 5,859 and on Repairs Rs. 2,17,693 against Rs. 4,768 and Rs. 1,95,059 respectively, during the previous year, and Rs. 10,959 and Rs. 2,10,134 the average of the previous five years.

On the Midnapore Canal, the expenditure on Extensions and Improvements was Rs. 9,056 against Rs. 5,785 in the previous year. The expenditure on Repairs was Rs. 1,08,155 compared with Rs. 1,14,284 the average of the previous five years.

On the Sone Canals, the expenditure on Extensions and Improvements was Rs. 25,029 as against Rs. 20,428 in the previous year. The expenditure on Repairs was Rs. 1,51,717 against Rs. 1,32,057 in the previous year. Compared with the average expenditure of the five years ending March 1896, the saving on Maintenance and Repairs during 1896-97 amounts to Rs. 60,000. It is explained that the cost of Maintenance and Repairs was larger than in the previous year mainly because there was a closure of the canals during the year under review, but also because extra silt clearance in front of the locks on the canals was necessary on account of the unusually large amount of silt in the water. As mentioned in the concluding part of paragraph 178 of the Chief Engineer's note, the expense of maintenance cannot be brought down below the sum necessary for keeping the canals in a thoroughly efficient state and a continuous record of reduced expenditure cannot therefore be expected. The measures adopted to check the deposit of silt at the heads of the canals continued to work successfully, but the results were not considered quite so good as those of the preceding year.

It is noticed that the average cost of maintenance per mile of distributary on the Midnapore canal is considerably more than twice that on the Orissa and Sone canals. The average cost per mile for the last three years are as follows on these three canals :—

	Rs.
Orissa Canals	33
Midnapore Canal	80
Sone Canals	31

11. The charge for establishment in the table in paragraph 10 is made up as follows :—

	Revenue management.	Maintenance.	Total.	Percentage.
	Rs.	Rs.	Rs.	
Direction	21,122	21,122	42,244	5·50
Executive	1,81,861	1,81,861	3,63,722	47·36
Collection	2,45,971	...	2,45,971	32·03
Navigation	1,16,042	...	1,16,042	15·11
Grand Total	5,64,996	2,02,983	7,67,979	100·00

The total cost of maintaining the Major Irrigation Works amounted to 73·2 per cent. of the gross revenue realized from them, the charge for revenue management being 35·1 per cent. of the total cost of maintenance.

12. The following table gives particulars of the disposal of objections to assessments during the year:—

Systems.	Pending from previous year	Filed during year.	Total.	Disposed of.	Balance left pending.
Orissa	105	1,745	1,850	1,739	111
Midnapore	106	587	693	611	82
Sone	511	9,005	9,516	8,476	1,040
Total .	722	11,337	12,059	10,826	1,233

The large number of complaints filed on the Sone Canals, nearly three times the usual number, is attributed to the increased area irrigated during the year. In seasons of strong demand for water and inadequate supply complaints against assessments must be expected to increase in a greater proportion than the area irrigated increases.

13. The Navigation receipts and expenditure are shown below:—

Canals.	Length of navigable channels.	Receipts.	Expenditure.
	Miles.	Rs.	Rs.
Orissa Canals	205	1,94,100	40,029
Midnapore Canal	72	1,62,231	12,380
Hijili Tidal Canal	29	89,511	40,191
Sone Canals	218	70,006	27,455
Calcutta and Eastern Canals	47	4,26,425	2,30,885
Orissa Coast Canal	102	83,856	87,901
Nadia Rivers	455	93,392	1,30,818
Total .	1,128	11,19,521	5,69,659
Figures for 1895-96 .	1,128	10,81,691	6,60,410

There was an increase in the receipts on all systems with the exception of the Calcutta and Eastern Canals and the Nadia Rivers. On the latter the very marked decline of traffic noticed in paragraph 13 of the previous year's review continues, and is said to have been aggravated by the unusually low level of the Ganges. The expenditure on navigation during the year was Rs. 5,69,659 as against Rs. 6,60,410 in the previous year. An expenditure of Rs. 9,851 was incurred on the improvement of the Bhil route connecting Khulna with Madaripur which is now open for steamers.

14. The Navigation receipts were made up as follows:—

	Rs.
Tollage on private boats	10,40,234
„ „ rafts	16,442
Transport service	49,399
Fines and sundries	13,446
Total .	11,19,521

The aggregate tonnage carried per mile amounted to 47⅘ millions, the estimated value of cargoes to 1,157½ lakhs of rupees, and the number of passengers was 551,295.

15. The rules for conducting crop experiments, to which reference was made in last year's review, were issued, but they were not brought fully into operation during the year under review.

16. The following table shows the duty of water on the Sone and Orissa Canals:—

Canals.	Average discharge, cubic feet per second.				Area in acres irrigated per cubic foot per second.			
	At head.		Utilised.		Discharge at head.		Utilised.	
	Kharif.	Rabi.	Kharif.	Rabi	Kharif.	Rabi.	Kharif.	Rabi.
1	2	3	4	5	6	7	8	9
Orissa	1,964	1,235	1,645	872	...*	...*	...*	...*
Sone	5,227	2,627	4,706	2,166	60·64	81·99	67·34	99·44

* Information not given. See footnote to table I-E, page 97 of report.

It is observed that the duty of water on distributaries is not recorded. In the Punjab and North-West Provinces much importance is attached to maintaining correct discharges of distributaries and comparing the duties obtained on different lines and on the same lines in different years, the end in view being to secure the closer attention of officers to the economical distribution of water in detail and to indicate localities where waste obviously occurs.

17. The Government of India notice with satisfaction the approval bestowed by the Lieutenant-Governor on the officers mentioned in paragraph 35 of the Resolution by the Local Government reviewing the revenue report.

The report was received by the Government of India on the 31st December 1897. It has been carefully prepared and is accompanied by the usual maps, but the map of the Sone canals is not nearly so clear as that submitted with the report of 1895-96. The map of the Orissa Coast canal should indicate more clearly the navigable connection between the tail of the canal at Charbatia lock and the Dhumrah river.

Order.—Ordered, that copies of this Review and of the report be forwarded to the Revenue and Agricultural Department for information.

The Governments of Madras, Bombay, the North-Western Provinces and Oudh, the Punjab and Burma.
The Chief Commissioners, Central Provinces, Assam, and Coorg.
The Residents at Hyderabad and Mysore.
The Agents to the Governor General in Central India, Rajputana and Baluchistan.

Ordered also, that copies of this Review be forwarded to the Government of Bengal for information and guidance, and to the Local Governments and Adminstrations in the Public Works Department, noted on the margin, for information.

Ordered further, that this Review be published in the *Gazette of India*, and that copies of this Review and of the Report and the Resolution by the Government of Bengal be forwarded to Her Majesty's Secretary of State for India.

J. S. BERESFORD,
Offg. Joint Secy. to the Govt. of India.

G. C. Press Simla.—No. 1484 P. W. D.—20-4-98.—216.

No 377 dt 5.5.98

Communicated to the Chief Engineer for Irrigation.
(Signed) W. H. J.

To
The Chief Engineer for Irrigation.
" Examiner, P. W. Accounts.

Public Works Department.

No. 70 I.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

CIVIL WORKS.

Irrigation.

Simla, the 19th April 1898.

Review of the Revenue Report of Irrigation and Navigation Works in Bengal for 1896-97.

Read—

The Revenue Report of Irrigation Works in Bengal for 1896-97, and the Resolution thereon by the Government of Bengal, No. 1390-I. A., dated the 7th December 1897.

OBSERVATIONS.—Of the seven canal systems in Bengal for which Capital and Revenue Accounts are kept, four are Major Works and three are Minor Works. One Major Work and two Minor Works are for navigation only.

The principal transactions of the year under review are summed up in the following table:—

Class of Works.		Capital outlay incurred during the year.	Capital outlay to the end of the year.	Area Irrigated.	Percentage of net revenue on Capital outlay.	Remarks.
		Rs.	Rs.	Acres.		
Major Works . .	I. Irrigation.	—7,637	6,15,94,649	805,387	0·79	
	II. Navigation	37,150	26,14,942	...	1·94	
Minor Works for which Capital and Revenue Accounts are kept.	I. Irrigation.	...	6,96,753	4,080	...	No Capital expenditure on the Saran Canals during the year.
	II. Navigation	4,89,657	1,04,53,618	...	1·98	

2. The Capital outlay on these works during and up to the end of 1896-97 was as follows:—

—	Number of works.	During the year 1896-97.							Total direct and indirect to end of 1896-97.
		Works.	Establishment.	Tools and Plant.	Suspense Account.	Total direct charges.	Indirect charges.	Total direct and indirect charges.	
1	2	3	4	5	6	7	8	9	10
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
MAJOR WORKS.									
Irrigation Works not charged against Revenue (Account head 49), *viz.*:—									
Orissa Project . . .	...	9,431	2,059	...	3,405	14,895	288	15,183	2,62,37,029
Midnapore Canal . .	...	4,927	1,133	...	...	6,060	159	6,219	84,60 252
Hijili Tidal Canal . .	...	25,731	5,631	5,000	...	36,362	788	37,150	26,14,942
Sone Project . . .	...	—12,322	1,780	—18,485	—261	—29,288	249	—29,039	2,68,97,368
TOTAL .	4	27,767	10,603	—13,485	3,144	28,029	1,484	29,513	6,42,09,591
MINOR WORKS AND NAVIGATION.									
Works for which Capital and Revenue Accounts are kept—									
Provincial—in operation (Account head 43) *viz.*:—									
Saran Project . . .	...	...	...	...	...	...	...	...	6,96,753
Orissa Coast Canal . .	...	12,697	2,920	1,000	3,656	20,273	409	20,682	44,98,290
Calcutta and Eastern Canals	...	3,61,859	81,164	10,903	472	4,54,398	14,577	4,68,975	59,55,328
TOTAL .	3	3,74,556	84,084	11,903	4,128	4,74,671	14,986	4,89,657	1,11,50,371
GRAND TOTAL .	7	4,02,323	94,687	—1,582	7,272	5,02,700	16,470	5,19,170	7,53,59,962

The largest work on which Capital outlay was incurred is the canalisation of the Bhangore Khall, an important channel in the series comprising the inner boat route of the Calcutta and Eastern canals system. Rs. 4,54,398 were spent during the year bringing up the total expenditure on this work to Rs. 5,90,041, against a sanctioned estimate of Rs. 10,57,364. Great difficulties are said to have been experienced in the construction of the locks at each end of the channel, but the description of these difficulties given by the Superintending Engineer as quoted in paragraph 111 of the Chief Engineer's note appears to indicate that considerable labour and expense would have been saved had a more thorough preliminary examination of the site been made by means of trial pits.

3. The total length of canals in operation was 916 miles, of which 495¼ miles are for irrigation and navigation, 242¾ miles for irrigation only, and 178 miles for navigation only. There were 2,605 miles of distributaries capable of irrigating 1,572,005 acres.

4. The financial results of the year's working are shown in the following statement :—

Canals.	Direct and indirect Capital outlay to end of 1896-97.	Gross Revenue collected.			Working Expenses.			Net Revenue.	Percentage of net Revenue on Capital outlay.
		Irrigation Revenue.*	Miscellaneous receipts.	Total.	Direct.	Indirect.	Total.		
1	2	3	4	5	6	7	8	9	10
Major Works.									
I.—Irrigation.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Orissa Canals	2,62,37,029	2,45,507	2,27,440	4,72,947	4,64,475	31,268	4,95,743	—22,796	...
Midnapore Canal	84,60,252	99,528	1,79,139	2,78,667	2,22,837	10,472	2,33,309	45,358	0·54
Sone Canals	2,63,97,368	9,52,678	1,06,967	10,59,645	5,48,671	48,793	5,97,464	4,62,181	1·71
Total I.—Irrigation	6,15,94,649	12,97,713	5,13,546	18,11,259	12,35,983	90,533	13,26,516	4,84,743	0·79
II.—Navigation.									
Hijili Tidal Canal	26,14,942	...	90,946	90,946	38,490	1,701	40,191	50,755	1·94
Total Major Works, 1896-97	6,42,09,591	12,97,713	6,04,492	19,02,205	12,74,473	92,234	43,66,707	5,35,498	0·83
Total for 1895-96	6,41,80,078	9,92,835	5,14,894	15,07,729	12,90,819	93,521	13,84,340	1,23,389	0·19
Minor Works and Navigation.									
Works of which Capital and Revenue Accounts are kept—									
I.—Irrigation.									
Saran Canals	6,96,753	—317	1,251	934	11,628	306	11,934	—11,000	...
II.—Navigation.									
Orissa Coast Canal	44,98,290	...	86,141	86,141	84,067	3,716	87,783	—1,642	...
Calcutta and Eastern Canals	59,55,328	...	4,39,938	4,39,938	2,28,052	2,707	2,30,759	2,09,179	3·51
Total II.—Navigation.	1,04,53,618	...	5,26,079	5,26,079	3,12,119	6,423	3,18,542	2,07,537	1·98
Total Minor Works, Irrigation and Navigation, 1896-97	1,11,50,371	—317	5,27,330	5,27,013	3,23,747	6,729	3,30,476	1,96,537	1·76
Total for 1895-96	1,06,60,714	1,064	5,43,983	5,45,047	3,48,926	14,187	3,63,113	1,81,934	1·71
GRAND TOTAL, 1896-97	7,53,59,962	12,97,396	11,31,822	24,29,218	15,98,220	98,963	16,97,183	7,32,035	0·97
GRAND TOTAL, 1895-96	7,48,40,792	9,93,899	10,58,877	20,52,776	16,39,745	1,07,708	17,47,453	3,05,323	0·41
Minor Works of which only Revenue Accounts are kept—									
Nadia Rivers	...	...	93,474	93,474	1,22,289	8,529	1,30,818	—37,344	...
Gaighatta and Buxi Khals	...	...	3,820	3,820	659	25	684	3,136	...
Total Minor Works, Revenue Accounts, 1896-97	...	...	97,294	97,294	1,22,948	8,554	1,31,502	—34,208	...
Total for 1895-96	...	...	1,25,171	1,25,171	1,50,409	9,376	1,59,785	34,614	...
Minor Works of which neither Capital nor Revenue Accounts are kept—									
Eden Canal	...	36,219	316	36,535	1,08,457	...	1,08,457	—71,922	...
Madhuban Canal	...	...	100	100	5,791	...	5,791	—5,691	...
Total Minor Works, neither Capital nor Revenue, 1896-97	...	36,219	416	36,635	1,14,248	...	1,14,248	—77,613	...
Total for 1895-96	...	30,518	476	30,994	59,734	...	59,734	—28,740	...

* Refunds deducted from Revenue.

5. The results of the year's working of the Major Works are very satisfactory, the percentage of net revenue on capital outlay having risen from 0·19 in 1895-96 to 0·83 in the year under review. This improvement was due chiefly to the Sone Canals which yielded a net revenue of Rs. 4,62,181 as compared with Rs. 1,90,882 in 1895-96 and an average of Rs. 1,18,275 for the last 9 years.

The percentage of net revenue on Capital outlay on the Minor Works for which Capital and Revenue Accounts are kept, was 1·76 as against 1·71 in the previous year.

6. The following table gives details for the three Major Irrigation Works of the unrealised balances of demands at the beginning and at the end of the year :—

Canals.	Balance unrealised at beginning of year.	Demands of year.	Total.	Less collection and remissions.	Balance unrealised at close of year.
	Rs.	Rs.	Rs.	Rs.	Rs.
Orissa	34,343	4,62,957	4,97,300	4,92,703	4,597
Midnapore	10,124	2,84,799	2,94,923	2,83,484	11,439
Sone	22,993	10,56,633	10,79,626	10,70,198	9,428
Total	67,460	18,04,389	18,71,849	18,46,385	25,464

The improvement in administration noticed in the three previous years' reviews still continues. The balance uncollected at the end of the year was Rs. 25,464 as compared with Rs. 67,460 at its commencement.

7. The areas irrigated and the assessed water-rates on the three Major Irrigation Works are shown in the following table :—

Canals.	Area irrigated.		Assessed water rates.		Rate per acre irrigated.	
	1896-97.	1895-96.	1896-97.	1895-96.	1896-97.	1895-96.
	Acres.	Acres.	Rs.	Rs.	Rs.	Rs.
Orissa	185,048	119,460	2,63,420	1,71,025	1·42	1·43
Midnapore	65,183	65,251	1,05,661	1,04,111	1·62	1·59
Sone	(a)555,156	395,222	11,24,449	7,83,921	2·02	1·98
Total	805,387	579,933	14,93,530	10,59,057	1·85	1·82

(a) Includes 22,825 acres on account of hot weather irrigation.

The increase in the area irrigated was chiefly on the Sone Canals, where, it is stated, the rainfall was very deficient, and failed entirely at the periods when it was most required. There was also a considerable increase in the area under the Orissa Canals; in Orissa the rainfall was above the average, but it was not well distributed, and in October, a most critical month, was practically *nil*. The rainfall statement for the rabi season as printed in paragraph 15 of the Chief Engineer's note requires to be corrected, the fall in February was 2·87 inches and not 0·80 of an inch as shown.

8. The areas irrigated in the kharif and rabi seasons were as follows :—

Canals.	Kharif.	Rabi.
	Acres.	Acres.
Orissa	171,748	13,300
Midnapore	65,183	...
Sone*	316,941	215,390
TOTAL	553,872	228,690

* Exclusive of 22,825 acres of hot weather irrigation.

The area irrigated by lift was 6,233 acres or 4·75 per cent. of the whole.

9. The area irrigated on all the canals in Bengal excluding 11,251 acres on the Madhuban canal for which no rates are charged, was 830,761 acres, and the areas of the principal crops irrigated were—

	Acres.
Rice	570,315
Wheat	68,399
Barley	23,339
Sugarcane	64,474

Over 95 per cent. of the sugar-cane and practically the whole of the wheat and barley crops were on the Sone Canals. It should be noted that the total area of sugar-cane given in the report is misleading, for according to the system in Bengal the same fields are recorded in the separate areas shown as irrigated in each of the three seasons into which the year is divided. (*See footnote* to statement III-E, page 98 of report.) Further, in case of long leases the area of sugar-cane is only approximate. It is probable that not more than 25,000 acres of sugar-cane, as a complete crop, was irrigated by canals in Bengal during 1896-97. The system of repeating the area of the same crop irrigated in different seasons of the year has, it is understood, been adopted owing to complications arising out of the existence of leases. In future an estimate of the area of sugar-cane irrigated during the year as one crop might always be given.

The estimated value of the irrigated crops was 381 lakhs of rupees excluding those on the Madhuban Canal.

10. The details of the working expenses, omitting the Eden and Madhuban Canals, are as follows :—

Canals.	1896-97. Works.	Establishment.	Tools and Plant.	Indirect charges.	Total.	1895-96. Total.
1	2	3	4	5	6	7
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
MAJOR WORKS.						
I.—Irrigation—						
Orissa Canals	2,23,552	2,23,345	17,578	31,268	4,95,743	4,72,395
Midnapore Canal	1,17,211	74,799	30,827	10,472	2,33,309	2,76,113
Sone Canals	1,76,746	3,48,525	23,400	48,793	5,97,464	5,74,434
TOTAL I.—IRRIGATION	5,17,509	6,46,669	71,805	90,533	13,26,516	13,22,942
Per acre irrigated by Major Works	...	...	...	...	1·64	2·28
II.—Navigation—						
Hijili Tidal Canal	22,343	12,147	4,000	1,701	40,191	61,398
MINOR WORKS AND NAVIGATION.						
I.—Irrigation—						
Saran Canals	9,417	2,185	26	306	11,934	1,354
II.—Navigation—						
Orissa Coast Canal	53,525	26,542	4,000	3,716	87,783	70,119
Calcutta and Eastern Canals	1,80,715	19,336	28,001	2,707	2,30,759	2,91,640
Nadia Rivers	59,718	60,925	1,646	8,529	1,30,818	1,46,281
Gaighatta and Buxi Khals	484	175	...	25	684	13,504
GRAND TOTAL	8,43,711	7,67,979	1,09,478	1,07,517	18,28,685	19,07,238

On the Orissa Canals, the expenditure on Extensions and Improvements was Rs. 5,859 and on Repairs Rs. 2,17,693 against Rs. 4,768 and Rs. 1,95,059 respectively, during the previous year, and Rs. 10,959 and Rs. 2,10,134 the average of the previous five years.

On the Midnapore Canal, the expenditure on Extensions and Improvements was Rs. 9,056 against Rs. 5,785 in the previous year. The expenditure on Repairs was Rs. 1,08,155 compared with Rs. 1,14,284 the average of the previous five years.

On the Sone Canals, the expenditure on Extensions and Improvements was Rs. 25,029 as against Rs. 20,428 in the previous year. The expenditure on Repairs was Rs. 1,51,717 against Rs. 1,32,057 in the previous year. Compared with the average expenditure of the five years ending March 1896, the saving on Maintenance and Repairs during 1896-97 amounts to Rs. 60,000. It is explained that the cost of Maintenance and Repairs was larger than in the previous year mainly because there was a closure of the canals during the year under review, but also because extra silt clearance in front of the locks on the canals was necessary on account of the unusually large amount of silt in the water. As mentioned in the concluding part of paragraph 178 of the Chief Engineer's note, the expense of maintenance cannot be brought down below the sum necessary for keeping the canals in a thoroughly efficient state and a continuous record of reduced expenditure cannot therefore be expected. The measures adopted to check the deposit of silt at the heads of the canals continued to work successfully, but the results were not considered quite so good as those of the preceding year.

It is noticed that the average cost of maintenance per mile of distributary on the Midnapore canal is considerably more than twice that on the Orissa and Sone canals. The average cost per mile for the last three years are as follows on these three canals :—

	Rs.
Orissa Canals	33
Midnapore Canal	80
Sone Canals	31

11. The charge for establishment in the table in paragraph 10 is made up as follows :—

	Revenue management.	Maintenance.	Total.	Percentage.
	Rs.	Rs.	Rs.	
Direction	21,122	21,122	42,244	5·50
Executive	1,81,861	1,81,861	3,63,722	47·36
Collection	2,45,971	...	2,45,971	32·03
Navigation	1,16,042	...	1,16,042	15·11
GRAND TOTAL	5,64,996	2,02,983	7,67,979	100·00

The total cost of maintaining the Major Irrigation Works amounted to 73·2 per cent. of the gross revenue realized from them, the charge for revenue management being 35·1 per cent. of the total cost of maintenance.

12. The following table gives particulars of the disposal of objections to assessments during the year:—

Systems.	Pending from previous year	Filed during year.	Total.	Disposed of.	Balance left pending.
Orissa	105	1,745	1,850	1,739	111
Midnapore	106	587	693	611	82
Sone	511	9,005	9,516	8,476	1,040
Total	722	11,337	12,059	10,826	1,233

The large number of complaints filed on the Sone Canals, nearly three times the usual number, is attributed to the increased area irrigated during the year. In seasons of strong demand for water and inadequate supply complaints against assessments must be expected to increase in a greater proportion than the area irrigated increases.

13. The Navigation receipts and expenditure are shown below:—

Canals.	Length of navigable channels.	Receipts.	Expenditure.
	Miles.	Rs.	Rs.
Orissa Canals	205	1,94,100	40,029
Midnapore Canal	72	1,62,231	12,380
Hijili Tidal Canal	29	89,511	40,191
Sone Canals	218	70,006	27,455
Calcutta and Eastern Canals	47	4,26,425	2,30,885
Orissa Coast Canal	102	83,856	87,901
Nadia Rivers	455	93,392	1,30,818
Total	1,128	11,19,521	5,69,659
Figures for 1895-96	1,128	10,81,691	6,60,410

There was an increase in the receipts on all systems with the exception of the Calcutta and Eastern Canals and the Nadia Rivers. On the latter the very marked decline of traffic noticed in paragraph 13 of the previous year's review continues, and is said to have been aggravated by the unusually low level of the Ganges. The expenditure on navigation during the year was Rs. 5,69,659 as against Rs. 6,60,410 in the previous year. An expenditure of Rs. 9,851 was incurred on the improvement of the Bhil route connecting Khulna with Madaripur which is now open for steamers.

14. The Navigation receipts were made up as follows:—

	Rs.
Tollage on private boats	10,40,234
„ „ rafts	16,442
Transport service	49,399
Fines and sundries	13,446
Total	11,19,521

The aggregate tonnage carried per mile amounted to $47\frac{4}{5}$ millions, the estimated value of cargoes to $1,157\frac{1}{2}$ lakhs of rupees, and the number of passengers was 551,295.

15. The rules for conducting crop experiments, to which reference was made in last year's review, were issued, but they were not brought fully into operation during the year under review.

16. The following table shows the duty of water on the Sone and Orissa Canals:—

Canals.	Average discharge, cubic feet per second.				Area in acres irrigated per cubic foot per second.			
	At head.		Utilised.		Discharge at head.		Utilised.	
	Kharif.	Rabi.	Kharif.	Rabi	Kharif.	Rabi.	Kharif.	Rabi.
1	2	3	4	5	6	7	8	9
Orissa	1,964	1,235	1,645	872	...*	...*	...*	...*
Sone	5,227	2,627	4,706	2,166	60·64	81·99	67·34	99·44

* Information not given. See footnote to table I-E, page 97 of report.

It is observed that the duty of water on distributaries is not recorded. In the Punjab and North-West Provinces much importance is attached to maintaining correct discharges of distributaries and comparing the duties obtained on different lines and on the same lines in different years, the end in view being to secure the closer attention of officers to the economical distribution of water in detail and to indicate localities where waste obviously occurs.

17. The Government of India notice with satisfaction the approval bestowed by the Lieutenant-Governor on the officers mentioned in paragraph 35 of the Resolution by the Local Government reviewing the revenue report.

The report was received by the Government of India on the 31st December 1897. It has been carefully prepared and is accompanied by the usual maps, but the map of the Sone canals is not nearly so clear as that submitted with the report of 1895-96. The map of the Orissa Coast canal should indicate more clearly the navigable connection between the tail of the canal at Charbatia lock and the Dhumrah river.

Order.—Ordered, that copies of this Review and of the report be forwarded to the Revenue and Agricultural Department for information.

The Governments of Madras, Bombay, the North-Western Provinces and Oudh, the Punjab and Burma.
The Chief Commissioners, Central Provinces, Assam, and Coorg.
The Residents at Hyderabad and Mysore.
The Agents to the Governor General in Central India, Rajputana and Baluchistan.

Ordered also, that copies of this Review be forwarded to the Government of Bengal for information and guidance, and to the Local Governments and Adminstrations in the Public Works Department, noted on the margin, for information.

Ordered further, that this Review be published in the *Gazette of India*, and that copies of this Review and of the Report and the Resolution by the Government of Bengal be forwarded to Her Majesty's Secretary of State for India.

J. S. BERESFORD,
Offg. Joint Secy. to the Govt. of India.

G. C. Press Simla.—No. 1484 P. W. D.—20-4-98.—216.

W 3773 Id 5.5.98

Communicated to the Chief Engineer
for Irrigation.

(Signed) W. H.
J.

To
The Chief Engineer for Irrigation
" Examiner, P. W. Accounts.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

IRRIGATION.
ACCOUNT.

Government {1898} of Madras.

PUBLIC WORKS.

Recd. } 1898. *Enclosures*

Regd. *Spare copies*

G.O., No. 378 I., 5th May 1898.

MAY.

Funds

Certain transfers of — under 43. Minor Works and Navigation, sanctioned.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—the following paper :—

From H. E. CLERK, Esq., Executive Engineer, Bellary Division, to the Superintending Engineer, III Circle, dated 13th April 1898, No. 3009.

In G.O., No. 117 I., dated 10th February 1898, communicated with your No. 6060, dated 16th February 1898, a sum of Rs. 800 had been allotted for expenditure on repairs to Kuppenkerra tank. The actual outlay to end of March 1898 against the above grant is Rs. 706, leaving a balance of Rs. 94 unspent.

2. A revised estimate for Rs. 2,670 for the work is under check in my office. To admit of the work being continued and completed, I would request that an allotment of, say, Rs. 2,000 may be obtained and the same communicated to me on an early date. The revised estimate will be submitted for sanction shortly.

No. 219 I.

Submitted to the Chief Engineer for Irrigation with a request that he will be good enough to sanction the allotment now applied for by the Executive Engineer.

(Signed) J. C. LARMINIE,
Supg. Engineer, III Circle.

26th April 1898.

ORDER—No. 378 I., dated 5th May 1898.

The following transfers of funds are sanctioned :—

Irrigation.
43. Minor Works and Navigation.
Minor Works, Revenue Department.

From		To	
Reserve—	RS.	Bellary Division—	RS.
Minor original works	2,000	Repairs	2,000
Establishment	460	Establishment	460
Tools and plant	30	Tools and plant	30
Total ...	2,490	Total ...	2,490

(True Extract.)

Under Secretary to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, III Circle.
" Examiner, Public Works Accounts.

Exd. C. Parthasarathy.

PUBLIC WORKS DEPARTMENT,

IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

READ the following

From the Supdg. Engineer, Third Circle. (H.R. No. 219-I dated 26-4-98)

The following transfers of funds are sanctioned :-

Irrigation.
43, Minor Works and Navigation.
Minor Works, Revenue department.

From		To	
Reserve -	Rs.	Bellary division.	Rs.
Minor Original Works. ———	2,000.	Repairs. ———	2,000.
Establishment. ———	460.	Establishment. ———	460.
Tools and plant. ———	30.	Tools and plant. ———	30.
	Total 2,490.		Total 2,490.

Issue
WH.
7/5/98

To The Chief Engineer for Irrigation.
" Supdg. Engineer, Third Circle.
" Examiner, P.W. Accts.

18

Public Works (189 8) Department.

CURRENT No. ~~4082~~ 3939

From The Superintg: Engr
3rd Circle
Bellary

Order

No. 219

Dated 26 - 4 - 98

Received 29 - 4 - 98

Registered 5 - 5 - 98

Enclosures

Spare copies

SUBJECT.

Hubbenkerra tank

Requesting sanction to an allotment of Rs 2000 for repairs to the tank

FE

Dept. to report for opl.

Rejd

Loes 28/4/98

28/4/98

E. I. Form No. 1—500—1-11-97

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

Copy of letter from H. E. Clerk Esquire Exec: Engineer Bellary Division to the Supt.g Engineer 3rd Circle No 3009 dated 13th April 1898.

In G. O. No 1173 dated 10 February 98 communicated with your No 6660 dated 16 February 98, a sum of Rs 800 had been allotted for expenditure on Repairs to Kuppenkera Tank. The actual outlay to end of March 98 against the above grant is Rs 706, leaving a balance of Rs 94 unspent.

2. A revised Estimate for Rs 2670, for the work is under check in my office. To admit of the work being continued and completed, I would request that an allotment of say Rs 2000, may be obtained and the same communicated to me on an early date. The revised Estimate will be submitted for sanction shortly.

(Copy)

No.

No. 2191 of 26 April 1898

Submitted to the Chief Engineer for Irrigation with a request that he will be good enough to sanction the allotment now applied for by the Exec: Engineer.

14/4/98 Subdg Engineer

M Circle

CHIEF ENGINEER. FOR IRRIGATION. 28 APR 1898 No.